

CRIME OBSERVATORY HANDBOOK:

CONCEPT, DESIGN, DEVELOPMENT, AND IMPLEMENTATION

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CONTENTS



- 1 Introduction 7
- 1.1 The Importance of Crime Observatories..... 7
- 1.2 Crime Observatory Operations 9
- 2 Establishing a Crime Observatory..... 12
- 2.1 The Initial Planning Phases 12
- 2.2 Initial and Long-Term Funding..... 16
- 2.3 Identifying Data Sources and Needs 17
- 2.4 Practical Considerations for Establishing a Crime Observatory..... 21
- 2.5 Requirements for Hardware/Software/IT Infrastructure..... 22
- 3 Data Sources and Key Variables..... 28
- 3.1 The Brief History of Crime Data..... 28
- 3.2 Establishing a Crime Observatory..... 28
- 3.3 Acquiring Data..... 28
- 3.4 Choosing Crime Indicators 30
- 4 Data Acquisition, Preparation, and Analysis..... 39
- 4.1 Data Acquisition..... 39
- 4.2 Processing and Preparing Data 40
- 4.3 Analyzing Crime Data..... 41
- 4.4 Analyzing GIS Data..... 44
- 5 Communicating and Translating Results..... 56
- 5.1 Crime Observatory Influence on Strategic Decision Making 56
- 5.2 Translating Results to Decision Makers..... 59
- 5.3 Final Comments 62
- References 63

CHAPTER I INTRODUCTION

CRIME OBSERVATORIES, IN THEIR MOST GENERAL SENSE, ARE ORGANIZATIONS THAT GATHER, ANALYZE, AND REPORT DATA RELATIVE TO CRIME WITH THE INTENT OF SUPPORTING CRIME PREVENTION ACTIVITIES.

This guidebook was written to provide a single source of information to help support standardization of observatory development, to identify the main functions of crime observatories, and to provide concrete and specific examples in the hopes that crime observatories will continue to grow in number and capability.

I.1 THE IMPORTANCE OF CRIME OBSERVATORIES

Crime observatories, in their most general sense, are organizations that gather, analyze, and report data relative to crime with the intent of supporting crime prevention activities (Prince, Ferland, & Bruneau, 2009). A crime observatory is typically a public organization that contains people, hardware, software, and physical space. These organizations can be local, regional, national, or international in focus and can be broad-reaching in terms of crime and public safety or be focused on “one of several thematic fields” (Prince, Ferland, & Bruneau, 2009, p. 5).

Developing a crime observatory can be an important step in the crime prevention planning process. As such, crime observatories offer a promising approach for developing information on the prevalence and nature of crime, analyzing trends in crime, evaluating the impact of crime prevention activities, and ultimately reducing crime and improving safety.

Crime observatories may be established by a variety of different entities, including governmental and nongovernmental organizations. While many observatories are focused on a particular municipality or jurisdiction, other observatories collect, analyze, and disseminate information on a national level. The type of organization involved in establishing a crime observatory can have major implications in terms of overall mission and planning, access to data, analytic emphasis, and the ability to influence responses to crime. There are also differences in resources and capacity to establish a crime observatory. Some

observatories represent multidisciplinary teams with support staff while others may have only one or two individuals with limited access to technology (Prince, Ferland, & Bruneau, 2009).

Because crime observatories are a relatively new concept and the development of observatories (even the definition of what an observatory is and what it should do) are evolving, there is little standardized, comprehensive information available to those who wish to investigate the development of a crime observatory or those who are actively developing a crime observatory.

This guidebook was written to provide a single source of information to help support standardization of observatory development, to identify the main functions of crime observatories, and to provide concrete and specific examples in the hopes that crime observatories will continue to grow in number and capability. Included is guidance on how to implement an observatory from an institutional point of view; the type of physical space, staff, and information technology equipment that might be needed; and practical examples, including tutorials and other job aids.

The guidebook is intended as a useful tool for those establishing new observatories and for those who want to maintain or enhance existing observatories. First, it is helpful to understand a little history about how the demand for crime data has evolved and how this process has contributed to the development of crime observatories.





CRIME DATA, CRIME PREVENTION, AND CRIME OBSERVATORIES

Governments, law enforcement officials, and the public in general have long been interested in better understanding the dynamics of crime. The first known attempt to compile crime statistics on an international level occurred at the General Statistical Congress held in Brussels in 1853. Two decades later, there was another major effort at the 1872 International Congress on the Prevention and Repression of Crime in London. Efforts to standardize definitions stifled these earliest attempts, and the matter did not resurface until 1948 when the United Nations' Economic and Social Council (ECOSOC) urged the Secretary General to begin maintaining a database on international crime statistics. In practice, though, reliable international crime data did not become available until the 1970s (UNODC, 2012). Annual international crime data from the United Nations did not become available until 2009.

Similarly, concerted efforts to obtain national, state, and local crime data around the world have been confounded by differences in legal statutes, a lack of resources and available technology, and in some cases, the political will to make crime data a priority. However, the demand for

crime data has evolved parallel to shifts in emerging policing strategies. Approaches to policing and formal social control around the world have historically taken many different forms. During the mid-twentieth century, this began to change, particularly in the Anglo-Western world, as models of traditional policing became more homogeneous. These policing systems tended toward paramilitary organizational structures characterized by reactionary calls for service (Garland, 2001). In this scenario, crime data were low priority and the main purpose was to justify continued resource allocation. In the last two decades or so, these traditional models of policing have begun to evolve in response to problem-oriented policing (POP), community-oriented policing (COP), broken-windows or zero-tolerance policing, intelligence-led policing (ILP), reassurance policing, and more recently, security and counter-terrorism policing (Oliver, 2006). These contemporary policing models include a focus on proactive policing, a reliance on community partnerships and cross-agency communication, and a dramatic increase in the use of crime data to drive social policy (Klofas, Hipple, & McGarrell, 2010). Given this evolution, the collection and analysis of data by crime observatories is particularly important in informing decision making about policing strategies and crime prevention programs.

AUDIENCE

The primary audiences for this guidebook are staff, collaborators, and other interested parties who are actively involved in or responsible for the development of a crime observatory. The material included in the guidebook is focused on presenting practical tools, sample forms, job aids, and examples to support this audience.

Other audiences who may benefit from the guidebook include managers and administrators of government institutions who, while not directly responsible for the creation of an observatory, may be involved in supporting an observatory. This audience may include police administrators, prosecutors, citizen groups, nongovernmental organizations, forensic specialists, and public health officials.

Data analysts, both crime analysis specialists and geographic information system (GIS) specialists, will benefit from the guidebook by providing the larger context for a crime observatory and by furnishing examples of analyses, computer-based tutorials, and information about the challenges of managing and analyzing the various sorts of data to be used in a crime observatory.

Decision makers and policy analysts will benefit from the guidebook by understanding what a Crime Observatory can and cannot do and better understanding what types of analyses a Crime Observatory can perform to support policy and decision-making roles.

I.2 CRIME OBSERVATORY OPERATIONS

A Crime Observatory should be a focal point for data sharing among multiple agencies that have responsibility for crime prevention. It is a place to establish the capabilities to more fully analyze crime and crime-related information than may be possible from within a single public agency. It supports transparency by being independent of particular agencies whose response to crime and activities of crime prevention are not trusted by the public. It has the expertise and institutional mandate to provide information to the public and to ensure that the public can form opinions about the quality and completeness of the data and data analysis products.

In addition to providing the capability of communicating data and analysis of the current crime status, an Observatory also provides a mechanism for coordinating and measuring the outcomes of policies, resource allocations, and community-based crime prevention activities. In this role, the Observatory represents a neutral partner in helping assess the success of investments in crime prevention and supports government institutions in understanding what is working and what is not working.

A Crime Observatory can also play a key role in identifying and understanding emerging problems and issues that might be overlooked by agencies that are focused on a single mandate rather than on a holistic examination of many types of data that provide overall pictures of crime.

ORGANIZATIONAL SETTING

Crime Observatories should be seen as independent, neutral organizations within government. Sometimes, public distrust of government institutions leads to the development of Crime Observatories, and therefore, the Crime Observatory should be established as an independent organization not located within the police depart-

ment or other judicial organizations whose performance may be highlighted by the observatory.

If the Crime Observatory must be located or managed by a police organization or other municipal government agency, strategic actions should be taken to ensure that the public has confidence that the work of the Crime Observatory is unbiased.

STAFF

A Crime Observatory does not need a large staff to accomplish its mission. The key staff roles are as follows:

MANAGER/DIRECTOR: This individual is responsible for the Crime Observatory. He or she should be a skilled administrator who can work within a multi-agency setting to manage staff, create priorities for observatory operations, and handle day-to-day tasks involved in running a data-driven analytical organization.

CRIME PREVENTION MANAGER/COMMUNITY POLICING EXPERT:

This person who understands the community, its problems and challenges, and the civil and political organizations that have a stake in reducing crime.

CRIME ANALYST: This is an employee who understands the basics of crime analysis and can carry out a variety of analytical tasks from basic to moderate complexity.

GIS ANALYST: This staff person should be knowledgeable of GIS technology and spatial analysis.

ADMINISTRATIVE SUPPORT: This critical role should be filled by staff with the capacity to fulfill the administrative duties of the Observatory.

Additional, optional staff may include Crime Researcher, GIS technician, Web developers, and database developers.

PHYSICAL SPACE

Crime Observatories will generally not need a large physical space. An office for the director and perhaps for the Crime and GIS analysts and workstations for administrative support staff are adequate. A conference room equipped with a teleconferencing phone, video projector, and whiteboards are necessary for internal and external meetings/presentations. Finally, space for information technology (IT) equipment, including computers, printers, and large-format plotters, should be provided.

HARDWARE AND SOFTWARE

Crime Observatories can be successful with basic investments in computer hardware and software. Initially, most Crime Observatories will start with desktop or laptop computers for each staff member, a central file or database server to store and manage data, a data backup system, power backups, printers, a large format plotter for the production of GIS maps, and perhaps a scanner.

Software necessary for the operation of a Crime Observatory includes basic word-processing, spreadsheet, and presentation tools, a database application to store and manage data, desktop GIS software to create maps and perform GIS analyses. More advanced Crime Observatories might include web-servers and web applications, statistical software, and server-based GIS tools. The choice and cost of software is extremely variable. Organizations that wish to save on software licensing costs may be willing to use Open Source technologies for operating systems, analysis tools, Web-based development, database technology, and GIS. This guidebook will provide greater detail on these components.

ESTABLISHING A CRIME OBSERVATORY

THIS CHAPTER PRESENTS THE FUNDAMENTALS OF ESTABLISHING A CRIME OBSERVATORY AS WELL AS RECOMMENDED STEPS FOR BUILDING ON AND IMPROVING CRIME OBSERVATORIES THAT ARE ALREADY UNDER WAY.

ORGANIZATION OF THE GUIDEBOOK

Every jurisdiction seeking to develop a crime observatory faces unique challenges and opportunities, and this handbook cannot address every scenario. However, some common planning strategies are useful to consider when establishing a crime observatory. The guidebook is divided into five chapters. Chapter 1 offers an introductory overview of the relationship between crime data, crime prevention, and crime observatories. Chapter 2 discusses how to establish a crime observatory, with considerable attention given to the capacity differences between communities that may seek to implement an Observatory. Chapter 3 addresses issues related to data, including possible sources and the most important measures and indicators. Chapter 4 offers an array of possible analytical strategies using geospatial techniques, and Chapter 5 provides recommendations about how to present data analyses in a format readily accessible by decision makers.

2.1 THE INITIAL PLANNING PHASES

As discussed previously, crime observatories vary significantly in the level of staffing, the resources available, and the availability of technical expertise, software, and equipment. Regardless of the specific situation, establishing a crime observatory, whether at the national or local level, requires substantial amounts of planning. During the initial planning phase, one of the first tasks is to conduct background research on crime observatories to establish the observatory's key objectives and mission. In addition to the thematic focus of the observatory (e.g., crime-specific focus versus "all-crimes" approach), crime observatories may also have different needs and priorities for how data and associated analyses will be used by partnering agencies. In some instances, the mayor's office, city council or other coordinating bodies may use information from the observatory to establish new priorities and to evaluate performance over time. In contrast, other jurisdictions may utilize the observatories mainly as an analytic resource to provide factual information and awareness about crime.

Besides this guidebook, there are a number of specific resources that may be helpful to consider. The list at the end of this chapter provides some useful suggestions, but new sources are created regularly. We also recommend that interested parties review the relevant literature related to problem-oriented policing. One of the most useful resources on this concept is the monograph by Clarke & Eck (2005), entitled *Crime Analysis for Problem Solvers* in 60 Small Steps and published by the U.S. Department of Justice. Updated publica-

tions occur frequently, so keep checking for new materials.

A second task during the initial planning phase is to identify local key partners and stakeholders who should be involved and invite them to learn more about the concept of crime observatories. Next, schedule meetings to share ideas about the utility of crime data. These meetings should include discussions of the local political and economic context in order to anticipate possible barriers to implementing the observatory. This group should work to fully understand the current crime data situation.

The group should also strategize about specific local benefits that might result from establishing a local observatory. Consider developing a list of objectives for the future crime observatory and be as specific as possible. These objectives will become important talking points as the plan moves forward. Below are some key points that might be helpful to consider in developing the objectives.

Establishing a crime observatory will accomplish the following:

- Create a centralized and trusted source for crime data.
- Standardize local definitions for criminal offenses that are consistent with national standards (if any exist).
- Develop the capacity to identify and monitor crime patterns and trends.
- Utilize crime data to proactively reduce and prevent crime.

- Monitor and evaluate violence prevention programs to determine effectiveness and to improve future program outcomes.
- Create a research-based platform for developing recommendations to improve crime prevention efforts.
- Maximize the use of limited resources.
- Promote transparency and accountability.
- Encourage cross-agency collaboration.
- Provide quality information to consumers of crime data (i.e., general public, media, researchers, policy makers).

One of the next steps should involve drafting a plan for implementing a crime observatory. While the details are important, we recommend that individuals not be distracted by seemingly insurmountable problems at this point. The main goal is to create a product that can be shared with others and refined over time. As the project gains support and participation from key partners and stakeholders, these obstacles can be addressed.

The amount of time required in the initial planning stage could take months. The amount of planning time varies so widely because of differences in the composition and effectiveness of planning teams, available resources, political pressures, and a host of other concerns. The teams can help mitigate these delays by seeking a broader base of support in the community.

FORMALIZING PARTNERSHIPS

Seeking support from key stakeholders is critical for the success of crime observatories that are built in large part around national, state, or local government agencies as the primary data providers and users. Every observatory area has certain agencies and key persons that must be involved in order for the project to be implemented

successfully. Law enforcement agencies are perhaps the most important. It is difficult to imagine a scenario whereby a local crime observatory would be successful without the strong involvement of law enforcement. Conversely, it is nearly as unlikely that a crime observatory could be implemented without significant input from other agencies such as forensics, public health, and key community groups involved in violent prevention and awareness. The initial planning team must strategically recruit participation and support from all of the key decision makers to ensure success. Furthermore, the interests and needs of different agencies and stakeholders should be considered during this planning process. If the crime observatory can identify specific ways to address the specific needs of a range of stakeholders, it will increase the likelihood of continuous data collection and the more complete integration of data analysis with strategic decision making over the long term.

The first step to securing participation from key stakeholders and agencies is to ensure that they understand how crime observatories are beneficial to their agency. The planning team must be able to clearly articulate the benefits of the project. Of course, the team will need to be prepared to field questions about any requirements for agency participation (e.g., the types of data that will be requested from agencies) and the costs of the project. It would be best if your plan included some explanation of start-up costs and ongoing maintenance requirements. Sometimes, it is possible to leverage influence from one willing partner to promote participation of a more reluctant partner, although this strategy involves political risk. Be ready to share examples of similar jurisdictions who have demonstrated success using a crime observatory approach.

The most successful crime observatories have committees or councils to guide and design development. A formal written

commitment from each of the key agencies is central to the functioning of this cross-agency council. Memorandums of Understanding (MOUs) are especially helpful. An MOU is a written compact between two or more partners that describes an agreement and defines responsibilities and resource commitments of each agency. Normally, these agreements are not legally binding, but they do serve to hold agencies mutually accountable to each other. One of the benefits of these agreements is that agency directors often have the discretion to form these alliances without any sort of legislative process.

Normally the agreements will include a statement that specifies each partner's commitment to participate. This might include such things as access to data, human resources, office space, and equipment sharing. The agreement should also specify how often the council will meet and which representative(s) will be assigned to participate. It is important that the council participants be empowered to make decisions on behalf of the agency or department they represent whenever possible; the council needs the participation of agency-level decision makers.

The cross-agency council must agree on governance and has flexibility in how this can be structured. At a minimum, the council members should agree on which agency or person will be responsible for coordinating the meeting agendas and when and where the group will meet. Ideally, the council could eventually consolidate resources and hire a coordinator to perform administrative tasks.

ESTABLISHING A MISSION STATEMENT

Developing a common understanding about what the priorities of the council are will be a challenge as some agencies may have conflicting roles. The council can



choose from several paths. One strategy is to summarize the goals and objectives of the council into a mission statement and/or a vision statement. Some may instead develop a vision and mission statement first and then develop goals and objectives. Either approach can be effective. Undertaking these activities should help to make the group more cohesive and clarify the roles of the participants. It is important to understand the differences between vision, mission, goals, and objectives.

A vision statement is an expression that captures what the council would like to accomplish as a result of the project. Such a statement is forward thinking and often represents an idealized future outcome. For example, the council might decide that the vision statement will be "Make the World Safe." By contrast, a mission statement emphasizes the fundamental process that the vision statement will be accomplished. The mission statement for the same council might be something like "using data to help predict and prevent criminal activity."

Goals and objectives are interrelated. Goals without objectives are impossible to achieve; objectives without goals will fail to move the project forward. Goals are statements about what the council wants to achieve. Objectives are concrete statements about how to meet the goals. Goals are more flexible whereas objectives need to be linked to action items that specify how the group plans to reach the goals.

The council should regularly revisit the vision, mission, and goals of the project, and assess how well the objectives are achieving the goals. Effective oversight and monitoring can help accomplish this.

OVERSIGHT AND MONITORING

Involving an independent person, group, or agency to monitor and oversee the activities of the council is recommended. Some councils may be able to enlist the services of a paid external evaluator to provide these services while others will not. Locating a qualified and objective person or agency to perform this task is essential. A good starting place to look for an evaluator is the local colleges and universities in the area. If none are available, seek qualified support within the partner agencies. Often, larger agencies have staff that can fulfill these roles. An interdepartmental team of people drawn from the partner agencies could also be effective. Preserve the integrity of the oversight by ensuring that the oversight team has the freedom to report back to the group objectively.

PUBLIC RELATIONS AND COMMUNICATIONS

Establishing a crime observatory is important news to share. Members of the public, agency employees, possible funding sources, policy makers, private business leaders, and others want to know how the crime observatory will affect their lives. More

specifically, they want to know what law enforcement is doing to make their communities safe. Among the challenges involved in sharing this information is connecting the messages the crime observatory wants to share with those who want to know at the right points in time. While transparency is nearly always appreciated, releasing facts and figures based on the newly available crime data is a sensitive matter and should be done cautiously.

As the plans to establish a crime observatory become more concrete, consider establishing a public relations plan. The plan might include hiring a public relations firm or establishing a communications subcommittee made up of partner agency representatives. This subcommittee is responsible for anticipating the informational needs of the communities the crime observatory serves. Strategic messages can help build awareness of the crime observatory and further solidify support for the project. Beware of scheduling open house events and other special announcements before the project is ready to be unveiled. Event cancellations and other failures to meet publicized milestones undermine the credibility of the entire project.

Crime observatories will not alleviate all crime and, unfortunately, victims will continue to be affected. Plan for the worst-case scenario and insulate the crime observatory from undue criticism. Because crime observatories deal with human behavior, predicting crime is an emerging and somewhat imprecise science. The public relations subcommittee should develop a contingency plan for responding to extreme criminal events. The committee is responsible for educating crime information consumers about the potential benefits and limitations of what the crime observatory can achieve.

2.2 INITIAL AND LONG-TERM FUNDING

Establishing and maintaining a crime observatory requires significant financial resources. Perhaps the main indicator that the initial planning and design phase has been successful is securing the necessary funds to begin implementation. Budgeting and the allocation of resources should be an ongoing component of all aspects of the project design and tasks. The council should constantly question how various aspects of the crime observatory will be supported and sustained financially. This section offers some suggestions about how to do this.

IMPORTANCE OF SUSTAINABILITY

The work of a crime observatory is inherently longitudinal. Analysts seek to collect data related to criminal behavior over time and use it to identify patterns, predict future occurrences, and strategize about how to respond. To maximize the utility of a crime observatory, the data collection and analysis must be ongoing. Sustaining an observatory requires a commitment from all of the key players, and this must be emphasized from the beginning.

INITIAL FUNDING FROM OUTSIDE SOURCES

Some areas may not feel they have the necessary funds to help plan, design, and launch a new crime observatory. While there are some creative strategies to apply for and secure external support to help offset some of the initial costs, these opportunities are uncommon and should not be the sole strategy for obtaining support. Here are some examples of how various communities have secured funding:

- In Juárez, Chihuahua, Mexico, municipal authorities partnered with civil organizations, a local university, and state and federal government agencies to declare crime a public health concern. Together, these agencies were able to maximize

the use of limited resources to establish the Security and Community Coexistence Observatory (*Observatorio de Seguridad y Convivencia Ciudadanas*).

- In Colombia, the National Network of Crime Observatories (*Red Nacional de Observatorios del Delito*) is a set of public entities and private organizations assembled under the leadership of the Center for Criminological Investigations (*Centro de Investigaciones Criminológicas – CICRI*) of the National Police. All of the observatories in the network are involved in monitoring, evaluating, and analyzing crime data with the intention of sharing this knowledge and practices with the members of the Network, territorial entities, and other interested organizations.

- In February 2003, the Guatemalan government passed legislation, Law N° 27933, which created the National System of Citizen Security (*Sistema Nacional de Seguridad Ciudadana*). As part of this law, a Citizen Security Council was established, which included regional, district, and local subcommittees formed to address issues of crime and delinquency. The Observatory for Citizen Security was thus formed.

These examples demonstrate the diversity of approaches that have been used to form observatories. There are many others. Research these models and explore creative strategies for establishing a new observatory.

TRANSITIONING TO LOCAL SUPPORT

Some groups, perhaps unfamiliar with how external support normally functions, may perceive that all of their financial concerns are alleviated once they secure external support. This is not true. Accepting external funding normally includes a requirement to plan for sustainability by eventually absorbing the costs to maintain the observatory. As mentioned above, budgeting for the future is an ongoing activity with constant monitoring and oversight directing priorities. Securing external funding should intensify the council's resolve to make the observatory permanent by incorporating the costs of operations into the local budgeting schemes.



2.3 IDENTIFYING DATA SOURCES AND NEEDS

DETERMINING DATA BOUNDARIES

The organizational structure of crime observatories varies considerably. Some countries in Latin America have national-level observatories (e.g., Argentina, Chile, Peru, Uruguay). Others rely on a decentralized model based on analysis at the regional, state, municipal, city, or town level that collect data locally and then feed information to a national coordination center (e.g., Colombia, Mexico). In the decentralized models, it is necessary to define the boundaries of the area that will be considered.

One of the first steps in determining data sources and informational needs is to decide on the scope of the crime observatory. For which geographical area will the observatory attempt to gather data? What areas make sense to include or exclude? For some jurisdictions, these are not simple questions, and the ultimate choices may be politically determined. The cross-agency council should seek common ground on these issues internally before entering into a larger community-wide discussion. Be prepared to defend the council's recommendations with clear and concise points about the areas that will be included.

A few common issues may help guide these decisions. Consider the following questions:

- What areas does the cross-agency council want to include? Is it necessary to include certain geographical areas to secure the participation of certain key members of the council?
- Politically, what areas must be included?
- Are there any unintended economic, social, or cultural consequences of including/excluding an area? Consider these concerns carefully. Because unintended consequences are almost always inevitable, anticipating these concerns can help to offset potential impacts.

- How much data can the observatory really manage? Be careful not to accept responsibility for more work than the observatory can realistically support.
- Do the existing data management systems have the capacity to meet the needs of the observatory? Do not make the success of the crime observatory dependent on another agency's compliance. Can the data partners really deliver the data in a format that can be analyzed?
- Are there any expected shifts in agency policy, legislation, political boundaries, community expansion, or business development that need to be considered? These situations will vary widely.
- Are there any overlapping jurisdictions in terms of law enforcement patrol areas, military bases, or national parks?
- Is the area significantly affected by spillover crime from neighboring jurisdictions? How will the observatory isolate and account for these effects?

The council will also need to assess the availability of data sources and decide whether the crime observatory will consider adult crime only or also include juvenile matters. The availability of other community-level data might also affect the rationale for expanding or retracting the geographical scope of the observatory. This will be discussed in more detail in the following sections.

IMPORTANCE OF QUALITY ANALYSIS

The primary purpose of the crime observatory is to analyze crime data to inform law enforcement command staff and policy makers. As mentioned above, conducting high-quality analysis requires considerable attention to data quality, but the cross-agency council must also emphasize the importance of quality analysis. Developing

the competency to do quality crime analysis requires a substantial investment of time and resources to train staff and provide the tools necessary. Without quality data analysis, the crime observatory will fail to achieve its mission.

Some strategies used by other observatories to promote quality analysis are listed below. Not all of these options are feasible for all observatories.

LINKS TO ACADEMIC UNITS

In Brazil, links to the academic community have been especially helpful in improving the quality of analysis. The Center for Crime & Public Safety Studies (CRISP) is housed within the Federal University of Minas Gerais. CRISP uses crime data, including high-quality mapping analysis, to promote improved criminal justice policy decision making. The Colombia Program, mentioned below, is another example of how crime observatories in Latin America have benefited from prominent relationships with universities and academic centers.

GUIDANCE FROM THE INTERNATIONAL COMMUNITY

A number of respected international organizations have developed recommended standards related to quality data management and analysis. Some of these agencies have developed programs that facilitate analysis activities. Here are a few examples:

- **Inter-American Uniform Drug Use Data System (SIDUC)** – Developed by the Organization of American States (OAS), this system is just one of the tools offered to improve standardization of data collection methods. This multidimensional security agency publishes helpful guidelines on evidence-based policies and scientific research that many crime observatories have adopted (e.g., Argentine Drug Observatory, Chilean Drug Observatory).

- The OAS also supports the **Uniform Drug Supply Control Statistical System (CICDAT)**, a data collection and analysis strategy that emphasizes the use of standardized questionnaires. These systems have promoted interagency collaboration among some nations (e.g., Haiti, Brazil).
- The **Colombia Program** (1998–2008) was the result of an affiliation between the Center for Latin American Studies at Georgetown University located in Washington, DC, and the CISALVA Institute of the Del Valle University in Cali, Colombia. Their work was funded by the United States Agency for International Development. This partnership resulted in the establishment of several crime observatories in Colombia.
- The **Inter-American Development Bank** provided support to Uruguay that resulted in the National Observatory on Violence and Crime. One of the results of this work was the establishment of the Department for Data, Statistics and Analysis, which expanded the capacity of the Uruguayan criminal justice system to diagnose and mitigate crime threats.

INTEGRATED GOVERNMENT-LED/COMMUNITY-BASED APPROACHES

In Colombia, the Cartagena Alliance (Alianza Cartagena) has organized around the theme of improving security conditions for residents and visitors of the tourist district and the cultural centers of Cartagena. Quality crime data analysis in this example emphasizes an interagency approach that includes local government agencies, universities, and community organizations. To learn more about the Cartagena Alliance, visit <http://www.distriseguridad.gov.co/>.

In Mexico, the Observatory for Social and Gender Violence, a municipal-level observatory in Zapopan, Jalisco, was created with

inputs from local, state, and federal government. The data analysis strategy focused on qualitative reviews of newspaper articles, but there was also a heavy emphasis on standardization of elements in official data sources.

CRIME AND OTHER COMMUNITY DATA

Initially, many crime observatories focus on establishing a reliable baseline for crime in their area of focus. The next step is usually to begin to add layers of data from other sources that can contribute to a more complete crime analysis. By adding layers to the data analysis, emerging crime trends, crime "hotspots," and shifting social patterns can be more easily identified. The analysis can be complemented by adding sources of data for comparison as well. The range of data sources is almost unlimited. The list below includes a few possibilities, but others may be relevant as well:

- **Juvenile crime/delinquency data:** Juvenile crime patterns often vary significantly from those of adults. Some jurisdictions may choose to consider juvenile crime data independently from adult information.
- **Housing data:** By including information on public housing, apartment dwellings, single-family residences, etc., analysts may be able to identify important victimization trends.
- **Police patrol areas:** Data analysis can help identify concentrations of crime activity and assist decision-makers in making personnel decisions. Patrol areas and concentrations of criminal activity may not be synchronized. Access to data related to command structure and patrol assignments may be useful in making decisions about how to assign resources.
- **Community corrections:** Knowing where offenders assigned to community correc-

tions supervision reside might be useful in investigations.

- **Census data:** Comparing crime patterns to demographic distributions within the area of study can be particularly helpful.
- **Business/economic development:** Economic trends are useful in forecasting crime patterns as well. An expansion of certain types of businesses (e.g., bars/nightclubs, pawn shops) may be a precursor of economic blight. Additionally, high-traffic economic centers, markets, shopping centers, and tourist destinations may reveal victimization vulnerabilities. An important part of doing crime analysis is understanding what attracts criminals to certain areas.
- **Other community factors:** A wide range of community indicators could be used to refine crime analysis strategies. This could include outlining known gang territories or doing a special analysis of gang-related graffiti, identifying concentrated locations where offenders may congregate (e.g., substance abuse treatment centers, halfway houses, residential treatment centers, jail and prison facilities, squatter communities, and places where homeless persons gather), and determining times of the day, days of the week, special event scheduling, school hours, seasonal cycles, and other considerations of the timing of crime.
- **Historical comparisons:** The ability to compare crime over time is especially informative but in many cases is limited by how the earlier data has been archived.
- **Comparing crime situations in similar settings:** Identifying similar areas to compare crime trends between two sites can be especially beneficial. Securing comparable data sources may be a significant challenge.

2.4 PRACTICAL CONSIDERATIONS FOR ESTABLISHING A CRIME OBSERVATORY

The first half of this chapter is concerned with the larger conception of how to establish a crime observatory. Now, the discussion is shifting to an overview of some of the more practical steps toward actual implementation.

REQUIREMENTS FOR PHYSICAL SPACE

An optimal crime observatory should have a dedicated space. Besides the issues of data security and an office environment that promotes communication, having a dedicated space for the observatory is important for the staff morale, effective management, and the overall credibility of the crime observatory. Factors such as space allocation, lighting, temperature, and office amenities are especially important to office workers. Here are some recommendations regarding physical space.

STAFF OFFICES

Staff will need a place where they can focus on their tasks most efficiently. Normally, this will require three or four office spaces. These include one for the director or supervisor. This person will be the face of the organization typically and will need an office space that is convenient for receiving calls, hosting one-on-one meetings, displaying multiple large maps, etc. The other office spaces can be used for analysts, programmers, and, if funds allow, other support staff.

Some key principles of effective integrated work spaces should be kept in mind. Design the work spaces to meet the functional needs of the users. Think about equitable distribution of the space, access to privacy, lighting, and aesthetics. Maximize the use of the space available by making the office system connectable; that is, promote full communication and simultaneous data access to all employees. This includes reliable access to e-mail and telephone services, necessary hardware and software, and other office

equipment. Plan ahead for power outages and other electronic disruptions, which may cause a loss of data and create unwarranted downtime for staff. Finally, ensure that the space has the necessary climate control to promote employee comfort and protect equipment that may be sensitive to extreme temperatures.

RECEPTION AREA

The crime observatory will attract much interest, and a small reception area is recommended but not critical. In addition to serving as a waiting area for visitors, the area should also serve an educational function. Demonstrate some of the capabilities of the center by adding relevant wall hangings and prepare handouts and make relevant reports available for guests to review. Ordinarily a reception area requires a staff support person to greet visitors.

CONFERENCE ROOM FOR MEETINGS/PRESENTATIONS

Ideally, a conference room with a table and chairs and the ability to host a small meeting of 8-10 people is preferred. A projector for presentations is also recommended. This room could double as a shared work room if necessary.

SPACE FOR PLOTTER AND OTHER EQUIPMENT

One of the principal activities of the crime observatory will be developing maps using a GIS. These maps will likely be produced using a large format plotter which will need its own space. A table for trimming, viewing, and editing maps may also be required.

PHYSICAL LOCATION

Careful selection of a physical location for the crime observatory is important, with some key issues to consider. Site selection is one of the most important decisions in designing a new crime observatory, because the site selected will affect the operations, cost, and appearance of the

new facility. Within budgetary limitations and the availability of space, it is critical to leverage the use of limited resources wisely and to choose the space that meets the goals of the team. Choose a location close to the action. This is vital to reduce travel costs but also to promote collaboration and increased opportunities for interaction with other government professionals. Being visible to those who will fund and need the services of the crime observatory is also strategic. A space near police headquarters and other municipal buildings is a good idea. Avoid being isolated. If the crime observatory is inconvenient and lacks government visibility, it will also likely become less of a financial priority as well.

Consider appointing a site selection committee. The committee should include representatives from the crime observatory, the design team, and the public, as well as other government officials. If committee members represent all perspectives on the project, opposition to a site later on is less likely because concerned parties will have participated in the selection process and will understand why a particular site was chosen.

APPROPRIATE HVAC FOR COMPUTERS

Think about environmental requirements for the new crime observatory and take steps to mitigate risks. For example, if the lab is in an area where flooding is highly likely, are the machines off the floor? Temperature control is also critically important to protect the computer equipment in the lab. Without the appropriate attention to heating, ventilation, and air conditioning (HVAC), equipment may be damaged and data lost.

2.5 REQUIREMENTS FOR HARDWARE/SOFTWARE/IT INFRASTRUCTURE

DESKTOP/LAPTOP COMPUTER FOR EACH STAFF MEMBER

Each staff member will need a desktop or laptop computer to access and analyze crime data.

PLOTTER AND PRINTERS

GIS allows users to create maps using software and electronic data. The software functionality allows a range of different views and color combinations, but most users will one day also want to print a hard copy of their work. To print a large map, most professional GIS laboratories use a plotter. A plotter is essentially a printer that allows vector graphics to be transferred from a computer to paper. To determine which plotter will work best, here are some points to consider:

- **Printing width** – The crime observatory will mostly be printing maps. Typically, people prefer larger maps. Most observatories will need at least a 44-inch (112 cm) plotter.
- **Processing power** – GIS files can be very large, some over 1 gigabyte (GB). Ensure that the plotter has enough processing power to work with especially large files.
- **Internal hard drive** – Choose a plotter with an internal hard drive. This will ensure that print jobs spool to the plotter more quickly and relieve strain on network resources. Hard drives should have 80GB of memory or more.
- **RAM** – Random Access Memory is important, but not as critical as in internal hard drive. As long as the plotter has an internal hard drive, 256 megabyte RAM is usually enough.
- **Pigment Inks** – Maps are usually stored for months and sometimes years. If you use a plotter with regular dye-based inks, then the image will begin to fade rather quickly. Dyes are affected by both

ultraviolet light and oxygen. On the other hand, pigments are fade and scratch resistant. Pigment inks will give you much better quality and durability.

The thing to remember when looking for a GIS plotter is to get something that will perform best for the needs of the observatory. Paying a little more up front may save money later.

SCANNER

Having a quality document scanner is useful. Many companies are now choosing to digitize their files, which has many benefits (e.g., file sharing, physical space savings, better organization). Some scanners available on the market allow images to be scanned that can then be georeferenced. Scanners vary widely in size and the largest floor-based models take up much space. Tabletop models can also be quite large in size. Although recommended by most, a scanner is not a critical piece of hardware.

CONFERENCE PHONE

Having a conference phone is a great way to facilitate communication between many callers at once. Some crime observatories in Latin America invest in these phones, but more often, users are choosing to use Skype or some other group meeting software, or cell phone-based technologies to have multi-party conversations.

INTERNET CONNECTION

In the past, many areas in Latin America have had inconsistent access to the Internet. Reliable, high-quality access to the Internet is essential to establishing a crime observatory. Besides the ability to do information searches, Internet access also allows users to send and receive e-mail, schedule and participate in on-line meetings, and develop Web pages that support the observatory's mission. Wireless Internet

(Wi-Fi) is especially desirable because it allows users to be more flexible in the work place. Wireless network routers can be used to interconnect a variety of electronic devices within the range of the Wi-Fi signal. Wi-Fi has some limitations related to signal strength. Typically, a Wi-Fi signal is limited to a distance of about 32 meters.

PROJECTOR

Most crime observatories will need to make presentations, thus having a projector is a good idea. Projectors have improved dramatically in recent years, but some key factors should be considered when buying a projector. Presumably, most presentations created by the crime observatory will be static data and not videos. With this in mind, the projector purchased probably does not need high-quality video or three-dimensional capabilities. Portability is an issue to consider and projectors now come in a variety of sizes. If the observatory expects to do a large number of off-site presentations, consider a lighter, smaller projector. For a typical MS PowerPoint presentation, a resolution capability of 800 by 600 pixels is generally sufficient. However, since the crime observatory will likely be showing high-quality maps, consider increasing the resolution. In terms of brightness, between 2,000 and 3,000 lumens is probably adequate. Since the laptop computers will likely have HDMI cables, make sure the projector has similar capabilities. LCOS projectors provide the best picture quality but are heavier and more expensive than LCD projectors. LCD projectors are fine for most purposes.

BUSINESS SOFTWARE

Deciding which software licenses to buy is an important consideration when making plans to purchase equipment. The most widely used business software is Microsoft Office, which normally includes Word, Excel, PowerPoint, and Access.

Other aspects of the MS Office Suite that many GIS labs and crime observatories find useful are Publisher and Visio. Often, these software products can be preloaded. Even so, the observatory should carefully manage software load disks and be able to reinstall products, if necessary.

GRAPHICS EDITING SOFTWARE

Deciding on graphics editing software is also important. Adobe Photoshop and Corel PaintShop are two full-featured software choices with a large market share. Gnu Image Manipulation Program (GIMP) is a free open-source tool for graphics editing. Even Microsoft Paint (normally included with the Windows operating system) can be used to alter images and screen captures.

FILE/DATABASE SERVER

Several options are available for managing the crime observatory file and database servers. The most well-known package is probably GeoServer, an open-source server written in Java that is designed for interoperability. MapGuide is another common open-source option that runs on either Windows or Linux and is supported by Apache and IIS Web servers.

BACKUP SYSTEM

The crime observatory will need to develop a written data backup protocol that can be included in the policies and procedures manuals. Backup systems do not need to be super complex to be effective. Disaster recovery and replacing corrupt or damaged files are the main purposes of having a backup procedure. Backups should be scheduled regularly to prevent data loss and system downtime. Deciding which backup plan best fits the needs of the observatory is a function of time, disk space, and vulnerability.

A full backup, one that creates a complete copy of all system and data files into a partition or other dedicated disk, is best. It is also the most time consuming and takes up the most disk space. This should probably be done at least once a week or after any major software update or other upgrade. A great deal of data can be lost in any particular week between backups. For this reason, it is a good idea to do a differential backup of the data more frequently. A differential backup is one that saves only the new information added since the full backup. These are normally done once a day. This is an improvement over the full backup alone because the data files are saved at the end of every day. As the week progresses, the amount of time and space to do the backup also increases.

An incremental backup copies only the new data files added since the last incremental backup. The files are far smaller and can be backed up even hourly. With this strategy, the system never faces the possibility of losing more than an hour of data. Incremental backups reduce the vulnerability to lost data, but the amount of time and effort to complete a recovery of the system may take longer since the incremental data will need to be compiled.

In summary, three options exist and may be used simultaneously. Schedule a full system backup weekly, a differential backup daily, and/or an incremental backup hourly. The full backup takes up more space and may require hours to complete. A daily differential backup reduces the time for backup and the amount of disk space involved, but the risk of data loss is somewhat high since it is done only once a day. An hourly incremental backup takes up less space and requires the least amount of time to complete, but the recovery process is more complicated. Each observatory will need to decide which backup strategy to adopt. In most cases, a weekly full backup and a differential

backup that goes back at least one month should be sufficient.

GIS SOFTWARE

One of the most important decisions regarding software is which GIS software will be purchased by the observatory. Because of the large number of software options and also the differences between users, network system requirements, economic limitations, etc., this section offers a list of GIS software priorities to help in decision making. Consider the following:

- **Vendor training** – What type of training and support does the vendor offer?
- Vendor documentation – Does the vendor offer documentation that can be used to develop written policies and procedures? Is this documentation available online?
- **General software geoprocessing capabilities** – Does the software allow for extracting and aggregating areas to create smaller or larger maps? Does it have the ability to merge map layers and edit spatial and attribute features of the maps produced? Is the system capable of working with the normal standard vector layers (i.e., point, line, polygon)?
- **Geocoding tool** – Does the software include a geocoding tool? Is there a composite address locator? Online address locator?
- **Data importing** – Can data with XY coordinates be imported in one step? Are there online databases that can be shared for your area?
- **Printing** – Does the system have the capacity to produce black and white, grayscale, and color maps?

- **Ease of use** – Take a look at the special joins and queries functions. Are these easy to utilize?

- **Time sequencing** – There are several questions to consider: Does the system offer temporal sequencing? Can these be exported into a file format that is accessible? Can the system track multiple incidents at the same location and different locations for the same incident?

- **Online community** – Are a large number of users online posting questions and answers to bulletin boards and forums?

RECOMMENDED SOURCES ON ESTABLISHING CRIME OBSERVATORIES

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Secretariado Técnico del Consejo Nacional para la Prevención de Accidentes. (2010). *Metodología para desarrollar un Observatorio de Lesiones causadas por el tránsito*. Gobierno Federal de Mexico. Retrieved on July 13, 2012, from www.cenapra.salud.gob.mx.



3.1 THE BRIEF HISTORY OF CRIME DATA

Governments, law enforcement officials, and the public in general have long been interested in better understanding the dynamics of crime. The first known attempt to compile crime statistics on an international level occurred at the General Statistical Congress held in Brussels in 1853. Two decades later, another major effort took place at the 1872 International Congress on the Prevention and Repression of Crime in London. Efforts to standardize definitions stifled these earliest attempts, and the matter did not resurface until 1948 when the United Nations' Economic and Social Council (ECOSOC) urged the Secretary General to begin maintaining a database on international crime statistics. In practice, though, reliable international crime data did not become available until the 1970s (UNODC, 2012). Annual international crime data from the United Nations did not become available until 2009.

Similarly, concerted efforts to obtain national, state, and local crime data around the world have been confounded by differences in legal statutes, a lack of resources and available technology, and in some cases, the political will to make crime data a priority. However, the demand for crime data has evolved parallel to shifts in emerging policing strategies. Approaches to policing and formal social control around the world have historically taken many different forms. During the mid-twentieth century, this began to change, particularly in the Anglo-Western world, as models of traditional policing became more homogeneous. These policing systems tended toward paramilitary organizational structures characterized by reactionary calls for service (Garland, 2001). In this scenario, crime data were low priority and the main purpose was to justify continued resource allocation. In the last two decades or so, these traditional models of policing have begun

to evolve in response to problem-oriented policing, community-oriented policing, broken-windows or zero-tolerance policing, intelligence-led policing, reassurance policing, and more recently, security and counter-terrorism policing (Oliver, 2006). These contemporary policing models share at least three common features: an emphasis on proactive policing, a reliance on community partnerships and cross-agency communication, and, a dramatic increase in the use of crime data to drive social policy (Klofas, Hipple, & McGarrell, 2010).

3.2 ESTABLISHING A CRIME OBSERVATORY

Every jurisdiction seeking to develop a crime observatory faces unique challenges and opportunities, and this handbook cannot address every scenario. However, some common planning strategies are useful to consider when establishing a crime observatory.

3.3 ACQUIRING DATA

The purpose of a crime observatory is to coordinate, gather, analyze, and disseminate crime and violence-related data in order to promote the implementation of community-level prevention strategies and activities.

Fundamentally, a crime observatory is a "data-driven" organization that depends on a variety of data inputs to measure crime, analyze trends, and report on crime status to policy makers. Some crime observatories may be linked directly to an institution (e.g., the police) that collects various types of crime data. In many cases, however, it will be necessary for a crime observatory to collect data from several other organizations as well as the police. For example, the prosecutor's office will have data on crime prosecutions; the judicial office will have data on convictions; the municipal GIS office or other institution will have

GIS background data such as city blocks, streets, police districts, political boundaries, and others. The census agency may have important demographic data from a census to allow crime rates to be calculated.

In some cases, direct approval to disseminate data to the crime observatory from these other organizations may be made on an informal basis. In other cases, formal memoranda of understanding or data sharing agreements may be required to ensure that all parties agree to certain responsibilities and limitations in sharing and using data.

Data absolutely essential to a crime observatory include the following:

- Crime incidents (reports of crime) with date, location, and crime type
- GIS street centerlines and census boundaries or police boundaries.

Many other types of data may be available and required for more advanced analysis and mapping, as shown in **Table I**.

Data will likely be acquired in a number of ways, such as the following:

- Periodic receipt of data tables or spreadsheets containing crime, criminal justice, or neighborhood data
- Direct connection of a crime observatory database system to a database system in other agencies whereby crime observatory data are always up-to-date with the data collected by the contributing agency
- One-time (or very sporadically updated) acquisition of GIS data, including streets, jurisdiction boundaries, and points of interest (schools, clinics, hospitals, parks, etc.).

Each of these modes of acquiring data requires in-depth discussions with the contributing agencies. Discussions should in-

TABLE I: DATA TYPES FOR ADVANCED ANALYSIS

NAME	DESCRIPTION	TYPE
Demography	Counts of persons by age, gender, and/or race. Income, education, employment.	Tabular linked to polygons
Land Use	Division of an area into land use types such as urban, rural, commercial, industrial, or agricultural	Either polygonal, raster, or as a map service
Landmarks	Schools, churches, government buildings, apartment buildings, housing projects	Point locations
Businesses	Retailers, restaurants, bars	Point locations
Vulnerable Populations	Location and population counts of senior centers, day care centers, nursing homes	Point locations
Street Lighting	Coding of certain streets as being lit at night	Tabular linked to lines
Parks	Location of public parks	Polygons
Aerial Photography	Recent, color or black and white, aerial imagery	Raster or as a map service
Hydrography	Lakes, streams, rivers, wetlands	Polygons and lines
Topography	Elevation or contours	Either raster or linear

clude decisions regarding the specific need for each data set or type of data. Collecting data that will not be used is not efficient, but is often the result of skipping the following steps—identifying problems and determining data needed to analyze those problems.

3.4 CHOOSING CRIME INDICATORS

When selecting crime indicators, it is essential to first determine how the data will be used. Proponents of problem solving and problem-oriented policing developed a framework that can be used to address crime and disorder problems (Schmerler, Perkins, Phillips, Rinehart, & Townsend, 2006). The four stages of the model include Scanning, Analysis, Response, and Assess-

ment (**Exhibit I**). This framework assumes that data relevant to crime can be analyzed to inform the most appropriate response to a selected problem. Once a response has been implemented, similar analytic tools can be used to assess whether the response was effective.

Exhibit I. SARA Framework

Scanning	Identifying and selecting a problem
Analysis	Analyzing selected problem
Response	Developing and implementing effective responses to the problem
Assessment	Assessing the impact of the response on the selected problem

The first step, Scanning, may be easiest as a number of problems may come to your attention; however, selecting a limited number of issues to address at a given moment may be more difficult. Unfortunately, all problems cannot be addressed simultaneously, so it is important to prioritize the problems to be addressed first. The focus of the observatory will be a primary basis for problem selection. For example, if the goals of the observatory are primarily focused on violent crime, then a few specific violent crimes should be selected. In addition, data must be available about the problem of interest in order to analyze it. In selecting a problem(s) to address, you should consider these additional factors (Schmerler et al., 2006, p. 6–7):

- Size and cost of the problem
- Presence of life-threatening situations
- Community interest and support for reducing the problem
- Impact of problem on police-community relationships
- Interest and support among police officers
- Potential for progress in dealing with the problem.

After a problem has been selected, Analysis is an essential step in thoroughly understanding the scope and potential causes of the problem. Analysis requires input data, and this is where you should evaluate the data needs of the analysis. For example, if the problem to be analyzed is whether drug crimes near schools have increased or decreased, then it should be determined whether both the drug crime locations and the school locations are readily available. If not, then the data will need to be collected. Once the required data have been collected, the periodic spatial analysis of drug crimes within a given distance of all schools

can be calculated using a GIS, and trends can be plotted. This type of data collection may need to be an ongoing effort.

An effective Response cannot be developed without comprehensive analysis because solutions need to be tailored to the specific nature and causes of the problem (Schmerler et al., 2006). Even with a thorough analysis of the problem, the first response selected may not be as effective as expected. In the case of drug crimes around school, types of responses might include increasing police visibility or police patrols near schools, using undercover narcotics officers in and around schools, or starting drug education programs for students.

Once a response has been selected and implemented, it is necessary to Assess whether it is effectively addressing the problem. The Analysis and Assessment stages tend to pose the greatest difficulties in this four-stage process (Clarke & Eck, 2005, Step 4). Chapters 3–5 of this handbook are devoted to these stages and provide guidance on how to use crime data to both analyze the extent of a problem and to assess responses.

TYPES OF CRIME DATA

A useful way of thinking about data on crime comes from routine activities theory, which states that in order for crime to occur, a likely offender and a suitable target must come together in the absence of a capable guardian (Clarke & Eck, 2005). Data used to analyze a crime problem may come from each of the three major components of crime: the offender, the victim, and the location of the crime. This is clearly illustrated through the inner piece of the crime triangle (Exhibit 2). When analyzing a crime problem, it is important to include each of these three crime components. The outer triangle in the exhibit includes a “controller” for each of the three components, which

may prevent a crime from occurring. For example, the Guardian controller includes people protecting themselves, in addition to police and security officers. Handlers, such as a parent, sibling, teacher, or probation officer, may have some control over the offender’s actions. Finally, Managers are responsible for controlling the behavior of individuals in certain locations; this group would include teachers, restaurant owners, or landlords.

Exhibit 2. Crime Triangle



Source: Clarke & Eck, 2005, Step 8

Information about criminal activity, including that related to the offenders, victims, and locations involved in these events, can be collected from a variety of sources. While some types of data are already collected and maintained by another entity (secondary data), you may need to collect your own data (primary data). Exhibit 3 summarizes some of the data sources that may already be available for analysis and other types of data that might be useful to collect. However, most crime data originate with law enforcement agencies, which record information about arrests, citizen reports, calls for service, and crime incidents. Due to the difficulty in measuring crime, it is important to use multiple types of data (to the extent possible) to completely and accurately assess the nature and level of criminal activity in a community.

Exhibit 3. Data Sources

Secondary Data	Police department data <ul style="list-style-type: none"> • Arrests • Crime reports and calls for service • Incident details • Gun seizures Hospital and epidemiological data
Primary Data	Community resident surveys Victimization surveys Environmental surveys

One of the most basic indicators of crime is the number of arrests made by a police department for specific crimes. Frequently, some information about the arrestee (e.g., age, race, sex) is also recorded. This type of data can be useful in assessing the demographic characteristics of offenders. However, while arrests represent an important measure of crime, changes in the number of arrests over time (or differences between communities) may reflect changes or differences in police policy or priorities rather than the actual level of criminal activity. For example, an increase in the number of drug arrests may simply reflect the success of a recent drug sting operation as opposed to an increase in the actual amount of drug trafficking taking place in the community.

Citizen reports, also available from law enforcement agencies, can be used to supplement data on arrestees by providing a measure of the number of crimes known to the police, regardless of whether the offender was indeed apprehended and arrested. When an individual is victimized or witnesses a crime occurring and subsequently reports the crime to the police, a police report may be generated. Similar to arrest data, changes in citizen reports over time (or differences between communities) do not necessarily reflect changes in victimization rates, but rather may be influenced

by the public’s willingness to report crimes to the police. For example, after embracing community policing strategies, a police department may see a rise in the number of crimes reported simply because of an increase in the public’s trust in the police and subsequent willingness to report such incidents. Additionally, not all citizen reports of criminal activity result in an official report. However, law enforcement agencies may also maintain data on **calls for service**, which include resident calls that did not result in an official report, such as noise violations, public disorder offenses, and drug activity. Examining calls for service can provide a more complete picture of criminal and other suspicious activity noticed by local residents. Both citizen reports and calls for service may include information about all three components of a crime: offender, victim, and place.

Although tabulating the number (and rate) of arrests, citizen reports, and calls for service can provide some basic information on the nature and extent of a community’s crime problem, more detailed information on each **crime incident** known to the police can be useful to provide more contextual information about crime that occurs in a community. Data on crime incidents may include details such as type of offense, location of incident, date and time the incident occurred, characteristics of the victim(s) and known or suspected perpetrator(s), and other circumstances, such as the identification of an incident as involving gangs or weapons. Information on the location and time of crime incidents can be used to inform the most efficient allocation of resources. For example, more officers may need to be assigned to high-rate neighborhoods and specific locations (crime hot spots). Incident data can also be used to examine whether certain areas have high rates only for certain types of crimes or at certain times of day. Victim profiles (including age and sex) can be developed to de-

scribe the types of persons most commonly victimized for certain types of offenses. Given the detailed information that may be included in incident reports, analyzing this data can directly lead to improved targeting of crime prevention programs and police intervention.

While arrests, crimes reports, and calls for service are the most common police department data used to analyze crime, police may be able to provide other data sources useful for certain crimes (Bynum, 2001). For example, a department may keep specialized databases about **gun seizures**, which would be useful if firearms were a prioritized problem to address. The observatory should inquire about all types of data maintained by law enforcement to determine whether these other data sources are available.

Additional data on crime victims of homicides and violent deaths, traffic-related deaths, and other suspicious death may be collected from **hospitals or epidemiological databases**. These medical sources may reveal additional victim data that were not reported to the police. For example, the hospital may be able to provide data on gunshot victims, including when and where the shooting took place as well as whether the patient survived.

Secondary data provided by law enforcement and other criminal justice agencies is not the only source of information about crime. Primary data collection, when feasible, may be an important supplement to data on crimes known to the police.

Community resident surveys can be used to collect information on residents’ perceptions of the community, specific problems in the community, and responses to problems. They can also be used to assess whether residents trust the police. **Victimization surveys** can tap into criminal activity that was not reported to or witnessed by law enforcement. This can include informa-

tion about rates of victimization as well as reporting behaviors, which may lead to an improved understanding for why citizens participate or do not participate in the judicial process. These types of surveys have the capacity to answer questions that cannot be examined with official police data, such as (1) why crime victims in some neighborhoods are more or less likely to report crime to the police than in other neighborhoods, and (2) how perceptions of the police vary across neighborhoods. Further, a series of surveys can be used to assess whether certain initiatives are having any recognizable changes in citizen perceptions or actions in targeted communities. However, surveys are dependent on residents’ ability to accurately recall such incidents and their willingness to truthfully report them.

Environmental surveys can provide information about the location of criminal activities that cannot be obtained from other methods. These surveys are relatively straightforward to conduct and typically include a checklist to measure characteristics of an area, such as building types and uses, lighting, physical condition of the area, and street patterns (Bynum, 2001). The result is a systematic assessment of the physical environment of the selected area, which can be used to assess how its features may contribute to crime and disorder (Bureau of Justice Assistance, 1993).

ASSESSING CRIME DATA QUALITY

Crime data analysts know that the quality of the analysis is dependent on the condition of the raw data. The adage, “garbage in, garbage out,” definitely applies to crime data analysis. If the quality of the data is poor, both the reliability and validity of the analysis will suffer. Data quality is a critical matter.

Research data are either primary or secondary. Primary data refers to information observed or collected directly whereas secondary data is information that was collected by another, often for a purpose other than the current one. The crime observatory is dependent on information collected by other agencies. Proper preparation and organization of secondary data are essential and must be well planned and managed. Some steps to help guide this process are listed below:

- Become familiar with the data sets and obtain any and all documentation that describes the database and data fields. Know all of the attributes of the data and be able to explain how definitions have evolved over time. For example, if the local law enforcement agency began capturing information on a certain crime only recently (e.g., methamphetamine production), the crime observatory should know this.
- Learn the source database structure and ensure that critical pieces of information are not inadvertently omitted from obscure tables. It is important to understand how the data are input, stored, and accessed by the source agency. Knowing these details will provide information that will be helpful in future analyses. Be concerned about referential integrity and double-check to make sure that relationships between tables remain consistent.
- Review the data for missing cases and other data anomalies that might disrupt the data conversion process. This could include a number of potential concerns: logical inconsistencies (e.g., dates outside of reasonable range), attribute accuracy (e.g., attributes undefined, missing or extra attribute codes), field-type conversion problems (e.g., numerical data captured as string), etc.

- Anticipate free-form or text field entry problems. Unbounded data fields that allow free-form text to be entered can be a nightmare for data analysis. In the context of crime data, this is most often seen in the names of offenders, addresses, and charge codes. Misspelled words and nonstandard reporting schemes may complicate import steps and will most assuredly make the analysis more complicated.

One of the beneficial consequences of the development of the crime observatory is that the agencies agreeing to provide data for analysis will have an opportunity to have their data system assessed by external reviewers. This provides agencies with an opportunity to make strategic improvements in local data systems but also creates a time of heightened anxiety as the primary source agencies are vulnerable to criticisms. Be sensitive to these concerns. The goal at this point is to improve data quality and improve the crime analyses.

Encourage the use of standardized code tables to promote referential integrity. Establishing a common charge code table is a great place to start and could be an excellent strategy for the observatory to have a meaningful impact early in the project. Gather all of the charge code tables in use by the various agencies. Collapse these into common categories, remove obsolete charges, and add any new ones. Use of a common charge table will improve data quality. Consider taking similar steps to standardize municipal, district, city, town, community, ejido, colonia, cuadro, barrio, street, and/or manzana tables. Also, tables including information about agency names can be standardized to further promote data quality.

Promote the use of internal quality controls at the agencies that provide data. This could include both manual and digital tools to

find and correct data that meet quality and format specifications. The crime observatory can also help guide agencies to take steps to validate their data. These steps toward quality assurance can be empowering for agencies. One of the many ways to do conduct quality assurance checks is for the source agency to periodically and systematically review a sample of all cases on a regular basis.

CRIME DATA VARIABLES

Crime incident data may be available in a number of forms and formats. Usually, the source of crime incident data will be the police. They may be able to provide direct connection to their database containing crime incidents, or they may produce regular exports of their crime incident data for use by the crime observatory.

The observatory should work with the police to determine a suitable format for and content of the exported data. Usually, a spreadsheet format provides the most flexibility. The crime incident data content should almost always include the following:

- Unique identifier
- Date of the incident
- Time of the incident
- Location of the incident (either an address, a cross-street, or a latitude/longitude coordinate)
- Crime incident code to indicate the type of crime that occurred
- Crime incident description.

With the above fields, a large variety of useful analyses can be performed on the data. They are essential.

TABLE 2: EXAMPLES OF ANALYSIS REFINEMENT

VARIABLE	DESCRIPTION	USE
Victim's sex	A coded value indicating the sex of the victim	Identify gender-based crime patterns
Victim's age	A coded value indicating the age of the victim	Identify patterns of juvenile crime or other age-based crime patterns
Domestic violence	A code to indicate whether the incident includes a domestic violence component	Seek patterns of domestic violence crime.

TABLE 4. GEOCODING PROCEDURES USING LOCATION DATA

VARIABLE	USE
Identifier of a police district, neighborhood, or other boundary type	The identifier of the district, or neighborhood, provides a link to a geographic boundary file. Summary statistics can be generated along color-coded maps by district or neighborhood.
Street intersection or cross street	GIS geocoding software can be used to generate a latitude/longitude based on the location of two cross streets. The result is a latitude/longitude coordinate for the point. This process allows for a variety of GIS analysis on the crime incident locations.
Complete incident street address	This geocoding process would assume that the street centerline GIS file contains low and high address ranges along each street. Geocoding of a street address that includes a building number and street name can be done in the GIS software. The result is an interpolated location along a given street.
Complete incident street address	If the local GIS data includes polygon boundaries for each parcel and the incident street address includes the identifier for the parcel, then a direct match from the incident to a building can be performed to derive the location of the incident.
Latitude/longitude coordinate	In some cases, crime incidents will be reported with a GPS-based latitude/ longitude coordinate. This would be the case when cell phone, mobile computer, or tablet-based reporting is employed. In these cases, no further geocoding processes are required.

TABLE 3: SAMPLE CHARGE CODES

CODE	DESCRIPTION
1	Murder and Non-negligent Manslaughter
2	Forcible Rape
3	Robbery
4	Aggravated Assault
5	Burglary
6	Larceny-theft
7	Motor Vehicle Theft
8	Arson

Additional valuable data fields are often included with crime incident data. These additional fields provide data that allow the analyst to perform more detailed or refined analyses, as shown in **Table 2**.

Crime incident codes are important to clearly track the specific crime perpetrated. Without a coding scheme, the crime incident data will be inconsistent and difficult to assess and analyze. Crime offense codes can be relatively simple or quite complex. A simple system of codes could have as few as those listed in **Table 3**:

More complex coding could include a "major" code and a "minor" code to indicate whether a particular incidence of Aggravated Assault included the use of a firearm.

CRIME INCIDENT LOCATIONS/GEOCODING

To perform any kind of GIS-based crime analysis or to produce maps of crime incidents, the location of each incident must be "geocoded." Geocoding is the process of identifying a latitude/longitude coordinate for a crime incident. Locations of crime incidents should be as accurate and precise as possible. **Table 4** provides guidance on what particular geocoding process might be employed for various types of location coding in a crime incident report.



TYPES OF GEOSPATIAL BASEMAP DATA

To effectively display and analyze crime incident data, the GIS system must include basemap layers to serve as background on maps and to associate crime incident locations with other features in the city.

Street Centerlines: These are GIS layers that contain lines representing streets. The lines serve to provide the street names, address ranges, and delineations/boundaries between zones, districts, or neighborhoods. They serve to provide a map reader with context and allow visual interpretation of crime patterns.

Zones: Zones may be police districts, neighborhoods, school districts, election districts, political districts, or any other type of boundary of interest to the jurisdiction. Zones are usually defined by streets. Zones must always have a unique identification number and a name or description. When the population of each zone is known, crime rates can then be calculated.

Census Zones: To be able calculate crime rates, it is necessary to know how many persons live in an area for which crime incidents are being summarized. In most

cases, a country's most recent census data (counts and characteristics of persons and households) along with the tabulation areas (zones used to conduct and tabulate census data) will be needed in the crime observatory GIS system.

Parks, Schools, Hospitals, Clinics: To analyze crime within and around important public spaces in a city, the GIS system must have data on the locations of these features. These may be represented as point features or polygons.

Geospatial basemap data such as those noted above are often available from the city's GIS department or sometimes from provincial or federal GIS agencies.

In cases where these essential layers do not yet exist, a GIS process of "digitizing" or creating a new GIS layer from paper maps or from imagery sources such as Google Earth is required. Police districts, school districts, and other zones that are specific to a particular city are the layers that are most likely to be created by the crime observatory. Often, simple paper maps of these zones can be used to delineate the boundaries and create a layer in the GIS.

4.1 DATA ACQUISITION

HOW TO ESTABLISH DATA SHARING AGREEMENTS

Formal data sharing agreements between the crime observatory and agencies that maintain data of interest need to be established. Developing a written memorandum of understanding (MOU) between agencies that provide data and the municipality that leads the crime observatory can facilitate data sharing. For example, an MOU will spell out each party's roles and responsibilities and may also explicitly state a regular schedule and method for delivering data to the Observatory staff. Any incentives or potential benefits seen by the agencies that provide data may ease this process.

ACQUIRING DATA

Most of the data used to analyze crime—including arrests, reports, calls for service, and incident data—can be acquired from municipal and local law enforcement agencies. In most situations it will make the process easier if a memorandum of understanding is established. An MOU is a formal agreement that can be used to address coordination and communication between multiple organizations or agencies (Department of Homeland Security, 2010). MOUs can be useful whenever improvements in interagency communications, collaboration, and participation are desired (Department of Homeland Security, 2010). In acquiring data from law enforcement and other agencies, MOUs can be used to formally establish who is responsible for providing the data, what format the data will take, and how often it will be transmitted. While there is no set MOU format, **Exhibit 4** presents a framework for organizing and structuring one.

Exhibit 4. MOU Example Section

- **Introduction:** Provides simple explanation of agreement and why it is needed.
- **Purpose:** Concisely states how agencies involved will use new capability and under what circumstances.
- **Scope:** Lists agencies involved and describes their relationship.
- **Definitions:** Describes operational and technical terms to help avoid confusion and uncertainty.
- **Policy:** Briefly describes circumstances under which capability will be used (e.g., authorized use, activation, timing)
- **User Procedure Requirements:** Outlines obligations (e.g., user requirements, responsible parties).
- **Maintenance:** Designates responsible party for maintaining equipment, systems, and licenses.
- **Oversight:** Describes how agencies will deploy the new capability, including how agencies can provide recommendations that affect policy.
- **Responsibility for SOP Compliance:** Assigns responsibility to agencies to ensure that Standard Operating Procedures are followed.
- **Updates to the MOU:** Describes how updates can be made to MOU (e.g., who has authority to update, how updates will be made, how participants will be notified of changes).

Source: Department of Homeland Security (2010)

DATA TRANSMISSION SCHEDULE AND DATA FORMATS

The MOU should establish both the frequency of data transmittal as well as the format the data will take. Establishing regular data transmissions (e.g., monthly or quarterly) has several benefits. First, it will allow the Observatory to plan ahead and be prepared to process the data on a regular schedule. In turn, that will allow for agencies to schedule regular meetings to discuss the most recent data. Setting up a data transmission schedule will also help the agency providing the data get into the habit of preparing and submitting the data. Doing so will enable the process to become a routine part of someone's job, which should help reduce delays and other issues in sharing the data.

In addition to the timing of data sharing, it is also important to establish the format of the data. For example, will the agency provide data in the form of paper records, electronic documents, electronic spreadsheets or databases, or data sets used by specific statistical software packages? The observatory should work with the agencies providing data to determine what will work best for both parties. To the extent possible, data should be provided in an electronic spreadsheet or database because paper records and even electronic text files are difficult to process.

4.2 PROCESSING AND PREPARING DATA

Because data that the observatory receives from various agencies may not be immediately ready for analysis, it must be processed first. This primarily involves reviewing the data for potential error and then recoding them for analysis. After the data have been reviewed and recoded, they are ready for analysis.

REVIEWING CRIME DATA

First, the data must be reviewed for completeness because some data records may have blank fields. In some cases, a field may not be relevant to the incident (e.g., a field for victim information would not be relevant to a drug possession charge) while in others the field is missing because the information is unknown (e.g., a field for perpetrator information is missing because no one has been apprehended for the crime). It is important to use different codes for different types of missingness, where possible.

Next, a frequency distribution of each item should be examined to make sure all of the values look plausible. This quick step can help ensure that the data includes no typographical errors that could bias the results. For example, if a homicide perpetrator's age is listed as 2 years old, it may indicate that the information was not accurately recorded. In some instances, it may be necessary to re-contact the agency providing the data in order to clarify values that do not appear valid on their face.

RECODING CRIME DATA

Once the data has been reviewed and all values appear reasonable, it may be necessary to recode some items. Because the agency providing the data records information for their own internal use, the data may not be in a format that is most useful to the Observatory.





For example, the agency may separately record various types of robbery (e.g., by weapon type), although it may make more sense for the observatory to group all robberies together. While there are a number of valid ways to recode most of the information, it will be necessary to develop a uniform method for determining which categories to recode various aspects of the crime incident to facilitate comparing information over time and between places.

In addition to offense type, data on incidents of crimes may include characteristics of both the victim and offender, such as sex, age, and race. While the actual age of the victim may be recorded by the police, the Observatory will probably be more interested in knowing whether the victim is a juvenile, young adult, adult, or older adult, for example, than knowing whether he is exactly 10, 16, 33, or 57 years old. It is common to collapse specific ages to age ranges, such as under 12, 12–17, 18–24, 25–34, 35–44, 45–64, and 65 and older. Age groupings should be developed that make the most sense from a policy and prevention standpoint. Similarly, an incident report may utilize a large number of race/ethnicity categories. If there are relatively few individuals within one race/ethnicity category, it may make more sense from an analysis standpoint to aggregate some of the smaller categories to an “other race” category.

Other characteristics of the incident, such as date/time, may also be easier to analyze if aggregated. For example, it is reasonable to expect that crime patterns may be different on the weekends and at night than on a weekday during the day. Codes should be created to flag which day of the week the incident occurred as well as what part of the day it occurred. Because the exact minute of the day an incident occurs is not particularly useful for this type of analysis, time could be recoded to indicate what hour of the day it occurred. While the exact location of a crime is important to assess crime spots and high-rate locations, it may also be useful to create indicators for the type of location where the offense occurred (e.g., public transportation, bar/nightclub, residence) because some types of locations may be more prone to certain types of crimes than others.

DOCUMENTING DATA PROCESSING

Analyzing crime data can allow municipalities to learn information they did not already know or to reinforce theories concerning crime in communities. To ensure some level of standardization both within sites over time and across sites, it is helpful to develop standard operating procedures for data collection, data cleaning and coding, and for data analysis. As mentioned in Chapter 3, an MOU with data-providing agencies should establish regular data collection procedures. Additionally, for data cleaning and coding, the crime observatory should document clearly how variables related to crime type, incident date/time, victim age, and other relevant data elements are recoded for analysis purposes. As mentioned above, it is important to develop a uniform method for recoding to ensure that comparisons made within a site over time or between sites are indeed comparing the exact same measures.

4.3 ANALYZING CRIME DATA

EXAMINE SUMMARY STATISTICS

Examining summary statistics, such as the average case or the spread of cases, is the first step in assessing the size and nature of crime in a community. The average case can be summarized using either the mode, median, or mean. In addition to the measures of central tendency, it can be useful to consider how much the observations vary. The most appropriate average and variation summary statistics are determined by the type of data used. Exhibit 5 describes different types of data and summarizes which descriptive statistics are most appropriate for each type.

Summary statistics can be used to gain a basic understanding of the problem at hand. For example, you could compare the average number of gun versus non-gun crimes that occurred over a certain period of time, examine average monthly number of crime reports for a particular offense, and summarize victim characteristics (e.g., identifying high prevalence rates for particular age groups or for women and men).

EXAMINE RELATIONSHIPS

After summary statistics have been reviewed, you may be interested in examining relationships between specific crime types and characteristics of victims, offenders, incidents, and places and determining whether these relationships are statistically significant. While there are numerous ways to measure association and test for statistical significance, three commonly used techniques are crosstab and chi-square test, correlation, and t-test. Standard statistical software can be used to calculate each of these statistics. The most appropriate method will depend on the level of the variables (i.e., nominal, ordinal, or ratio) you are interested in.

TABLE 5. TYPES OF DATA, THEIR USE, AND THEIR LIMITATIONS

	NOMINAL	ORDINAL	RATIO
Description	Names categories	Ranks & names categories	Has equal intervals between numbers, and 0 is meaningful
Example	0=victim 1=one crime	0=no crime 1=one crime 2=more than one crime	Number of crimes: 0, 1, 2, ... (0=no crimes)
Allowable Average	Mode	Median & Mode	Mean, Median, & Mode
Allowable Spread	Range	Inner quartile range & range	Standard deviation & others
Comments	Used when dealing with categories (e.g., gender) and groups (e.g., chain stores, not chain stores)	Used when there is a natural ranking or order to categories (e.g., police ranks) but the differences between ranks is not always the same or is unclear	Use for percentages, counts, and a host of other measures

Adapted from: Clarke & Eck (2005, Step 22).

One of the simplest methods for examining the relationship between nominal and ordinal variables is to create a crosstab, which presents the distribution of one variable for all categories of the other (Bachman & Schutt, 2001). For example, you may be interested in subgroup comparisons, such as determining whether a weapon was more likely to be used in an assault with a male or a female victim. Because you are interested in whether variation on the independent variable has any effect on the dependent variable, you will calculate the percentages on each value of the independent variable (Bachman & Schutt, 2001). In this example, you would calculate the percentage of assaults on male victims that involved a weapon and the percentage that did not involve a weapon.

You would then do the same for female victims. **Table 6** presents an example of how this table may look (the data are not real). To determine whether the relationship is statistically significant, or not likely due to chance, you would use a chi square test. If you have one or more continuous variables but want to examine a crosstab, you can recode the data into a categorical variable

TABLE 6. CROSTAB OF ASSAULT VICTIMS' GENDER BY WEAPON PRESENCE

	ASSAULTS		
	WEAPON PRESENT	NO WEAPON PRESENT	TOTAL
Male victim	20%	80%	100%
Female victim	10%	90%	100%

(e.g., recode age in years to 1=18–24 years old, 2=25–34 years old, 3=35–54 years old, and so on).

The most common method for comparing differences in the means between two groups is the t-test (Statsoft, 2011). A t-test is used if you wanted to compare, for example, whether the number of times an arrestee was previously arrested is higher for white or for black arrestees. In such an example, the means of the dependent variable (times arrested) would be compared between the selected groups based on the specific values (white and black) of the independent variable (Statsoft, 2011).

If you are interested in examining the relationship between two continuous variables, you could examine the correlation coefficient. The correlation coefficient ranges from -1 to 1, where 0 indicates no correlation, -1 indicates a perfect negative correlation between the variables, and +1 indicates a perfect positive correlation (Statsoft, 2011).

EXAMINE TRENDS OVER TIME

In addition to examining potential correlates of crime, it is also important to consider their daily and weekly rhythms (Clarke & Eck, 2005). Cycles of activity can greatly influence when and what type of crime may be most likely to occur. For example, robberies of intoxicated young adults may occur primarily around bar closing time on weekend nights (Clarke & Eck, 2005).

Charting the day and time of crime occurrence can help identify the temporal clustering of events. While some crimes may occur fairly evenly over times of the day or days of the week, others may be clustered in certain times. Examining these clusters of when events are most likely to occur can be useful in identifying potential causes or sources of the problem.

Although daily and weekly rhythms are important, long-term change should also be considered (Clarke & Eck, 2005). Examining the monthly trends in a crime over a long period of time can help identify whether it is getting better or worse. To visually examine long-term trends, the number or rate of events should be plotted against time. With low-frequency crimes (e.g., homicide), considerable monthly variation can obscure systematic variation (Clarke & Eck, 2005). Using a moving average to smooth the curve can help reveal patterns obscured by this random variation. A moving average is calculated by simply averaging the crime rate over a period of months for each month in the time series. For example, the 3-month moving average homicide rate for the month of March would be the average homicide rate of February, March, and April; the month of April would be the average of March, April, and May.

ASSESS RESPONSES TO CRIME

Finally, crime data can be used to measure the effectiveness of local initiatives, which is a key to sustaining local efforts, maintaining community participation, and improving the effectiveness of programs. As such, crime observatories should include evaluation as a core component and measure the impact of intervention strategies. The first issues to be addressed are (1) how the intervention is impacting crime (or other factors) in the targeted area, and (2) what changes (if any) are occurring in the comparison area. The most basic evaluation design would

be to use a pre- and post-test framework to compare crime indicators before and after program implementation to document the impact of the intervention on its intended outcomes (i.e., criminal incidents). Significance tests would then be used to determine the likelihood that any changes occurring in the pre- and post-test periods were due to random chance.

Take, for example, the installation of street lights in high-crime areas of a community. A basic evaluation design would be to compare crime indicators (e.g., robberies, burglaries, homicides) before the installation of the lights with those after installation. A decrease in criminal activity may indicate that the lights were successful. This design could be further strengthened by examining changes in the same crime indicators over the same time period in other areas of the community that experience similar crimes but did not install street lights or implement any other local crime initiative. Finding that crime rates changed in the target area over time but not in the comparison area strengthens the evidence suggesting that the lights had an impact on criminal activity.

4.4 ANALYZING GIS DATA

CREATE MAPS

Maps are a powerful tool and can be a very effective way to present crime data. They allow data to be summarized and can identify patterns and trends that would not be visible when analyzing tabular data. It is important, however, to create well-designed and high-quality maps that are easily understood and present the message behind the data.

BASIC MAP DESIGN

All maps should contain five key elements: a title, a north arrow, a graticule, a scale bar, and a legend. The title indicates the theme of the map and highlights specifically which data are being displayed. The north arrow indicates which direction is north, and the graticule (a grid showing the coordinate system used to display the data) allows the position of features to be calculated. The scale bar allows the distance between features to be calculated. Finally, the legend (or key) explains the symbology (symbols, colors, and patterns) used on the map.

STANDARDIZATION

Although all maps are different, standardization should be a goal of all map creation. Standardization should encompass the map's size, orientation (portrait or landscape), projection, scale, symbology (colors and symbols), background data, and placement of map elements. This allows maps to be more easily compared, and the map user can quickly and efficiently locate map content. Standardization can be achieved by using a map template, in which most of the information remains the same, so that a new map can be quickly and easily generated. It can also be achieved using automation, which may make use of an existing template.

PROJECTION

The projection of a map is a way of transferring coordinates of a three-dimensional object (the earth) and placing them on a two-dimensional surface (the map). Numerous map projections exist that minimize the inherent distortions. Some projections attempt to maintain the area of polygons (equal area projections), while others attempt to maintain the distance between objects (equal distance projections). A standard or common projection may be used in certain geographic areas.

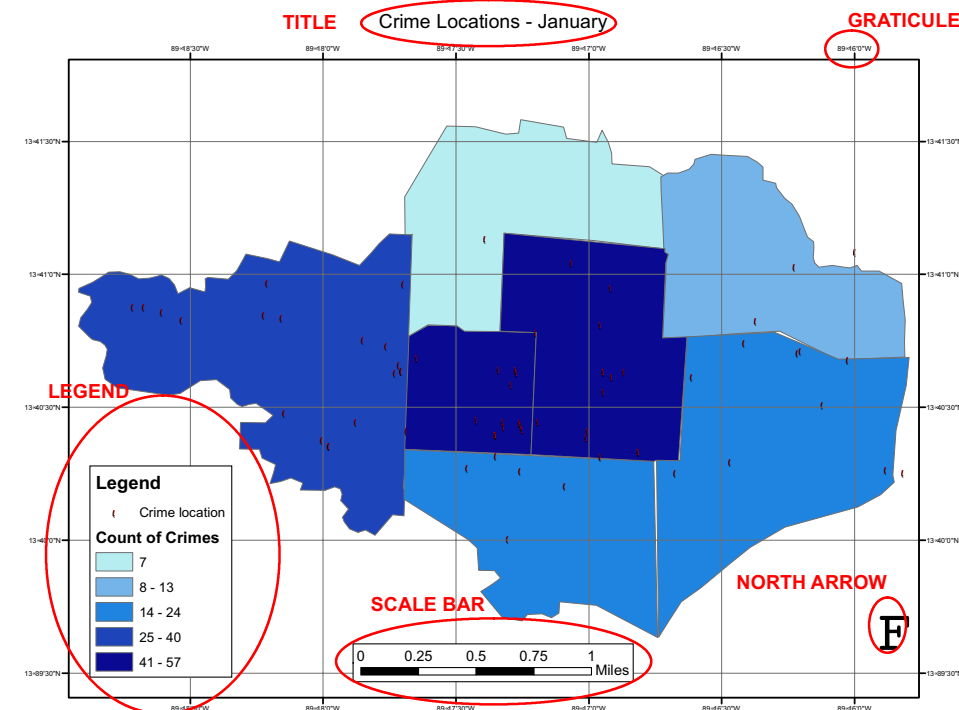


Exhibit 5: Basic Map Design

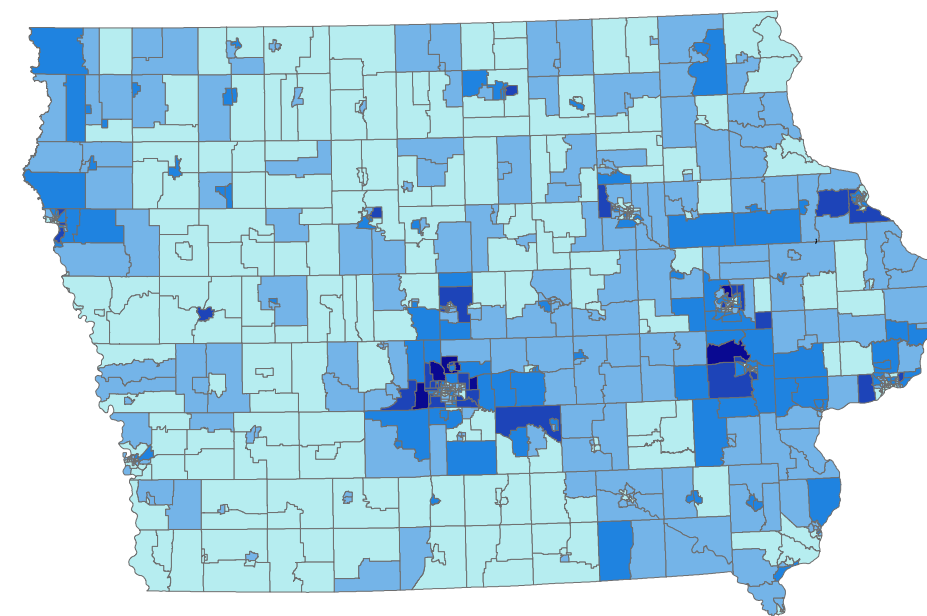


Exhibit 6: Symbolization

The units of the projection may be degrees, minutes, and seconds for geographic projections, and feet or meters for nongeographic projections. Choose a projection that best presents the geographic information at hand. For crime data, the area may be quite small, and therefore the distortions inherent in the projection may not be significant.

SYMBOLOLOGY

There are generally two types of data: continuous and discreet. Continuous data are those that may have any value within a range. For example, percentage values may be any value between 0 and 100, in general. Discreet data are those that are more categorical. For example, the names of regions are discreet data. Each will have its own unique value. Continuous data should be symbolized by color or size gradients. Discreet data should be symbolized by qualitative colors and symbols. See www.colorbrewer.org for color symbolization recommendations.

The following map (Exhibit 6) is an example of good symbolization. It is showing a continuous variable (population density) with a gradient of blue colors. The map user can easily see which areas have the highest (dark blue) and the lowest (light blue) population density.

The following map (**Exhibit 7**) is an example of poor symbology. It is showing the same area and the same data, but is using discreet colors to show continuous data. There is no logic to the colors chosen. They do not convey any sort of pattern. They simply show different population density categories with different colors.

LABELING

Labeling of individual features can help identify and differentiate them from other features without needing to symbolize them. This is helpful if two layers of polygon data are being shown simultaneously. Both cannot be shaded, but one can be shaded and the other can be labeled. Point features are also good candidates for labeling. It is preferable to label individual points rather than symbolize them all differently and then list them in the legend. However, care must be taken to make sure that the label is easily matched to the feature, that the labels do not overlap each other, and that there are not so many as to make them illegible.

Exhibit 8 is an example of poor labeling: overlapping labels and ambiguity about which labels correspond to which features.

Exhibit 9 is an improvement in labeling: The overlapping labels have been moved, and leader lines have been added to indicate which labels correspond to which features.

INSETS

An inset map is a map within a map. It can be used either to show the area's geographic location in relation to a larger geographic area or to show more detail in an area of the map that is congested with large amounts of data. Inset maps should possess the same data layers as the main map and be symbolized in the same way. They should have their own title and scale bar.

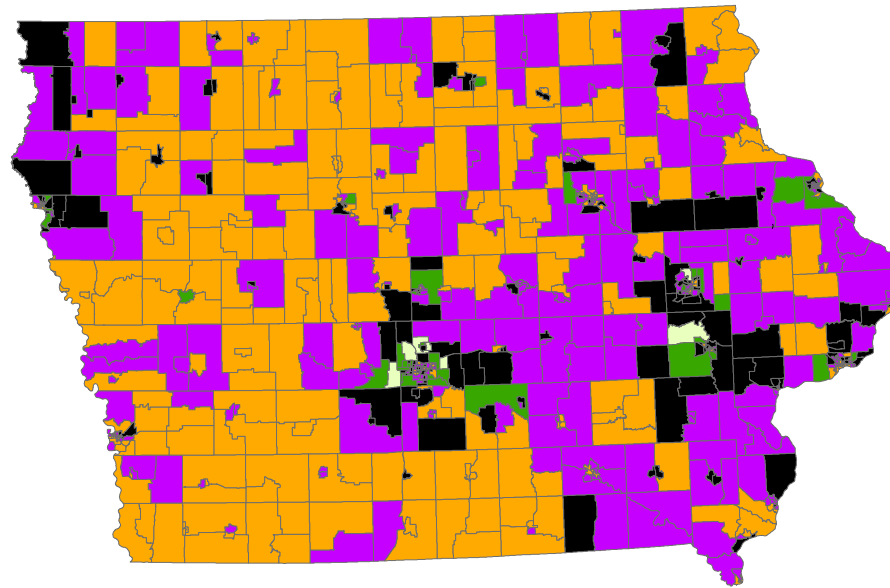


Exhibit 7: An Example of Unclear Symbology

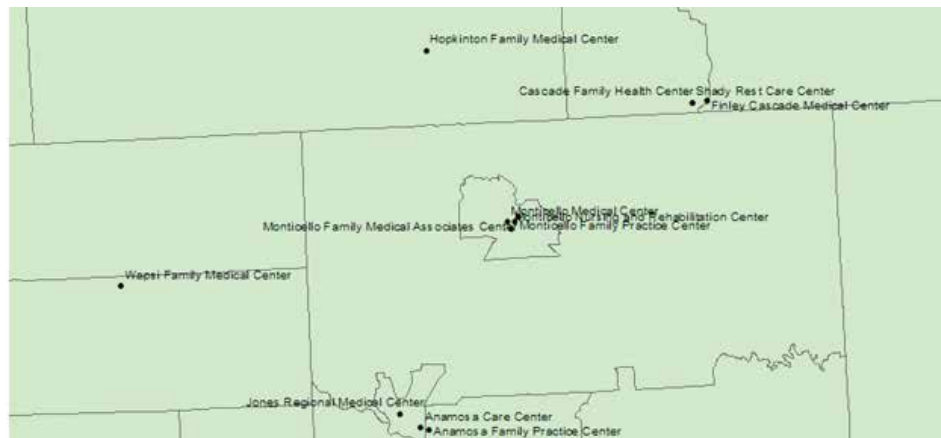


Exhibit 8: An Example of Poor Labeling

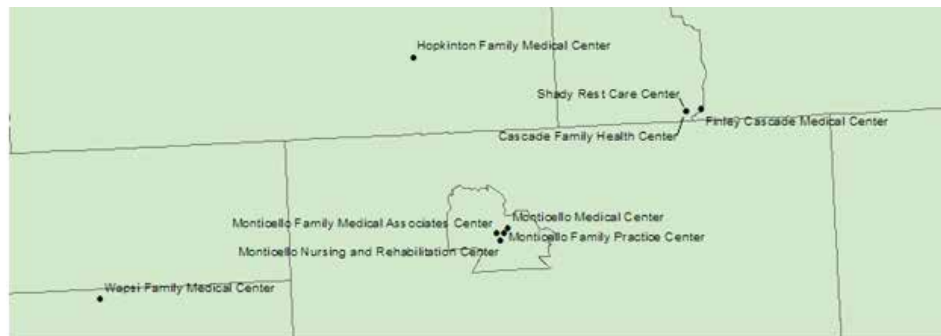


Exhibit 9: Label Improvement

CONTEXT

It is important to add appropriate geographic background content to the map so that the map readers can orient themselves and see the crime data as it relates to known, static features (e.g., roads). These data can be points, lines, or polygons, and should be labeled. It is even possible to add raster data (aerial photography, satellite data, and map services) to a map, which provide a continuous background. Care must be taken to ensure that the background data do not dominate the map; the crime data should remain the focus. Background information should be symbolized with subtle colors and symbols, and labeled with small, but clear text.

AVOIDING CLUTTER

Sometimes a wealth of geographic data is available in a given area. It may be possible to add many geographic layers to a map, and symbolize them all differently. Care must be taken, however, to avoid adding too much information to a map. The more information present, the harder it is to make the main information (the crime data) stand out. Each map should present a clear message. If there is too much information to include on a single map, consider making a series of maps. Exhibit 10 is an example of a map with too much information. It is difficult to understand what is being presented.

GIS ANALYSES

Many GIS analyses are possible using crime data, ranging from simple to complex. The type of analysis chosen will depend on the type and number of data points, as well as the overall goal of the analysis. The following will illustrate a cross section of the types of analysis possible using a GIS. These examples assume that the input data are point locations that contain X,Y (or longitude,latitude) coordinates.

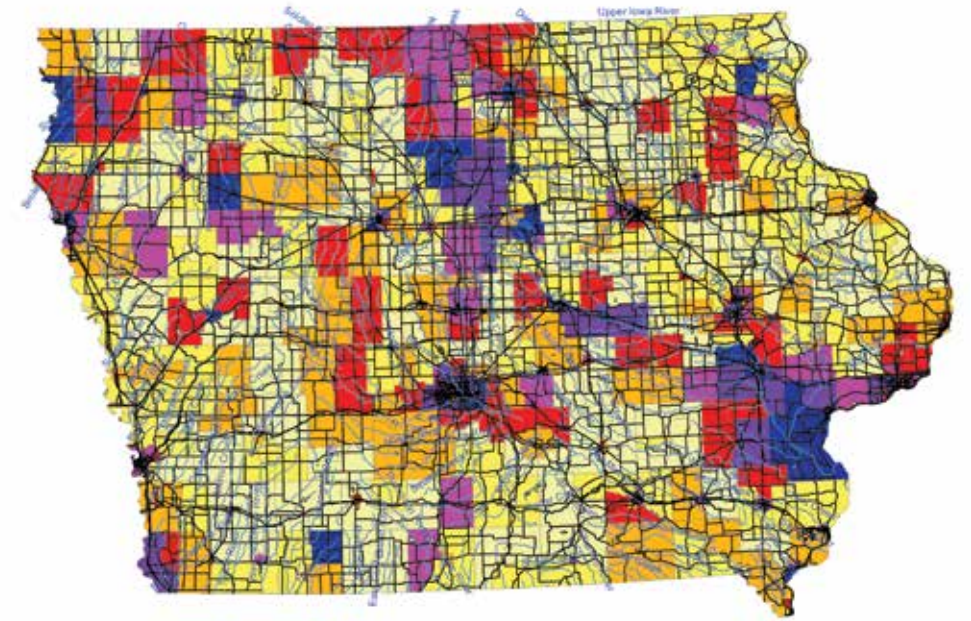


Exhibit 10: A Map with Too Much Information

SIMPLE DISPLAY

The display of crime events as individual points can be a very effective way of visualizing data. This is often the first type of analysis done when exploring a data set. It answers the question "where" and gives the audience an idea of the overall distribution and relative number of crimes (**Exhibit 11**).

In most cases, this will simply be a matter of adding the data to the GIS and symbolizing the points. Background data such as streets, prominent points (e.g., schools), and jurisdictional boundaries give context to the map and allow the map user to see where the crimes are occurring.

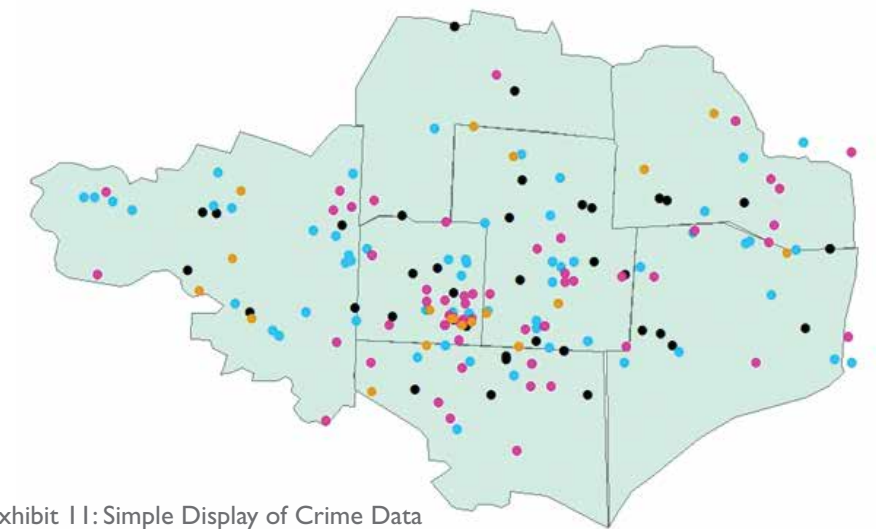


Exhibit 11: Simple Display of Crime Data

SUMMING BY POLYGON

Often a sum of the number of crimes by some larger polygon is needed. This allows the point data to be generalized by an area, rather than simply showing the individual points. This enables the polygons to be compared, as the sum of crimes will show their relative totals. To do this, an identifying characteristic (e.g., police precinct) is added to each point. The number of crimes per unique polygon can therefore be totaled and then added to the polygon as an attribute. A map can then be made showing the total crimes per polygon (Exhibit 12).

CALCULATING RATES

While summing the number of crimes by polygon can give an impression of their relative importance, it can sometimes be misleading since the polygons themselves may be different by size, population, or some other measure. To compensate for this, it is common to calculate a rate (also called normalization). This means taking the count of crimes by polygon and dividing by the area, or population, or other measure to arrive at a rate. The rate can be expressed as the number of crimes per square kilometer, or number of crimes per 1,000 people, etc. This allows the map (Exhibit 13) to show the relative number of crimes per polygon in another way, which may be more realistic.

KERNEL DENSITY MEASURES

Kernel density is a way of expressing the density of point data by summing them over a regularly spaced grid of polygons, and then performing an average of the values in the immediate area. This is done to generalize or “smooth” the input crime location points to spread the count of crimes over the immediate area. Kernel density helps identify areas of higher and lower crime, without the need for preexisting smaller polygons that will capture this spatial variability. The size of the regularly

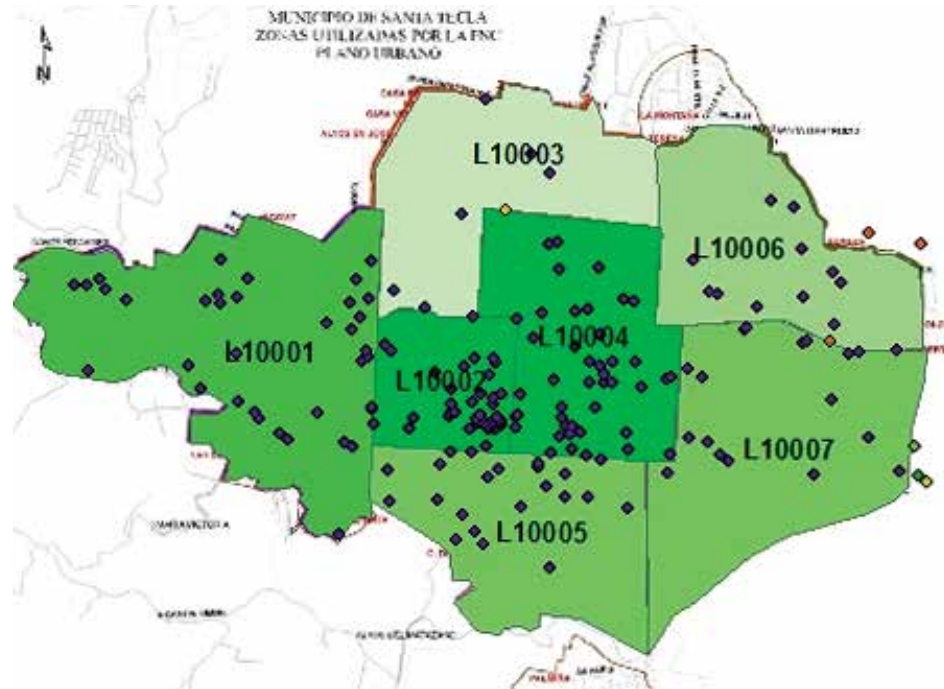


Exhibit 12: Crime Data Summed by Polygon

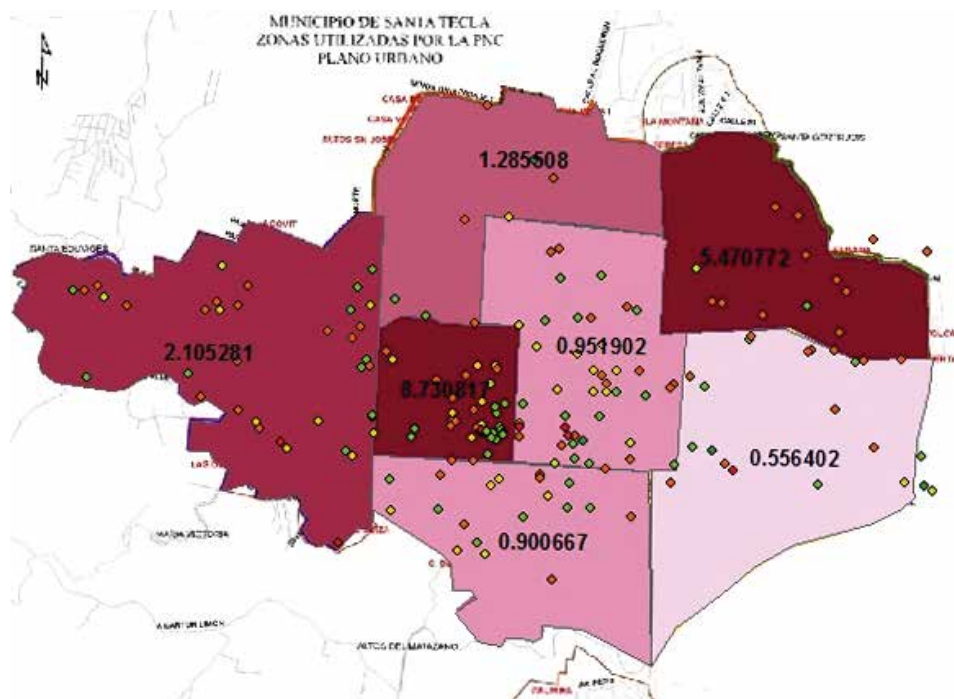


Exhibit 13: Map Showing Crime Rates

spaced grid, as well as the smoothing distance, can be altered to produce different crime densities depending on the overall goal of the analysis. Once the smoothed densities have been generated, they can be color coded to show their differences.

Exhibit 14 shows how creating a kernel density can show “hot spots” of criminal activity. The highest cell values (pink) need not have an actual crime in them, just a large number in the immediate area. Conversely, a single crime gets smoothed out if there are no other crimes around it.

CREATING CLUSTERS

A cluster is a way of grouping individual point locations of crimes. The display of crimes as individual points can give an overall impression of crime number and distribution, but it may also be helpful to group individual crimes into clusters so as to be able to associate crimes together, or to associate them with additional spatial data such as retail locations. There are several measures of clustering that are easily calculated by spatial statistics software. One of them is the mean (or median) centroid, which calculates the X,Y location of the center of a cluster of crimes. Another is an ellipse, which encompasses the standard deviation of the distances of the points to the mean centroid. Both of these can be added to a map to show the characteristics of the cluster(s) (Exhibit 15). A third measure of clustering is a nearest neighbor analysis. This compares how close any individual point is to its nearest neighbor and compares this distance to the expected distance if the points were randomly distributed. Values closer to 1 indicate a more random distribution, and values closer to 0 indicate a more clustered distribution.



Exhibit 14: Kernel Densities Superimposed on Crime Locations

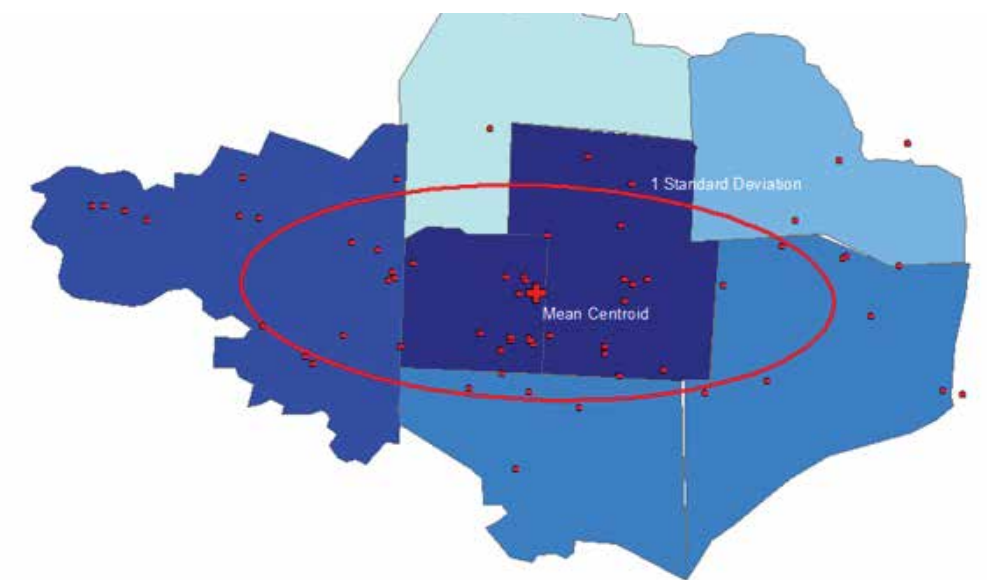


Exhibit 15: Map of Mean Centroid Location and Ellipse of One Standard Deviation

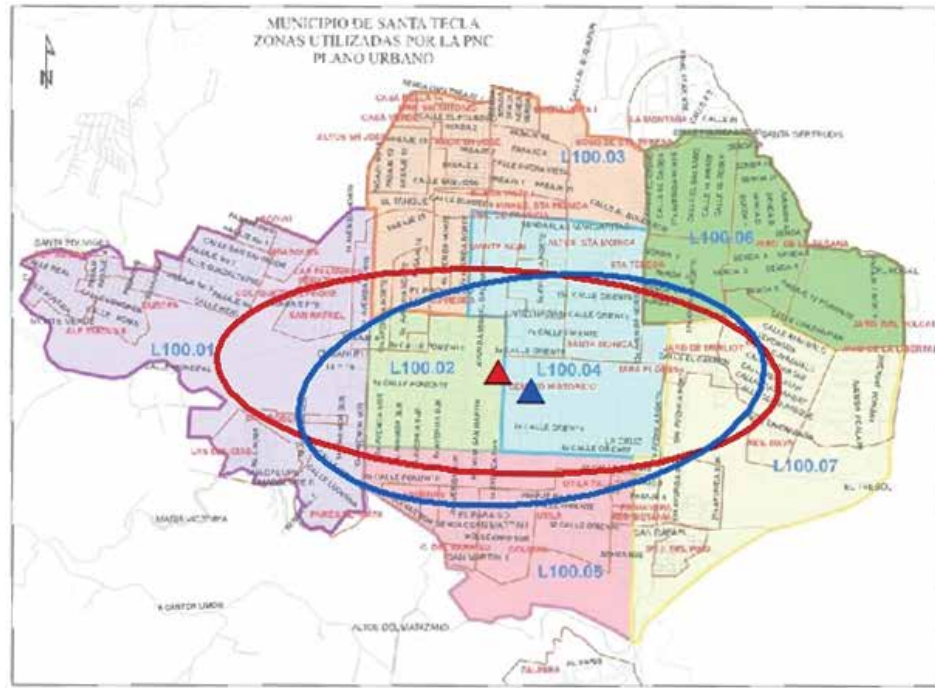


Exhibit 16: Map of Mean Centroids and Standard Deviation Ellipse in Consecutive Months

MOVEMENT OVER TIME

In addition to capturing the distribution of crimes at a given point in time, one can also calculate the movement of the mean centroid. Such an analysis will show if the distribution of the crimes is changing, and in what direction and by how much. This movement may have occurred as a result of a change in patrols or arrests, and may show that crime is being displaced. For this analysis, several distinct time periods (e.g. months) of data can be analyzed separately. The results can be displayed on top of each other, and the trends can be viewed or calculated. Exhibit 16 shows the mean centroid of crimes in two consecutive months. The distance and direction of the movement of the center of crime activity can be calculated.

5.1 CRIME OBSERVATORY INFLUENCE ON STRATEGIC DECISION MAKING

Crime observatories can play important roles in informing a jurisdiction's crime prevention and intervention strategies. To do so requires that results are communicated in a manner that is consumable and directly relevant to criminal justice professionals, government authorities, and other decision makers. Recently, the Director of the National Police of the Dominican Republic reported that "criminality had been reduced by 13 percent but that the community had not perceived any reduction because they were still living in a state of victimization." An effective crime observatory must do more than produce crime statistics; it must communicate findings into results that inform improved decision making. Below we describe four possible functions for a crime observatory that involve analyzing, tracking, targeting, and evaluating crime patterns and trends.

1. DESCRIBING AND UNDERSTANDING CRIME PROBLEMS

One of the tasks of the crime observatory is describing crime in its community. To do this, the observatory staff needs to be familiar with national, state, and local laws; criminal justice processes; and community demographics. The crime observatory is responsible for establishing a fundamental shift toward evidence-based, objective decision making.

The crime observatory can perform a variety of activities to promote these goals. First, learn the community. Establish relationships and compile official data from a variety of sources that complete the

demographic profile of the community. This could include, but is not limited to, census, public health, education, housing, and public assistance data. Use these data to add contextual layers to the crime analyses. For example, concentration of a particular type of housing could help to explain trends in a particular aspect of crime in the community.

The crime observatory should review the local, state, and federal laws that govern their communities. Normally, local and state laws are the most pertinent, but federal regulations are also helpful. Develop a list of all of the statutes and codes and organize them according to offense types. This inventory of criminal laws should include the statute reference, a descriptive title, details on any special instructions, and the most complete definition possible. It might be possible to obtain automated lists of these details from the administrative offices of the courts, law enforcement agencies, prosecutors, defense attorneys, and official legislative bodies in the jurisdictions. Consider gathering data tables from each of these sources and conducting a systematic comparison. Because new laws are added and others become obsolete, it is necessary to update these data files regularly.

Understanding local law enforcement procedures is also critical for interpreting crime data. The crime observatory should be able to describe all of the possible points of entry and exit into the juvenile and adult criminal justice systems. A detailed summary flow chart of the criminal justice system is especially useful. Two versions of this chart should be developed and maintained by the crime observatory, one that reflects the flow of people through the system and another that shows the flow of paperwork.

Gather copies of law enforcement paperwork, including policy and procedure manuals, citations, summons, warrants, court documents, presentence reports, judgment and sentencing forms, and other data

sources. Essentially, the crime observatory should be able to describe every aspect of how data related to crime, suspects, and offenders in the local community are generated.

2. MONITORING CRIME TRENDS

As mentioned earlier, the perceptions of crime by community residents are often radically different from reality. The crime observatory should work to establish the trust and confidence of local leaders, criminal justice professionals, and citizens. Use of reliable crime trend data is one of the most persuasive strategies available to demonstrate emerging local priorities. However, to be responsive to community needs, the crime observatory will need to anticipate some of the types of information that consumers of crime data will want and need. For example, every community is especially concerned about violent crime, and therefore, showing shifts in violent crime trends is essential.

One priority for the crime observatory will be to discern what historical data are available and whether these data can be charted over time. The crime observatory should be able to produce a series of reports that show crime trends for a variety of offense types. In some cases, these data may not be available or the data quality may be suspect. It is the responsibility of the crime observatory to document data deficiencies in local criminal justice agencies and to offer suggestions as to how these data could be obtained.

3. TARGETING INTERVENTIONS

Once crime patterns and trends can be demonstrated, the next step is to implement targeted interventions to reduce incidents of crime. For example, suppose a crime observatory had been monitoring local auto burglaries and discovered that a concentration of burglaries occurred in

a downtown area just after students at a nearby high school were released from classes. Extra police patrols right after school would be a reasonable intervention.

With the proper data and analytical capacity, a crime observatory can be an invaluable resource for informing local law enforcement practices. Most responses to crime tend to use inductive processes, that is, they make broad generalizations from specific observations. For example, inductive processes could include: (1) making specific observations and measures, (2) detecting patterns and regularities, (3) designing some intervention, and (4) finally developing some general conclusions or best practice solution. However, there are also deductive approaches, which begin from a general position and become more specific. Starting with a broad theory (e.g., crime occurs in communities where neighbors rarely interact), a deductive approach would then narrow that down into more specific hypotheses that could be tested. For example, broken-windows theory suggests that maintaining and monitoring urban environments will reduce further deterioration of the community. The crime observatory might produce a report showing building code violations. This report might then be used to predict where illegal electricity theft might be occurring. In summary, the crime observatory needs to consider both inductive and deductive approaches to identifying crime and promoting interventions.

4. EVALUATING PROGRAMS

Measuring the impact of targeted interventions is important for several reasons. Stakeholders want to know if the intervention achieved the desired effect. A program evaluation can determine what works and what does not. Program evaluation is vital for transparency and community accountability. Was the intervention cost-effective? Unintended consequences of the intervention are also important to consider. For

example, sometimes interventions in one area may displace crime to new areas. Shifts in one component of the criminal justice system might create a strain on resources in another (e.g., police overtime, jail crowding, reduction in treatment facility capacity).

As the community begins to rely on the crime observatory to compile and analyze data and communicate results, certain strengths and weaknesses of the various stakeholders may become apparent. Program evaluation can help to systematically assess performance and identify where there may be an opportunity for more support or training. An evaluation can also provide stakeholders with opportunities to discuss the challenges they face and offer potential solutions. Once law enforcement agencies understand that the crime observatory will be evaluating aspects of intervention processes, implementation, and outcomes, they will begin to be more introspective of their own processes. These self-assessments further advance the goals of the community to improve practices aimed at reducing crime. Objectively evaluating interventions can also serve to document processes that will allow the intervention to be replicated in other areas. Finally, thorough program evaluation is necessary before an intervention can be considered a best practice.

MEASURING THE SUCCESS OF PROGRAMS AND INITIATIVES

Program evaluation is more than a quick look at outcomes at a single point in time. Measuring the success of intervention strategy is a far more involved process, and the goal should be to provide stakeholder-focused evaluation. One of the goals of evaluation is to improve capacity of the criminal justice system.

Too often, politicians, media outlets, and the public want to be able to classify information as good news or bad. Indeed, outcome measures are quantifiable indicators that gauge productivity or success.

However, these measures should not exclude the need for reflective observations. Sometimes, less tangible outcomes of a particular intervention may be the most important in terms of community perceptions. Consider the example mentioned earlier from the Dominican Republic. The police director reported a sustained decrease in crime, and yet, the people in the community report feeling less safe. Perceptions of safety are important, and left unchecked, can lead to important changes in communities.

Some important details should be considered when designing performance indicators for monitoring and evaluation. Consider the following 10 points:

1. Does the measure reflect an important community-wide performance dimension?
2. What is the unit of analysis?
3. Are data on this measure likely to lead to improvement?
4. Does the measure reflect the stakeholders' needs?
5. Do key stakeholders view the measure as credible?
6. Can the measure be communicated to and understood by a wide audience?
7. Is the cost/benefit relationship sensible, in terms of data availability or resources needed to collect data versus value? Can the data be reasonably obtained?
8. Will the measure be sustainable over a period of years?
9. What might be the unintended consequences of the measurement? What political motives need to be considered?
10. Which measures should be released to limited audiences (i.e., a particular stakeholder group, for internal use only, for command staff only)?

IDENTIFYING EVIDENCE-BASED PRACTICES

The idea of “evidence-based practices” refers to the conscientious, explicit, and judicious use of the best and most current research showing positive outcomes in making decisions about intervention strategies. Evidence-based practices emphasize empirical results, consistency of findings, and cross-site replication. There are many emerging evidence-based practices in criminal justice; however, it is important to note that evidence-based practices may vary by the target population’s characteristics. In other words, interventions that have substantial evidence of positive outcomes with one group may not hold true for another group. Interventions proven effective in the United States may not have the same result in Nicaragua, for example. Evidence-based practices do not replace community-specific knowledge; they are intended to inform decision makers about the best scientific evidence regarding strategies to realize desired outcomes.

Identifying evidence-based practices can be challenging on several levels. There may be a lack of quality research in some areas to support certain practices. In these situations, look to research sources that may have been utilized in other areas. Many evidence-based practices exist in the field of criminal justice that are likely useful in diverse populations. For example, proactive community policing has shown tremendous promise for improving law enforcement practice in various parts of Latin America. However, when considering specific interventions (e.g., neighborhood watch campaigns, community bike patrols, death review teams), the research may be less clear. In these situations, program evaluations become even more critical as the crime observatory becomes a producer of evidence that can be used to either support or discount a particular intervention. Cross-site replication of results should be encouraged.

5.2 TRANSLATING RESULTS TO DECISION MAKERS

The products developed by the crime observatory must be accessible to the stakeholders. Lengthy, technically complicated reports that use advanced vocabulary confuse stakeholders and obfuscate policy implications and action plans. The observatory must be mindful of the available time that the stakeholders have to invest in reviewing a report. Moreover, the motivations of the stakeholders to be concerned about the report are perhaps even more important. Finally, always consider the policy implications of any report released. It is the responsibility of the producers of the reports to translate the results into a format that is easily understood and able to be acted upon. The following sections offer some recommendations on how to make the products of the observatory have more impact.

DEVELOPING A COMMUNICATIONS PLAN

In Chapter 2, the idea of developing a communications subcommittee was presented. The stakeholder council should develop a communications subcommittee that is responsible for reviewing and approving all reports, presentations, maps, or other products released to the public. Certainly, any messages prepared for, or released to, the media should have substantial review prior to release. The manager of the crime observatory should be the final approval point for all outputs of the observatory.

The communications subcommittee, perhaps chaired by the crime observatory manager, should develop a written communications plan. A plan will help to organize how outputs are disseminated will help prevent unwanted surprises. The following tips may be useful:

- Organize a communications subcommittee where membership allows and encourages discussion. Make sure the members understand their responsibility.
- Consider all of your stakeholders as customers and consumers of the products of the observatory.
- Set up a tracking system to document the activities of the observatory, including photographs, video clips, newspaper articles, and all written products developed by the observatory.
- Develop a logotype and establish a common format and color scheme for all products (e.g., documents, maps, PowerPoint presentations.)
- Segment the stakeholders into separate, manageable parts (e.g., law enforcement, politicians, other government officials, community leaders) and cultivate working relationships with each.
- Be proactive in engaging local media and use this outlet to your advantage.
- Build in community involvement by creating opportunities to showcase the work of the observatory.
- Develop marketing tools for group presentations, discussion starters, town meetings, etc.

One final detail is very important. A serious crisis will occur someday that will require an official response by the observatory. The manager should have a protocol for responding to the situation. In advance of the crisis, the manager should consider doing a vulnerability audit and internal agency assessment. Try to anticipate what might go wrong and why. For example, suppose that a mass casualty event, terrorist attack, or assassination takes place. What if a security breach leads to leaking of classified data about an upcoming police action? What if a data coding error leads to a faulty analy-

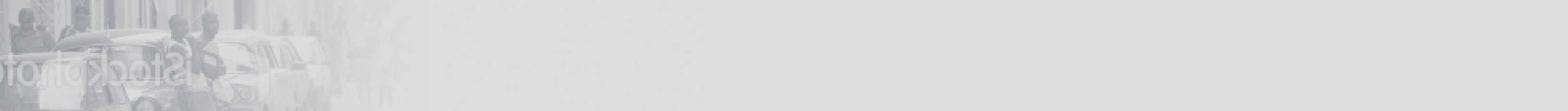
sis? What if a crime data finding contradicts statements by a powerful political personality? Try to plan for these events and decide in advance how the crime observatory will respond. The communications subcommittee should also develop a strategy for notifying key stakeholders during a crisis, including the media, employees, law enforcement partners, and other key stakeholders specific to your organization.

PROVIDING CLEAR AND CONCISE OUTPUT

The goal of the products developed by the crime observatory is to communicate information. Standardization of reports, presentations, and other products will facilitate easier comprehension of the outputs. Whenever possible, simplify written reports by limiting them to two or three main points. A stapled handout with 30 black and white maps is usually counterproductive. Develop report templates and data sheets that can be easily updated. Guide the reader to the most important details by using formatting. Be sure to seek advice from a graphic design professional for all of the report templates and logotypes. Whenever possible, keep data reports in a research-in-brief format that includes a section with report highlights. Also, use clear titles with as few words as possible.

Standardize data summaries to the extent possible and follow similar labeling conventions to avoid confusion. Also, present statistical data consistently. For example, when presenting a summary of the univariate variable “age,” the data should always have the same age categories. In addition to the frequency distribution by age category, the mean age and standard deviation would also normally be included.

In data tables, many researchers prefer to show percentages in the columns and to make comparisons by row. Substantively, there is no difference how the data are shown; just be consistent.



Similarly, researchers normally present rates per capita when showing most crime data. Rates allow data to be standardized by dividing the number of incidents or events by the total number of individuals in the population. By multiplying the quotient by a constant, usually 1,000, the crime rate is standardized in terms of X number of crimes per 1,000 people in the population. The main objective is to provide clear and concise output. Standardizing reporting formats helps to accomplish this.

ORGANIZING ANALYSIS AROUND SPECIFIC CRIME PROBLEMS

Crime observatories are most effective when analysis is directed at specific crime problems. For example, in Jamaica, following a sharp increase in homicides, the crime observatory began to focus on strategies to address this serious concern. The observatory was able to highlight the problem areas and help to focus the law enforcement responses. Additionally, the observatory took strategic steps to standardize data reporting and analysis, which aided in translating the scope of the problem to authorities. Finally, the observatory's analyses were used to conduct evaluations of the intervention programs that were implemented. In this example, the crime observatories in Jamaica focused on a specific crime problem.

GEOGRAPHIC CONCENTRATIONS

Certain areas often experience high concentrations of crime, disorder, and victimizations, sometimes referred to as "hot spots." These areas of concentrated criminal activity present complex analytical opportunities for crime observatories. However, it is important to recognize that crime hot spots are a function of both geographical area and time. While there may be a reason to identify a particular crime pattern over a few hours, days, or weeks, most analyses consider crime activity over longer periods of time and seek to isolate areas of high-

density crimes. These "hot spots" are often targets for the increased law enforcement activity.

Keep in mind that hot spot boundaries are somewhat arbitrary. Crime density is measured over an entire geographic area, and ultimately, there is some subjectivity and perceptual differences in determining exactly how to interpret and present graphic concentrations of crime. Specific reasons may exist to expand or constrict an identified hot spot because of natural boundaries, law enforcement jurisdiction, and land use patterns. At least five main methods can be used for detecting crime hot spots, including grid cell analysis, spatial autocorrelation, cluster analysis, visual interpretation, and choropleth mapping. Each one of these strategies has multiple variations. Identifying geographic concentrations of crime is useful in allocating the limited resources of law enforcement. However, it is important to recognize that a multidimensional approach using several analysis techniques may affect the identification and interpretation of hot spot boundaries. It is usually a good idea to share findings with law enforcement officers in the field before finalizing interpretations of hot spot analyses.

EMERGING CRIME PROBLEMS

Often, emerging crime problems are identified as a result of informal observations and anecdotes. However, the crime observatory can be especially helpful in identifying emerging crime problems sooner by anticipating shifting crime patterns. An important first step is to establish data baseline measures and to do analyses on a variety of types of crimes. Maintaining data of other community indicators is an important task of the observatory. For example, forecasting prison populations and estimating future release dates might be helpful in analyzing emerging crime trends. Shifts in major social indicators (e.g., unemployment rates, truancy, juvenile delinquency, drug use patterns, poverty, migration patterns) could

also help to predict and explain shifts in criminal behavior.

Additionally, anticipated changes in criminal justice policies and procedures, including new laws, provide an excellent opportunity for the crime observatory to provide analysis. Suppose, for example, a new statute requires longer prison sentences for a particular type of crime. Does any change result in these reported crimes? Does prison crowding occur? Are the changes in the system reflected across all parts of the jurisdiction?

Identifying emerging crime patterns requires a certain degree of creativity. Analysts for the crime observatory should consider issues such as shifts in land use patterns, seasonality, shifts in victim behaviors, special events, new drugs, emerging technologies, etc. Of course, the crime observatory should also communicate with other observatories to learn about emerging patterns of behaviors and new analytical techniques.

5.3 FINAL COMMENTS

Establishing a crime observatory requires a shared commitment from key stakeholders to promote the capacity and sustainability of the effort. An effective crime observatory has the potential to dramatically transform approaches to law enforcement, community prevention and intervention efforts, and community safety. An observatory can also mark a fundamental shift toward data-driven policy decisions. This guidebook has addressed many of the fundamental requirements of an observatory, but there is no single model of implementation. Available resources vary considerably between communities. Some observatories have advanced equipment and many employees while others may have limited access to data and only one analyst. Both models can make significant contributions to understanding local crime patterns.



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