Home Office

Police Standards Unit

Crime Mapping: Improving Performance

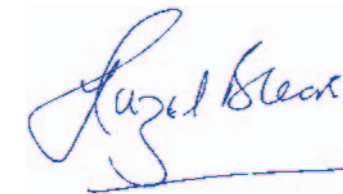A good practice guide for front line officers

Foreword by Hazel Blears
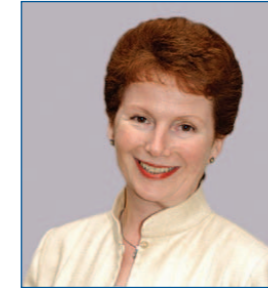
Improving performance remains central to the delivery of our objectives of reducing crime and the fear of crime. Crime mapping is an important and flexible way of supporting a wide range of policing functions at BCU and other levels. It can also provide the platform where data from the different partners in a Crime & Disorder Reduction Partnership can be meaningfully brought together.

The intelligent use of crime mapping can provide a better understanding of crime and its location and enables improved targeting and resource deployment, improved intelligence products and facilitates tactical analysis.

This guidance is not based on abstract theory and is written with a firm grip on reality. It sets out in a straight-forward way how you can use crime mapping to support these activities and gives real examples from police forces who have applied crime mapping to successfully improve their performance.

1. Purpose of the Guide

This guide is designed to help front line police officers identify how crime mapping can support policing, intelligence development and performance improvement. It demonstrates how crime mapping can play an integral role in many police service activities that include the first stages of response and data collection through to the monitoring and evaluation of any targeted actions.

All police forces and constabularies already possess the infrastructure to utilise crime mapping, but few are exploiting its full potential. Where its use is active, police forces are realising the benefits. This guide helps to identify how these opportunities can be realised.

2. What is crime mapping?

Most crimes and incidents have an inherently geographical quality. Understanding why a crime or an incident happens where it does can offer vital intelligence that contributes to improving responses to crime/incident problems. This geographical quality of crime/incidents also extends to,

- Identifying where offenders and victims live
- Analysing how offenders have travelled to the crime/incident location
- Identifying emerging neighbourhood issues
- Profiling the characteristics of areas and how these contribute to the causes of crime/incidents
- Identifying why crime/incidents may have occurred in one location and not another

Crime mapping can support a number of policing functions. These include,

- Responding to calls for service
- Collecting data at crime locations
- Targeting responses and deploying patrols
- Analysis and the generation of intelligence products
- Information sharing with partnerships
- Reassuring the public.

The use of crime mapping is also supporting new policing functions such as neighbourhood policing and performance review.
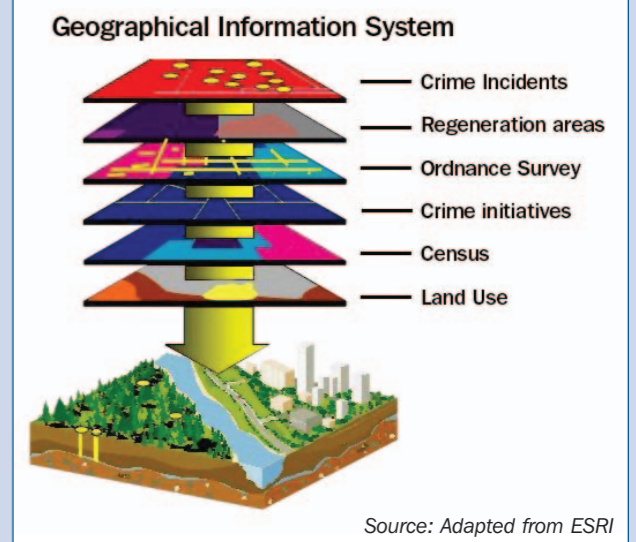
GIS and crime mapping

A geographical information system (GIS) is a computer system for capturing, storing, integrating, analysing and displaying geographical data.

GIS can exist in several forms,

- as a desktop software package
- as an in-house customised information system
- as a web-based system
- on mobile handheld computer devices.

Crime mapping is the direct application that comes from considering the inherent geography in crime. Crime mapping combines the skills of people, the practical use of data and information, and the application of technology to capture, analyse, identify and respond to crime problems and improve policing performance. Crime mapping techniques can also be applied to other police data such as incidents, offenders, victims, stops and searches.


Geographical Information System

- Crime Incidents
- Regeneration areas
- Ordnance Survey
- Crime initiatives
- Census
- Land Use

Source: Adapted from ESRI

"Why do I need a map to show me what I already know?"

Studies have shown that police officer perception of where crimes happen does not necessarily match where crimes actually occur. Basing deployment decisions on perception can be unreliable because,

- It can be weighted by anecdotal information
- It can be insensitive (or over biased) to newly emerging patterns, or biased to historical problems that have since been overcome
- It can be based on only limited facts about a small area, and not all the facts about the area as a whole.

- Few people are able to consider more than a few issues at a time and may omit critical information.

The use of crime mapping has helped to better inform and overcome inaccurate perceptions of where problems are located, particularly in terms of presenting information in a visually accessible format to a diverse audience, helping all to more effectively contribute to discussions about crime problems.
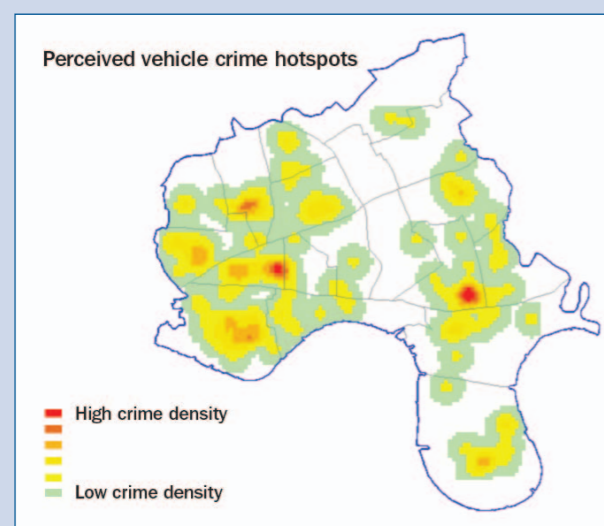
Map A: Perceived hotspots
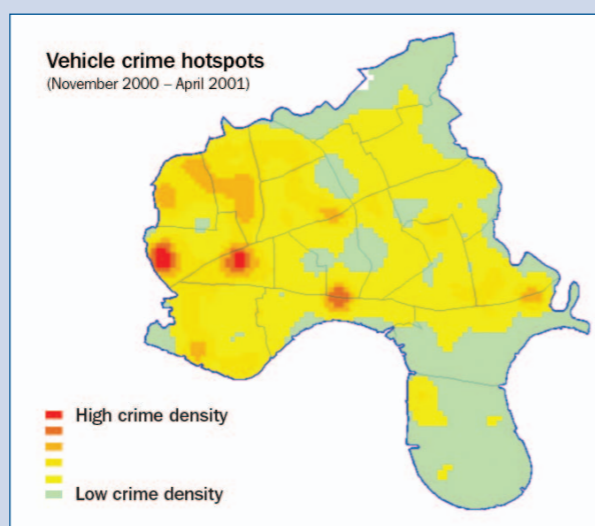
Map B: Actual hotspots

In a study in one BCU, the police and partners from the CDRP were asked to identify where they perceived the vehicle crime hotspots to be (Map A). The actual locations of vehicle crime hotspots were quite different to their perceptions (Map B). *Source: Chainey and Ratcliffe, 2005).*

Section 3 – Putting it on the map?

3.   Putting it on the map?

When a crime/incident is reported, the address or location details of the crime/incident are recorded. This may sound like a simple process but if the address or location details are not recorded in a standard way it can create many future problems that affect how crime mapping can be used.

For a crime/incident to appear on a computer map it requires the crime/incident record to be assigned geographical grid coordinates – a process known as geocoding. These coordinates are based on the address or location of the crime/incident.

Levels of geocoding vary by police force, from 25% to 100%. That is, some forces can only view 25% of their crime data on a map. Very few police forces currently achieve high geocoding levels. This means that many police forces often present an incomplete picture of crime in their computer mapping systems, restricting how crime mapping can be used across the police service.

Regardless of the size of the police force, ensuring that address and location data for crime records are of good quality relies on the same basic principles.

When Dumfries and Galloway Constabulary began mapping crime data they realised that a large number of their crime records were being geocoded into the Irish Sea! In a drive to improve the efficiency and accuracy of capturing information, Dumfries and Galloway integrated GIS and a comprehensive gazetteer of property and non-addressable locations (e.g. car parks and other areas of open space) into their recording system. This has meant that the capture of address and location data of where crimes happen has significantly improved;

- The quality of recording the address/location details of crimes is now extremely precise and accurate – geocoding hit rates have reached 100%
- The process for capturing address/location details of crimes is quicker
- The cost of ensuring data is of adequate quality and making amendments is much now reduced (Data Cleaning)

Using this approach, Dumfries and Galloway estimate cost savings of over 70% in comparison to their old approach of address data capture.

Several other police forces such as Hertfordshire have made a similar investment in the gazetteer that is used in all their information systems. Hertfordshire employ a dedicated team of three staff to maintain the gazetteer, populating it with new records when they are required, including sourcing from their local authorities the addresses of new building developments. This means that nearly 100% of their crime records possess a geographic grid coordinate.

How do I get crime data onto a computer mapping system?

There are generally two approaches for geocoding crime records;

- One approach is automatic and utilises an in-built list of addresses, locations and street names (known as a 'gazetteer') in the crime information system to immediately populate the crime record with its geographic grid coordinates. This approach helps to overcome many issues that relate to geo-coding crime records.

- The second approach relies upon geocoding crime records at some stage after the crime address details have been manually entered into the crime information system. This approach can cause a number of geocoding problems due to the poor content of address information that is originally entered into the crime record.

Action points:
Putting it on the map

- Develop and maintain a single gazetteer that is integrated across all police information systems
- Standardise and/or automate processes that help improve the quality of address and location information that are captured
- Adopt automated geocoding processes

4. How can I use crime mapping?

4.1. Using crime mapping for responding to incidents

Pin pointing the location of an incident and ensuring that it is identified with minimal ambiguity is vital for a quick and direct response. Many police forces use gazetteers that are integrated into their mapping systems to search for and view the location of an incident when a call comes in to their command and control centre.

Several police forces utilise Global Positioning Systems (GPS) to provide a real-time link to the command centre to show the location and details of response teams that are on patrol.

The use of mobile computing technology also helps police forces and their partners organise responses to incidents. In North London an alliance between the Metropolitan Police and its CDRP partners in Enfield, Haringey, Barnet and Waltham Forest uses mobile GIS technology for the accurate and timely capture of environmental crime data (e.g. fly tipping, abandoned vehicles, graffiti). Not only does the use of the technology help to improve the quality of data that is captured, but the data are collected more quickly enabling response times to be much more rapid. In the case of abandoned vehicles the response time to remove these vehicles has improved from four days to a matter of hours. This enables community safety partner response teams to recover these vehicles before they may become burnt out, reducing the recovery cost from £5000 to just £30.

Action points:
Putting crime data on the map

- Make use of a gazetteer to identify the locations of incidents
- Take full advantage of GIS technology and existing licenses of Ordnance Survey mapping and address data to help record crime details and respond to incidents

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4.2. Using crime mapping to generate intelligence products

Crime mapping forms an integral subset of analysis. Crime mapping plays a useful role in not only helping to visualise the geographic patterns of crime through the use of hotspot maps, but in being used as a more integral tool in analysis by helping to understand why crime happens. It can play a role in a broad range of intelligence functions – from the more immediate by supporting operational requirements to the strategic level, by identifying areas that need a more considered response.

A. Integrating intelligence

Lancashire Constabulary is finding that crime mapping is useful for helping to link their disparate datasets together (such as crimes, incidents, stop and search, and youth referral data) by using the common geographic theme that is held in data records on their information systems (i.e. all records are referenced to a place). As a result, Lancashire is not simply using crime mapping as a final step to produce a map for a report, but is using crime mapping as an integral tool for visualising, interacting, exploring and understanding crime.

Lancashire is finding crime mapping techniques to be useful tools to drill down into areas to identify problems that are not constrained by artificial geographic administrative boundaries around which resources would typically be allocated. Their use of crime mapping allows them to explore crime at a level that helps get into the specifics of crime problems and breakdown the mechanisms that initially created the problem.

"Making crime mapping more integral to analysis has made our intelligence products more innovative"

Senior Analyst Mark Dallison, Lancashire Constabulary.

B. Tactical analysis

An example of one particular tool that supports tactical and investigative analysis is the West Midlands Police's Force Linked Intelligence System (FLINTS). FLINTS is a dynamic crime fighting tool that incorporates GIS technology to help combine and present data about people and places. The data held on FLINTS is up-to-date and presented in a user friendly environment to allow quick retrieval. For example, data from a range of information

systems can be easily searched by names, addresses, vehicles and telephone numbers, and combined in seconds to produce immediate analyses of crime trends and links between people. All of these data can be visualised on crime maps.

"FLINTS gives officers the ability to build a graphic pattern of links between crimes and criminals which were previously thought to have no connection. It can search the whole of the West Midlands square metre by square metre to identify crime 'hotspots' and can even tell officers who is likely to have been committing certain crimes. Discovering these links has resulted in thousands of hours saved, and hundreds of crimes solved and criminals convicted."

ACC Nick Tofiluk, West Midlands Police.

C. Assessments and problem profiles

Priority neighbourhoods and hotspots in the West Midlands

On the back of its developments with FLINTS, West Midlands Police uses crime mapping as a central tool for their assessments and problem profiles. Initiated through a programme called Project Spectrum, West Midlands set about redefining how they looked at the geographical aspects of crime by initiating a comprehensive assessment of its worst crime areas.

The process began by mapping the last three years of crime to identify priority neighbourhoods across the whole of the West Midlands area. The priority neighbourhoods were the persistent problem areas that required dedicated focus. These data were mapped alongside partnership activity in the areas to align police responses to other initiatives such as Neighbourhood Renewal. Mapping and analysing the neighbourhoods helped to prioritise and target West Midlands' effort and provided problem resolution support to the local BCU's.

This process also included mapping hotspots of key crime types showing where short-term problems or emerging problems existed, and visualising these alongside the priority neighbourhoods.

Vehicle crime problem profile in Camden

The value of crime mapping as an integral tool for analysis has been shown in Camden in Central London. In a problem analysis exercise aimed at vehicle crime, crime mapping was used to help direct the analysis, identify problem areas, and explore the causes of vehicle crime in these areas. Importantly, this analysis also made use of linking spatial information with temporal information to support effective resource deployment.

One particular area's problem profile identified that thefts of two-wheeled motor vehicles accounted for nearly 75% of all vehicle thefts, and that these thefts peaked
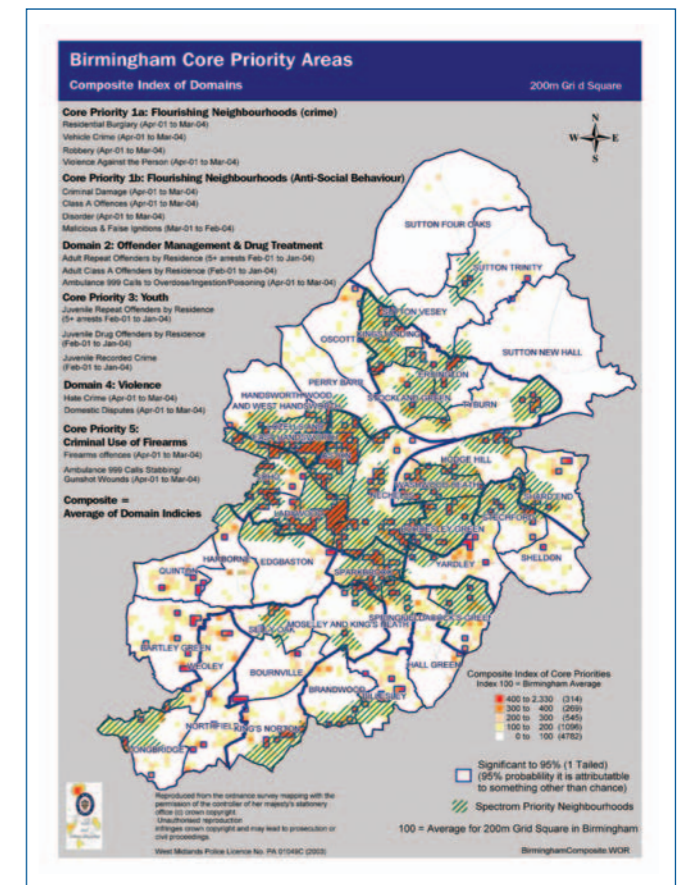

This map shows the priority neighbourhoods in Birmingham (the green shaded areas). Crime mapping of Birmingham also included using a composite index of crime and anti-social behaviour data to help focus and further understand local priorities.

during afternoon hours. The problem profile also identified the link to a large number of motorbike parking bays. Identifying this problem helped to recognise that installing anchor points in the kerb side of the parking bays offered a cost effective crime prevention solution.

Reducing vehicle crime in Portsmouth

With a target in their Crime and Disorder Reduction Strategy for 2001-2004 to reduce vehicle crime by 17% from the 2001 baseline, an increase of 16% in 2002 and further increases being projected meant that Portsmouth BCU in Hampshire needed a new approach to address this growing crime problem. By using crime mapping in its problem profile of vehicle crime the following were identified,

- Portsmouth had a number of 'hot-streets';
  - Half of all vehicle crime occurred in 175 of Portsmouth's 1600 streets
  - 10% of vehicle crime occurred in just 12 streets
- Vehicle crime was concentrated in many repeat locations that had not been previously identified
- Certain high-risk locations were identified. These included car parks at hospitals, doctors surgeries, and sports clubs, and in areas close to entertainment districts
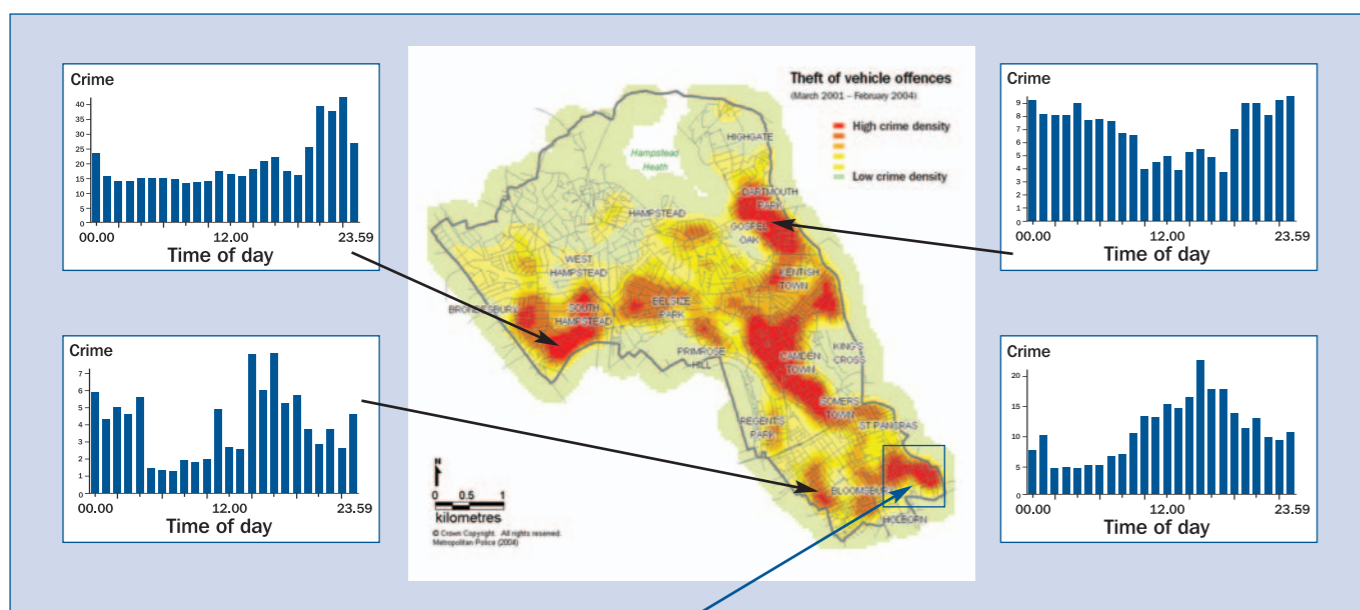
Analysis of vehicle theft hotspots across Camden identified certain problem areas. Analysis of the temporal profiles of crime in these areas revealed that each area had different and specific problems.
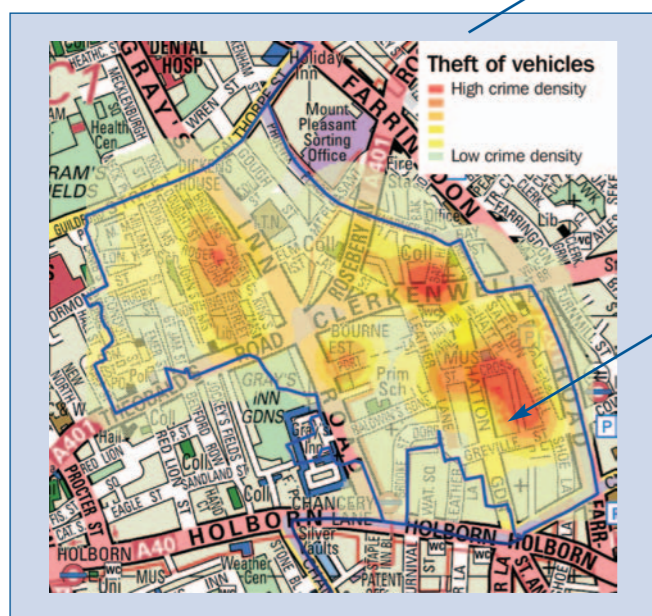
75% of thefts of vehicles in this hotspot (the area highlighted by the blue line) were thefts of two wheeled motor vehicles.

Further analysis revealed the large number of motorbike parking bays in the area and their lack of anchor security fixings.

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- An overall 29% reduction of vehicle crime across Portsmouth
- A total of 1220 less vehicle crimes representing a cost saving of approximately £1,220,000 (based on Home Office estimates of the cost of this type of crime to society).

These achievements from Operation Cobra were not dependent on large additional resource inputs, but were predominantly based on using existing resources in a much more focused way to produce sustained reduction. The success of Operation Cobra saw it rewarded with the 2004 Goldstein Award.

"Thorough scanning and analysis of data to establish the locations where the vehicle crime was occurring was critical to the success of Cobra – we went from a position where the perception was that vehicle crime was everywhere, to realising for the first time that almost 50% of our vehicle crime was occurring in just 11% of our roads, and 10% of the vehicle crime was

- Repeat offenders tended to travel across Portsmouth while others committed crime local to their home.

In response to this analysis Operation Cobra was developed and shifted the emphasis of work away from previously predominantly offender based activity, to all aspects of the problem triangle, resulting in much greater emphasis on targeted location work. This included initiating localised problem resolution projects, and an extensive vehicle crime reduction strategy that focused problem-solving responses to the worst affected areas.

Within the twelve months of Operation Cobra there was a significant reduction in vehicle crime including,

- 33% reduction in thefts of vehicles
- 37% - 58% reduction in vehicle crime in areas that had been determined as 'hot-streets'

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occurring in less than 1% of roads. Likewise when we moved into the targeted response phase, victim and location aspects of the problem triangle were concentrated on before offender focus. During parts of the Operation, due to competing resource priorities offender based activity had to be completely suspended, yet reductions in crime continued to be sustained from just focusing on victim and location work alone."

Chief Inspector Julie Earle, Hampshire Constabulary.

Action points:
Generating intelligence products

- Use crime mapping as an integral tool in analytical techniques
- Use crime mapping to help profile problem and priority areas
- Take advantage of crime mapping by placing greater emphasis on geographical pattern analysis in the generation of intelligence products

4.3. Using crime mapping for reassurance policing

The use of crime mapping is central to reassurance policing in Birmingham, not only for analysing patterns of fears, perceptions and worries, but as an integral tool for intelligence gathering, service response, management reporting, problem analysis, and real-time updates to neighbourhood patrols.

Using handheld computers, built with streamlined GIS-based reporting tools, GPS, a gazetteer and a camera, field officers can quickly record details about crimes. Once this information is collected it is immediately loaded across a wireless network into a central database. This database automatically alerts a number of policing and community safety services, including,

- Updating each field officer's handheld computer with a icon on their mapping interface showing the crime incident that has just been reported
- Sending an e-mail alert to the responsible authorities. For example, if the incident logged was an abandoned vehicle, the incident would

Crime mapping is central to reassurance policing in Birmingham. Its use is helping to gather intelligence and automatically alert street patrols, response services, neighbourhood police officers and the Birmingham CDRP.

be automatically and immediately directed to the relevant local authority department for them to take action

- Informing neighbourhood patrols of recent events through the use of a neighbourhood policing system

- Loading data into the CDRP's GIS-based information sharing system to help better inform partners about local issues, support the generation of management performance reports, and for problem-solving analysis to inform future multi-agency interventions.

"Signal crimes, environmental and social disorders exist in local neighbourhoods causing concern to citizens and raising the fear of crime. What has been lacking is an effective tool to capture information about these identified signals in a way which not only records it, but importantly translates to direct targeted action. Introducing mobile crime mapping technology has provided for an effective electronic mechanism that directly feeds into joint NIM control strategy and tactical processes."

Inspector Mark Kenwood, West Midlands Police.

As part of a programme of developing reassurance in Devon and Cornwall Constabulary, analysts use crime mapping to help select priority areas for reassurance. To do this they use a postcode based geodemographic dataset that is used to describe community lifestyle profiles. This lifestyle dataset is also linked to the British Crime Survey (BCS) to describe community fears of crime and public satisfaction of the police.

Analysis of these lifestyle profiles in Devon and Cornwall has identified that a lifestyle category termed as "dignified dependency" has the highest levels of fear of crime, and the poorest satisfaction levels of the police. This lifestyle group is typified by settled older couples and pensioners with low incomes, renting small flats and maisonettes. Their BCS profile describes them as having,

- the highest levels of fear of becoming victims of burglary, rape, mugging and physical attack by strangers

- The highest rate of victimisation (for all types of crime) immediately outside their own homes.

Additionally their lifestyle profile describes them to be highly dependent on public transport and very responsive to poster advertising. Mapping those that are classified in this lifestyle group revealed certain areas where this community was heavily clustered. Using this approach, Devon and Cornwall are able to apply a more considered and targeted approach to reassurance. One current tactic is to use posters at bus stops in the area to promote the reassurance message to this vulnerable group.

Action points:
Reassurance policing

- Make use of mobile GIS and supporting technology to gather intelligence, coordinate service responses, brief neighbourhood patrols and inform problem analysis

- Use the British Crime Survey and demographic datasets (such as the Census, Neighbourhood Statistics and commercially available geodemo-graphic profiles) to help target reassurance

## 4.4. Results analysis and performance monitoring

Crime mapping is useful in a results analysis for comparing the before and after picture of crime levels in an area. Analytical methods can also check if there has been any displacement or diffusion of benefit as a result of a response.

Similarly, the performance of policing or CDRP activity in an area can be analysed geographically to reveal if performance targets are being met, and to identify those areas that may need some additional support. The performance review approach is typified in the CompStat model that has been developed in the United States. The CompStat process is also appearing in various forms in England and Wales, both in policing environments and in CDRP management groups. For example, Middlesborough CDRP adopt a CompStat-type approach in their monthly strategic review and operational planning meetings.

Crime mapping is at the heart of CompStat. Crime maps form a useful basis around which police can visualise operational decisions, resource allocation, and managerial accountability. Thames Valley Police's monthly Performance Group meetings are based around the core principles of CompStat;

- Timely and accurate information and intelligence

- Effective tactics

- Rapid deployment

- Relentless follow-up and assessment.

Thames Valley's Performance Group uses live and interactive crime mapping as a way to help focus and direct discussions around particular problems, deployed tactics, and performance in relation to priorities such as violence and disorder, burglary dwelling, vehicle crime and robbery.
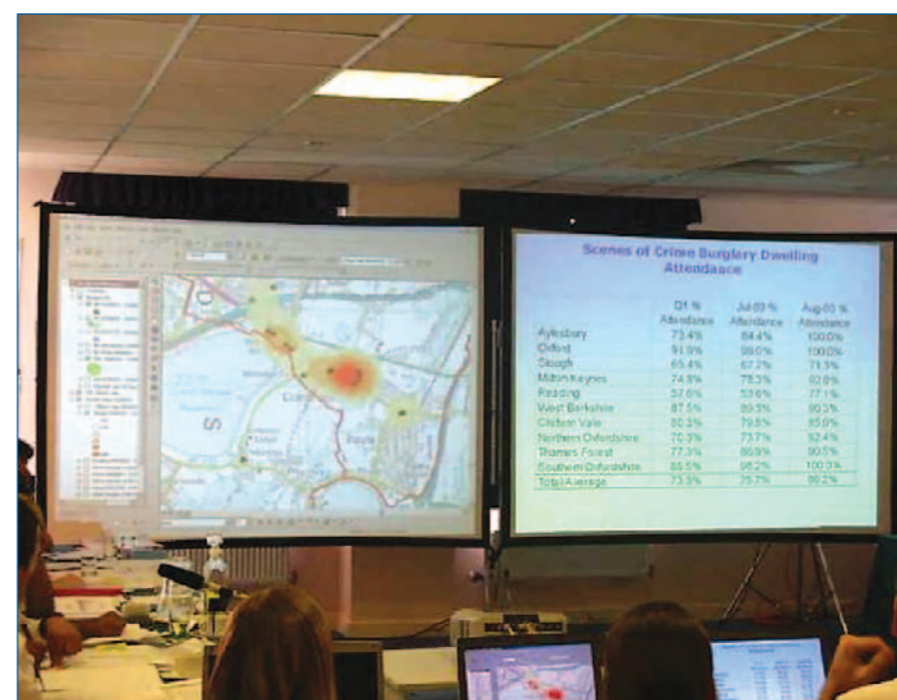
Performance Group

Crime maps are used at the Thames Valley Police Performance Group meetings. The maps allow TVP and their partner agencies to visualise problem areas and discuss targeted actions. This is reviewed alongside management information such as progress against targets from April (of the current year) to the present date and Home Office iQuanta charts to review performance of BCUs or departments.

Supporting Performance Group –
Sally Roberts, Performance Group Support Manager, Thames Valley Police, explains:

The Performance Group is held in Thames Valley on the 2nd or 3rd Tuesday of the month. It's planning and organisation is supported by a dedicated team of four staff.

The planning cycle for each Performance Group (PG) starts immediately after the last PG and begins with a de-brief and review of the issues for follow up. The information required for the next PG, including data and analysis requirements, are also organised and a programme of analysis, briefings, and logistical planning for PG begins. This includes meetings between members of the Performance Team, with the Head of Performance Review and BCU Commanders, and a review of performance with the Deputy Chief Constable to identify the issues that will be explored at the next PG.

The next few weeks sees the production of the analysis, presentation materials, and briefing notes. The week before the PG we have a full run through of the statistics and analytical outputs to identify key issues for questions and focus. Once the content has been reviewed the Head of Performance and the Performance Group Support Manager meet with the PG Chair to discuss questions to explore at the PG and any additional information requirements.

The Performance team also circulates a full briefing pack including maps with written analysis, briefing notes, monthly BCU comparison scorecards and presentation slides to those delegates that will be attending PG. A final brief is then provided for the PG Chair and BCU Commanders, and Performance Group is ready for another month.

Action points:
Results analysis and performance monitoring

- Use crime mapping for results analysis

- Use crime mapping to support performance review meetings

4.5. Information sharing and partnership working

Police forces and their local CDRP partners are making use of GIS-based information sharing systems to support their core business service roles. Partnership systems such as Amethyst (Devon and Cornwall), CADDIE (Sussex), COSMOS (Birmingham), GMAC (Greater Manchester), JUPITER (East Midlands GO region) and NERISS (North East GO region) use crime mapping as a fundamental tool to support the following business functions,

- Delivering timely management performance reporting information
- Operating a scanning facility to identify community safety problems. This scanning role also includes identifying and allowing easy access to data that is fit for purpose to begin a detailed problem analysis
- Analysis of crime and community safety problems in a multi-agency environment
- Providing the public with facts and reassurance about community safety.

A number of police forces recognise that their analysts are often tasked with generating management performance reports. These descriptive reports are certainly required, but due to their repetitive requirement can be easily automated. West Midlands Police have initiated such a process using the COSMOS system that has been developed in partnership with Birmingham CDRP. COSMOS is a web-based system that provides standard reports and easy to use mapping and scanning tools. It operates a 'two-click' approach for retrieving data and generating management information. These concise but very effective reports can then be easily customised by drilling further into specific crime types.

"Within two-clicks I found the information I needed, saving me pestering my analyst to produce a report on how robbery has changed in the last few months"

A West Midlands Police Sector Inspector.

Action points:
Working with partners

- Identify and source data that would support the creation of intelligence products
- Combine resources to use crime mapping based systems to meet the efficient delivery of common service functions

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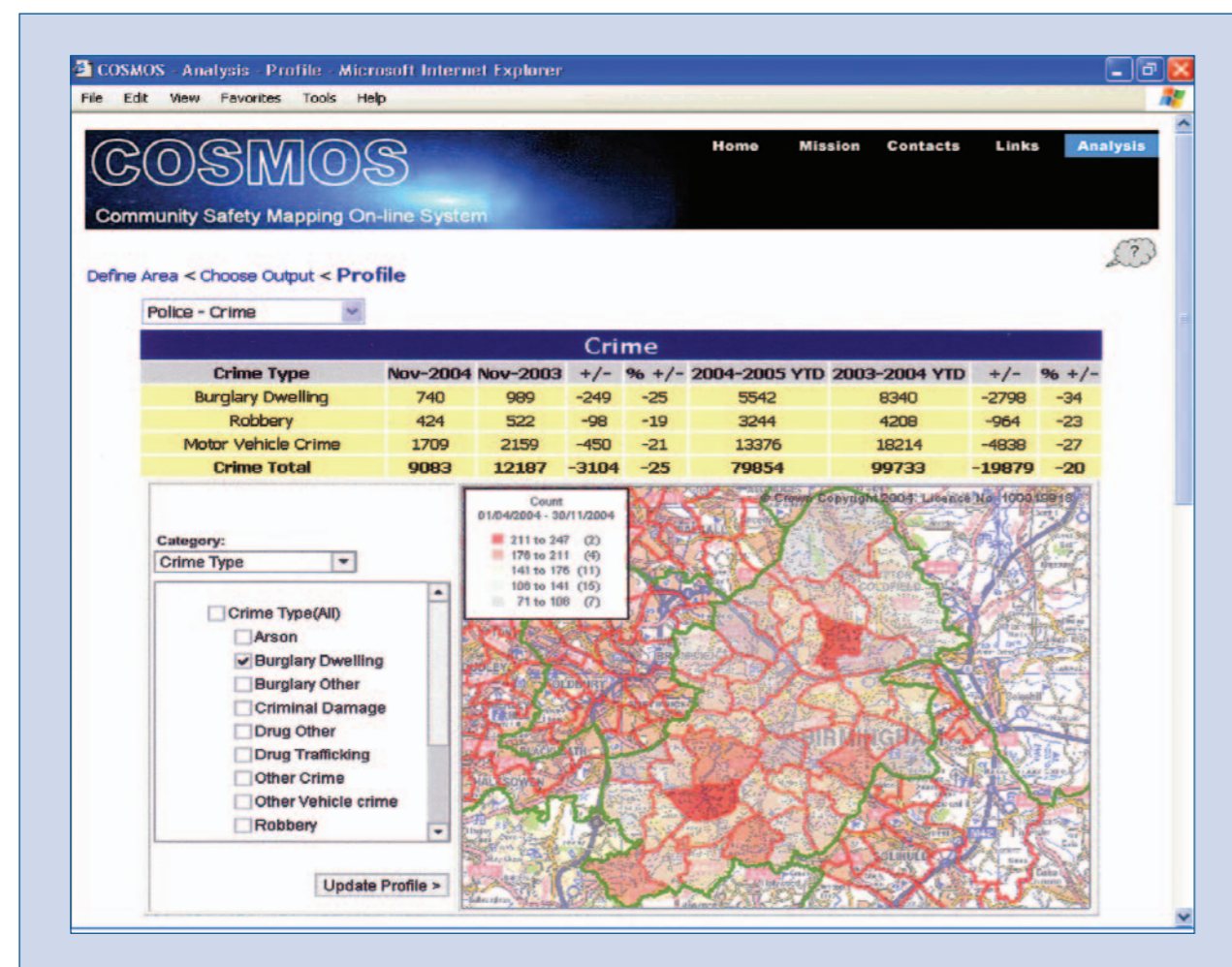
COSMOS operates an easy to use facility for generating management performance reports. It's reports include statistics, a map, and a graph showing recent trends.

Section 5 – Supporting a force's analytical and mapping functions

5.1. Data management and mapping services

Automated routines that help data processing benefits crime mapping and analysis. Many analysts find they need to perform mechanistic tasks to get data to acceptable quality levels (data cleaning) With more data coming from outside sources, a lack of dedicated resource to deal with data cleaning holds up the analytical work.

Additionally, most police forces have occasions when specific maps are required for operations, as court evidence to support a prosecution, or for internal or public displays. These tasks are often directed to analysts who typically do not have the cartographic skills, nor the printing resources, to produce these types of high definition quality maps.

Surrey Police have overcome this by creating a dedicated "mapping and data management team". This team of five staff possess the necessary facilities and skills to produce specific and important maps. Surrey's Mapping and Data Management Team also act as a direct support unit for the force's 35 analysts. The team works closely with the analysts to develop automated routines to help simplify certain analytical queries and ensure that the data requirements for analysis are being well managed.

"We take out some of the hassle [in data quality and management] that our analysts used to experience, helping them to just get on with their jobs of analysing data rather than cleaning and managing it into a required state. We also act as a one-stop shop for mapping and geographical information work for the force, helping to remove the ad hoc requests for maps that analysts in other forces tend to receive".

Greg Brown, Mapping and Data Management Team Manager, Surrey Police.

5.2. Developing skills in crime mapping

A number of police forces recognise this skills gap. The success of crime mapping in West Midlands Police is largely possible because of the introduction of a training programme to develop skills in crime mapping. The initial stages of Project Spectrum identified problems including;

- Analysts possessed only limited skills in crime mapping and spatial analysis
- A general lack of awareness by both managers and intelligence analysts of the potential benefits offered from crime mapping about what other data existed and could be used in addition to standard police data
- Data quality problems associated with police and non-police data.

West Midlands addressed these issues by providing dedicated crime mapping and spatial analysis training for analysts and established a central unit to support local BCUs and the force in the use of crime mapping techniques and the collection of partnership data. Importantly, West Midlands also introduced crime mapping awareness training for all new sergeants and inspectors seeking promotion. As a result, the quality of the analytical products routinely produced by analysts has improved, and there is now an improved understanding across all management positions as to what is possible utilising GIS and crime mapping. West Midlands believe that Project Spectrum and this training have been fundamental in improving their policing performance and reducing crime.

"Over the past 18 months crime mapping has become essential to the way we undertake our business and serve our communities. It has been fundamental in improving police performance in the West Midlands, and in recent months reducing all crime by 20%"

ACC Nick Tofiluk, West Midlands Police

Sussex Police are also embarking on a new crime mapping training programme to help develop their analysts. This has involved developing a customised course with their GIS software provider that teaches principles in crime mapping and spatial analysis alongside understanding the functionality of the software.

Action points:
Support the use of crime mapping

- Create a crime mapping and data management team to support intelligence requirements, manage police and partnership data, and support the service's general mapping requirements
- Provide dedicated crime mapping and spatial analysis training for analysts
- Raise awareness of the benefits offered from crime mapping to intelligence managers and other key decision-makers

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6. New developments in crime mapping

Crime mapping is a continually evolving field. These examples describe new and developing uses of crime mapping;

- Catching serial offenders: a technique known as geographic profiling has been used by the Serious Crime and Analysis Section at NCOF for a number of years to support investigations on serious serial crimes. Geographic profiling is an investigative methodology that uses the locations of a connected series of crimes to determine the most probable area where an offender lives. Its application is also being explored for other serial crimes such as distraction burglary and robbery.

- Prospective crime mapping: Existing methods of predicting and mapping the future locations of crime are intrinsically retrospective. Recent research demon-

strates that the risk of burglary is communicable. By using this understanding of burglary, new mapping techniques have been developed and pilot tested to reveal that a prospective mapping approach is more accurate in predicting future burglary hotspots than existing hotspot mapping techniques.

- Mapping street crime risk: A study in Westminster explored patterns in the risk of robbery and theft snatch by using new techniques that model pedestrian traffic to generate accurate counts of pedestrians at the street level. Combining pedestrian counts with street crime data identifies areas where the likely risk of being a victim of robbery or theft snatch is high. The analysis has helped to understand that the street crime responses to an area of high crime volume and high risk require different attention and design to those responses required in areas of high crime volume and low risk, and low crime volume but high risk.

Modelled daytime pedestrian counts per street segment in the West End of London, shown thematically with a photographic representation of the on-street population. Source: Chainey and Desyllas, 2004. © Crown copyright. All rights reserved. Metropolitan Police Service PA01055C 2004

7. How do I make full use of crime mapping?

The guide has described how crime mapping can support policing, intelligence development and performance improvement. To take advantage of the benefits offered from crime mapping requires certain principles to be in place.

Most police forces and constabularies already possess the core infrastructure for crime mapping. It involves four elements; hardware; software; data; and properly trained people;

- GIS software can already be found in all police forces in England and Wales and most police IT systems are adequate to run desktop GIS software. Depending on the existing infrastructure, some investment in technology and software is usually required to take advantage of web-based and mobile GIS

- Police records need to contain good quality geographic grid coordinates

- All police forces have a licence to use Ordnance Survey mapping and address data, and Census data and Neighbourhood Statistics are free to download from the internet. Many other forms of data can be sourced through local partnerships

- Analysts and other key staff need to have the skills to maximise its use.

The guide describes a number of actions at the end of each section that can be used as tips to help develop crime mapping. At present there is no single national facility or single contact whose role is to directly support and provide advice on how to develop crime mapping. This requirement is currently under review. A number of contacts are provided at the back of this guide and who are available to provide advice. We encourage you to use these contacts. The following recommendations do however identify how forces and constabularies can begin to improve their use and develop crime mapping;

- **Recommendation 1:** Champion crime mapping at the senior level: Each force/constabulary should identify a senior officer to actively champion and lead on the development of crime mapping

- **Recommendation 2:** Create a geographic data management and support team: Create a central team responsible for gazetteer maintenance, geo-

graphical data management (including the management of data sourced from CDRP partners), analysis support and servicing specific mapping requests.

Organisations such as the Jill Dando Institute of Crime Science at University College London can provide advice on how to create this team

- **Recommendation 3:** Maintain high levels of geographic data quality: Implement systems and processes that ensure that data held on police information systems is geocoded to levels that are fit for purpose for geographical analysis. This not only includes crime records, but also data on incidents, offenders, victims, and stop and search. PITO, Ordnance Survey and organisations such as the Jill Dando Institute of Crime Science can provide advice on how to achieve and maintain high levels of geographical data quality

- **Recommendation 4:** Develop skills in crime mapping: Invest in a training programme that will develop analysts' skills specifically in geographical crime analysis. Training should also be available to all decision-makers to raise their awareness of crime mapping's potential. This training and awareness raising should be directed to ensure,

  - The better integration of crime mapping into the generation of intelligence products, making geographical crime analysis a core theme in analytical techniques

  - That GIS technology is taken advantage of to support policing services, such as supporting responses to incidents, problem-analysis, performance review, reassurance, neighbourhood policing and partnership working.

NCPE can provide some advice on the content requirements of these training courses. Organisations such as the Jill Dando Institute of Crime Science and GIS software providers can provide dedicated crime mapping training and consultancy support.

Useful contacts

The following list provides useful contacts that can help you develop crime mapping in your force or constabulary. If you have any specific questions about this guide then please contact the guide's author, Spencer Chainey, at the Jill Dando Institute of Crime Science.

Home Office – Police Standards Unit
Irwin Turbitt   Irwin.Turbitt@homeoffice.gsi.gov.uk

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The Police Information Technology Organisation
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The National Centre for Policing Excellence
Kate Pearce kate.pearce@centrex.pnn.police.uk

Ordnance Survey
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www.ordnancesurvey.co.uk

The Jill Dando Institute of Crime Science, University College London
Spencer Chainey s.chainey@ucl.ac.uk
www.jdi.ucl.ac.uk

The Intra-governmental Group on Geographic Information
www.iggi.gov.uk

The Association for Geographic Information
www.agi.org.uk

The United States NIJ Mapping and Analysis for Public Safety Programme
www.ojp.usdoj.gov/nij/maps

How was the guide produced?

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