HOW TO MEASURE EFFICIENCY. EFFECTIVENESS AND EQUITY WITHIN THE COMPLEX ROLE OF POLICE IN A DEMOCRATIC SOCIETY

AN ICURS ECONOMICS OF POLICING STUDY

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Executive Summary

Policing is complex. No easy measures exist for determining efficiency, effectiveness or equity in the overall economics of police service. Perhaps this is related to the fact that the debate on issues like core policing and tiered policing is both contentious and not well understood. For example, dealing with mental health issues in vulnerable communities may not be considered core policing in some discussions but it certainly remains an important element of and a key activity in contemporary policing. We are, nevertheless, making major advances in the 21st Century. Simple crime rate or response time measures have some meaning, but the multi-agency, multi-role character of policing calls for better measures that take into account the underlying public meaning of crime, the varying demands for police service in different jurisdictions, and the rapid increase in cyber crime. Such measures would address:

- System-wide impacts on crime;
- Baseline models of demand for police services from a community perspective;
- Crime diversity and Crime Gravity;
- Crime attractors, Crime corridors and Crime catchment areas;
- Repeat Offending and Repeat victimization;
- Mobility of Offenders;
- Evolution and change in the methods of criminals (such as the apparent change in stealing through break and entry to stealing through computer hacking);

Such measures would also address public and police perceptions to the quality of services delivered through conduct of surveys among populations that actually use or deliver police services. These would include:

- Surveys of equity and fairness in policing that elicit the perspectives of direct consumers of police services – victims of crime, witnesses, suspects, offenders and other categories of persons entered into RMS subject files as well as other criminal justice system actors.
- Surveys of sworn police officers and civilian employees to:
    - solicit suggestions for improvements in regulations, procedures and practices to enhance effectiveness, efficiency and equity in provision of police services; and,
    - assess Issues of morale.
- Surveys of other criminal justice and social service personnel including crown prosecutors, judges, correctional personnel, social workers, emergency paramedics, and hospital emergency room personnel

There are no simple measures of policing or police performance, but with research and management focus on the economics of policing and its complexity, there should be a way, over a span of two to

three years, to develop and implement a process for assessing the efficiency, effectiveness and equity of policing at the community level and aggregating that up to show broader patterns at the jurisdictional, regional and provincial levels.

In such a process, police serving a particular jurisdiction would know estimates of demand for their services from:

- The size of the population at risk of offending or being victimized;
- The risks economically;
- The risks from presence or absence of other governmental services;
- The planned growth and projected change to their community;
- The public view of police services in their community, and especially the views of persons who have had contact with the police.

With this information, likely future crime trends can be estimated and likely success rates in various activities can be estimated. These estimates would provide a base line for identifying what police and do to improve services and where police can only improve services by working collaboratively with other parts of government and community organizations.

Recommendations

1. Focus on the equity, effectiveness and efficiency of police services in specific police jurisdictions.
2. Recognize that core policing services in Canada involve the provision of many different public services in addition to proactive and reactive investigation of crime.
3. In support of core policing, develop better tools for the analysis and visualization of core police activity for use by senior police managers at local, regional, provincial or territorial, and national levels.
4. Develop a new, standardized police service statistical survey that captures and weights all of the different types of calls for service received by police to supplement the current survey on crimes known to the police.
5. Develop a new measure of expenditures for police service   and situate that measure within the context of all other governmental expenditures.
6. Develop additional measures of crime to supplement the standard crime rate and the crime severity index. The crime gravity score and the location quotients of crime should be among those measures.

Introduction

Policing in British Columbia is organized under the Police Act (RSBC 1976, Ch. 367). There are three types of provincially defined policing services in British Columbia: the provincial police force; many municipal police forces and several designated police forces. The Act also permits creation of specialized police services. These policing agencies operate under the supervision and policy direction of the Director of Police Services, a senior official in the Ministry of Public Safety and Solicitor General.

Currently there are 196 general policing jurisdictions in the province. There are 11 independent municipal police forces providing services to 12 municipalities. The Royal Canadian Mounted Police, a federal agency, operate under contract with the Provincial Government as the provincial police force, providing services to small communities and rural and remote parts of the Province through 119 provincial police detachments, and provide various specialised services to all police forces. The RCMP also provide, under contract, municipal police detachments to 64 larger municipalities across the province. There is one First Nations Administered Police Service. The BC Transit Police provide focused policing services to the transit system in Metro Vancouver. There are also several specialized integrated police units that draw members and funding from multiple police jurisdictions and operate across jurisdictional boundaries. At present, there are eight integrated police units operating Province-wide: the Combined Forces Special Enforcement Unit; the Integrated Child Exploitation Team; the Integrated Gang Task Force; the Hate Crime Task Force; the Integrated Road Safety Unit; the Integrated Sexual Predator Observation Team; the Integrated Municipal Provincial Auto Theft Team, and Integrated Technological Crime Unit. There are also several regional integrated teams operating in portions of the Province. (Note that the RCMP federal policing program also operates in British Columbia as well as two federally authorized specialized railroad police forces.) There are also RCMP federally led integrated units operating in the province, which includes the Integrated National Security Enforcement Team, the Integrated Border Enforcement Team, Integrated Proceeds of Crime, and the Integrated Border Intelligence Team.

Generally, the police are seen to enforce the law, maintain public order, provide public safety and reduce individual risk. More specifically, police respond to calls for services and to observed instances of behaviour requiring intervention to protect order and public safety; maintain specialized units for investigation of major and specific crimes; pursue public engagement; provide services to other government agencies to support vulnerable populations, as well as generalized support to Federal, Provincial and Municipal governments in delivering their services on a number of levels. Provision of such support is common in matters ranging from protective assistance to persons with mental health issues to the administration of the courts to managing public events. Police also provide first response and support in emergencies and respond to both minor and major disturbances. In fact, most police calls for service and police work more broadly are related to order maintenance and provision of services rather than response to and investigation of criminal events. Figure 1 illustrates this for RCMP E-Division over a four-year period.

E-Division CAD Calls Derived from PRIME-BC
2009-2012
(n=4,558,023 Calls for Service)

- Property crime 9%
- Personal crime 9%
- Traffic-related 15%
- Drug-related 2%
- Alarm-related 4%
- Disorder/disturbance 9%
- Assist public or agency 14%
- Suspicious Person or Circumstance 6%
- Other 22%
- Abandoned call or blank 10%
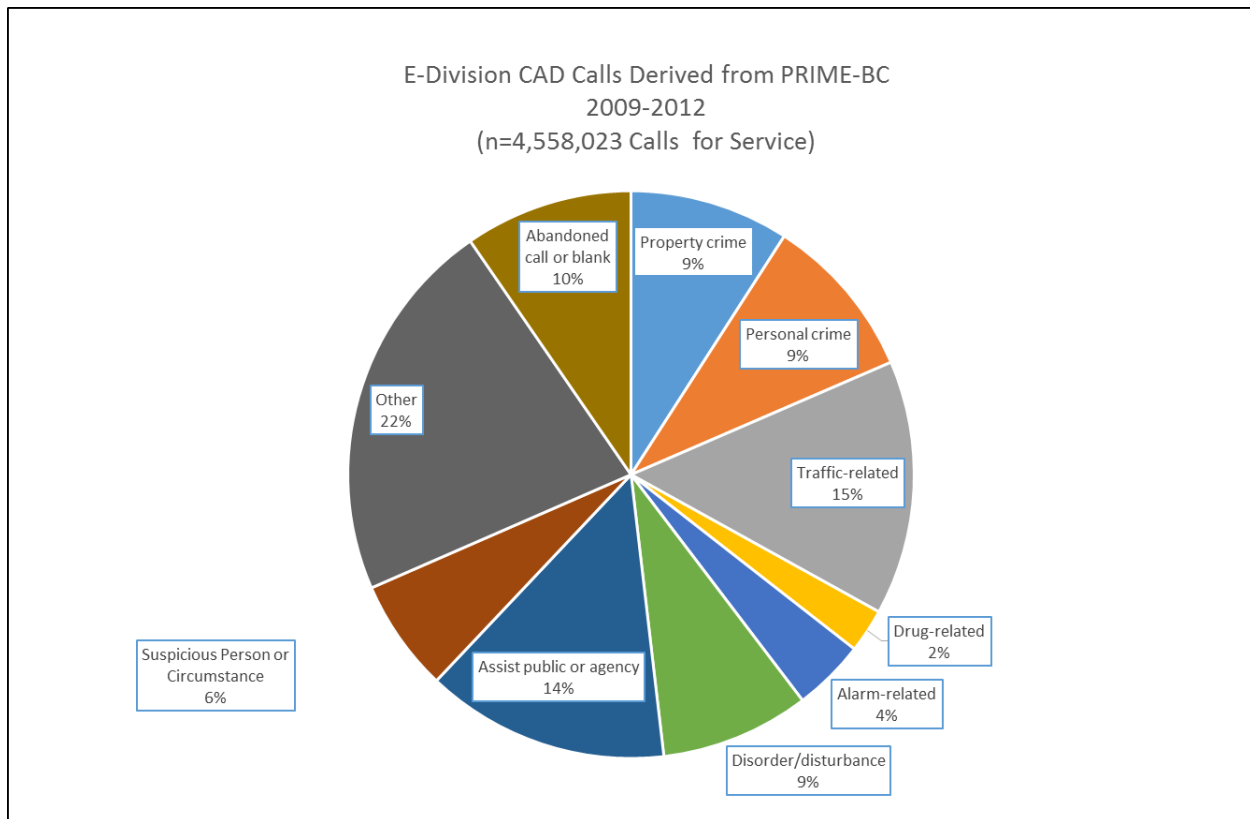
Figure 1: Calls for Service

It is worth noting that police do not, by and large, produce workloads through their own actions in isolation. There are exceptions to this general rule: for instance; proactive federal policing focused on border security, organized crime, drug crime and intelligence gathering; provincial proactive policing focused on organized crime, drug crime and traffic crime; as well as local proactive policing focused on traffic management, gangs and drugs. Demand for police services is driven by demographics, patterns in repeat offending and repeat victimization, as well as economic and social conditions. Police provide a point of first government contact for many non-crime situations: the behavioural issues associated with mental illness and drug addiction, with suicides and attempted suicides, and the problems associated with homeless ("roofless") populations living on the streets. Police are often the agency expected to respond to public safety and tranquility issues associated with seasonal employment patterns, tourism, and community housing needs. For example, in some communities, local pubs become the "living room" and point of contact between vulnerable persons and police. Police also provide traffic safety services, enforcing both the criminal code provisions (e.g., for impaired driving and for hit-and-run behaviour) and Provincial traffic legislation (for instance, speeding in a school zone). In doing so, they are dependant on the structure and quality of road networks. Many police agencies have a category called "Assistance to General Public" which is a catch all for a wide variety of services not specifically related to what most would view as typical law enforcement.

This brief description of policing in British Columbia provides a good indication of why measuring the economics of policing is complex. Development of specific measures of police performance in context

and across all the activities the public expects is challenging. The purpose of this report is to provide information on the scope, complexity, and internal and external influences affecting police services and to provide information on the state of the art in measuring the efficiency, effectiveness, and equity of police services.

This will be done in eight sections:

- *Section 1* presents a description of the categories of demand and expectation that can be used to divide policing into groups of similar activities*.*
- *Section 2* presents overall trends in the quantity of crimes and costs of police services in British Columbia*.*
- *Section 3* summarizes core policing and describes how the components of core policing vary over time and in different contexts. Of importance is the way in which core policing is composed of different things in different parts of the province.
- *Section 4* describes efficiency, effectiveness, and equity in more detail, leading to the next section of the report that describes the frequently used measures of police performance such as changes in the standard crime rate and state of the art measures that reflect more of the complexity of police work.
- *Section 5* provides a detailed description of data sources for measuring police activities and their efficiency, effectiveness, and equity.
- *Section 6* reviews the strengths and weaknesses of some currently used measures.
- *Section 7* provides a detailed description of alternative measures. Finally,
- *Section 8* provides a summary of recommendations that could be followed to improve measures of efficiency, effectiveness, and equity of police services in the near future.

Section 1: The Policing Function

The policing function in Canada is organized around three major public policy pursuits that can, broadly, be considered *core policing:*

- Public Safety
- Crime Reduction
- Public Welfare

Public Safety

The Public Safety element of the policing function includes response to a wide variety of events that are not directly related to crime control and reduction, but do relate to protecting members of the public from other kinds of harms. These involve both proactive and responsive strategies intended to prevent harm to people and property.

Traffic control and crash prevention is a major example of policing for public safety. Proactive police work involving support for legislation requiring, for example, motor vehicle passengers to wear seat belts and tougher restrictions on impaired driving and distracted driving combined with responsive and targeted enforcement this legislation has contributed to major reductions in the harm caused to the public by vehicle crashes. Motor vehicle collision fatality rates dropped by 28% between 1983 and 2015. Vehicle collisions causing injuries dropped by 40% over the same time (Transport Canada, 2017). Police are first responders at vehicle crash sites. In addition to their primary function of conducting

investigations into the collision itself, police provide support to other emergency responders and direct traffic to reduce the chance of further collisions. They enforce laws traffic laws setting speed limits and prohibiting other hazardous moving violations and engage in public education to minimize the likelihood of collisions.

Another example of the public safety component of the policing function is crowd and traffic management at major public events. The 2010 Olympic Games in Vancouver, for instance required work by thousands of police officers managing traffic and crowds, managing venue security, and responding to public complaints. Police routinely provide these kinds of services for sporting events, parades, political demonstrations and many other types of events.

A third example of the public safety aspect of the policing function is disaster response. Police are first responders when wild fires, earthquakes, floods and other disasters threaten communities. Police are the agency normally expected to deliver evacuation notices, ensure that the notices are heeded, protect the boundaries of evacuated areas, and provide some rescue services.

Crime Reduction

This component of the policing function is the one most commonly considered in terms of police performance. Crime reduction has three elements: prevention; proactive investigation, and; responsive investigation. This is a critically important part of the policing function, but as indicated by Figure 1, only a minority of public calls for police service involve one of the more than 200 types of crime tracked by the Canadian Uniform Crime Reports system.

Crime prevention, Community Safety Officer work, problem oriented policing practice and similar activities form a very important component of Canadian police work which affects both the public's perceptions of crime, peace and order in their communities, and the volume of crime that must be investigated and prosecuted after the fact. Crime prevention holds the most promise for reducing the level of crime in society, but often receives the least attention in terms of resourcing.

Proactive investigation is a way of describing large scale investigations into the ongoing criminal activities of criminal networks, particularly organized crime groups and terrorist groups as well as other self-generated work by front line officers, such as detecting impaired drivers, street-level drug enforcement, and problem-solving as part of community-based policing. These efforts are often based on the work of crime-analysts. Proactive investigations probe past activities in order to solve crimes and charge offenders, but also seek to predict and prevent planned criminal activities before they happen. A distinctive aim of proactive investigation is to degrade and destroy the interpersonal networks that sustain criminal groups and their activities over time.

Responsive investigation seeks to solve crimes and charge offenders after a crime has been committed. Solving crimes and charging offenders serves many of the standard aims of the criminal justice system: reinforcement of the law; deterrence of potential offenders; incapacitation of offenders themselves; and, provision of justice for the victims of crime.

Public Welfare

The public welfare component of the policing function maintains public tranquility through disorder reduction and incivility control, assistance to the public and protection of vulnerable populations. Much of this work must be done in cooperation with other government agencies, dedicated non-governmental

agencies and the public at large, yet police are often the first responders when public welfare issues occur.

Control of public disorder and incivility, often called *broken windows theory* (e.g., Kelling & Coles, 1996), has two aims: maintenance of quality of social experience, particularly in urban settings; and reduction of conditions that encourage crime. Leadership in addressing such issues typically falls to the police function.

For instance, ICURS supported research into public concerns in different neighbourhoods across Metro Vancouver identified incivilities and disorder ranging from drug and sex trade litter to graffiti to bicycle riding on sidewalks that materially degraded the perceived quality of life and inflated fear of crime in those neighbourhoods (Guterres, et al., 2009a, 2009b; Mosca & Spicer, 2007; Spicer 2012). Police led collaborative projects involving reduction of litter, anti-graffiti programs, and reduction of disorderly behaviour measurably improved the quality of life for residents, workers, and visitors.

Broken windows theory takes things a step further, arguing that community failure to attend to minor incivilities such as litter, graffiti or broken windows in an unused building and minor disorder such as aggressive begging or skateboarding on the sidewalk send a message to potential criminal offenders, telling them that if they commit crimes they can expect little in the way of consequence. The theory argues that inattention to small things creates a feedback loop that causes the crime problem to grow. Police attention to disorder and incivility control then becomes a critical component of the crime reduction component of the policing function as well as the public welfare component.

Police provide assistance to the general public in many ways, ranging from giving pedestrian directions for reaching tourist destinations such as museums to summoning tow trucks for stranded motorists to providing search and rescues personnel. Location of missing persons is a critically important public assistance component of the police function.

Provision of services to vulnerable populations is another important component of the police function that dates back to the very beginnings of the modern police institution. Police deal with public intoxication, moving intoxicated persons to safe facilities until they sober up or to medical facilities as required. Similarly, police deal with persons with mental health issues who act out in ways that might be harmful to themselves or others. Working with vulnerable populations presents a major draw on police time and resources.

The Complex Logistics of Policing

Police must be both proactive and reactive in pursuing public safety, crime reduction and public welfare. Police work must be carried out within the expectations and constraints imposed by at least four separate but related contexts: the community in which the police are located; the legal context at the time and place the work must be conducted; the crime context in which the police are operating; and the administrative context that defines the resources that can be used and procedures that must be followed to make police work possible. The mix of resources available to a particular police force places constraints on the types of services that can be provided. The resource levels directed to policing might be seen as a measure of what a given policing authority considers acceptable after taking into consideration a number of factors including risk, the amount of crime a community is prepared to live with and efforts to balance the funding amongst all of the various needs.

Police resourcing is often thought of in terms of budget allocations on the part of governments, and we discuss things from this point of view in section 2 below. Police resourcing really needs to be considered in terms of the tasks to which police are expected to attend and the personnel and skill sets needed to do so as well as the time, equipment and support services required to do the job properly. Cybercrime, for instance, is a major new area of police work which requires skill sets and equipment that police have not traditionally acquired. Addressing the needs of severely addicted persons or homeless mentally ill persons, which police must frequently do requires different skill sets from those needed to address money laundering by criminal organizations or residential break-ins or homicides or sexual assaults or graffiti painting. The complexity of the tasks that fall within the police function suggest consideration both of some form of tiered policing focusing on different education, knowledge and skill sets and of lateral entry into police service of persons with particular esoteric skill sets. The complexity of police work and how it might be measured in presented as a set of tables, drawn from the ICURS report on measurement of policing complexity (2010), in Appendix A below.

Section 2: Trends in Crimes and Police costs

Trends in Crime in British Columbia

Crime Statistics

Canada has collected some form of crime statistics since shortly after confederation. Judicial statistics, counting criminal charges and convictions were collected from the early 1870s until the late 1970s. Canada experimented with collection of police statistics during the 1920's and collected some limited forms of aggregated national police statistics until the early 1960s. The quality and coverage of these early police statistics proved unsatisfactory and beginning in 1962 Statistics Canada conducted a systematic survey of police agencies utilizing standard offence definitions and recording rules for recording criminal events in the aggregate. The results, published annually as the Uniform Crime Reports (UCR), provided standard counts of criminal incidents and a standardized crime rate for each Canadian policing jurisdiction for more than half a century. The Government of British Columbia began collecting and publishing its own tabulations of UCR data, in more detail than those provided by Statistics Canada, in 1977. During the 1980's an improved and much more detailed incident based crime statistics system was developed and promulgated by Statistics Canada. Commonly referred to as *UCR2*, the incident based reporting system spread slowly, largely dependent on development of computerized records management systems in local and provincial police services. National coverage of UCR2 was completed in 2009 and Statistics Canada replaced the UCR1 counts with UCR2 data.

The UCR2 system, as of 2015, collected counts of incidents for some 220 discrete types of crime and also provided many aggregations of crime types. For instance, separate incident counts are provided for the discrete crimes of Murder in the First Degree, Murder in the Second Degree, Manslaughter, and Infanticide; the aggregate category *Homicide*, representing the sum of the four discrete crime types, is also provided in the published statistics. The offence of Homicide receives additional special treatment: there is a separate and very detailed survey that collects information about the characteristics of every homicide in Canada including detailed information on where and when and how the crime was committed, the characteristics of the victim and, if known, the characteristics of the offender.

Property Offences Per 100,000 Population
Canada
1962-2015
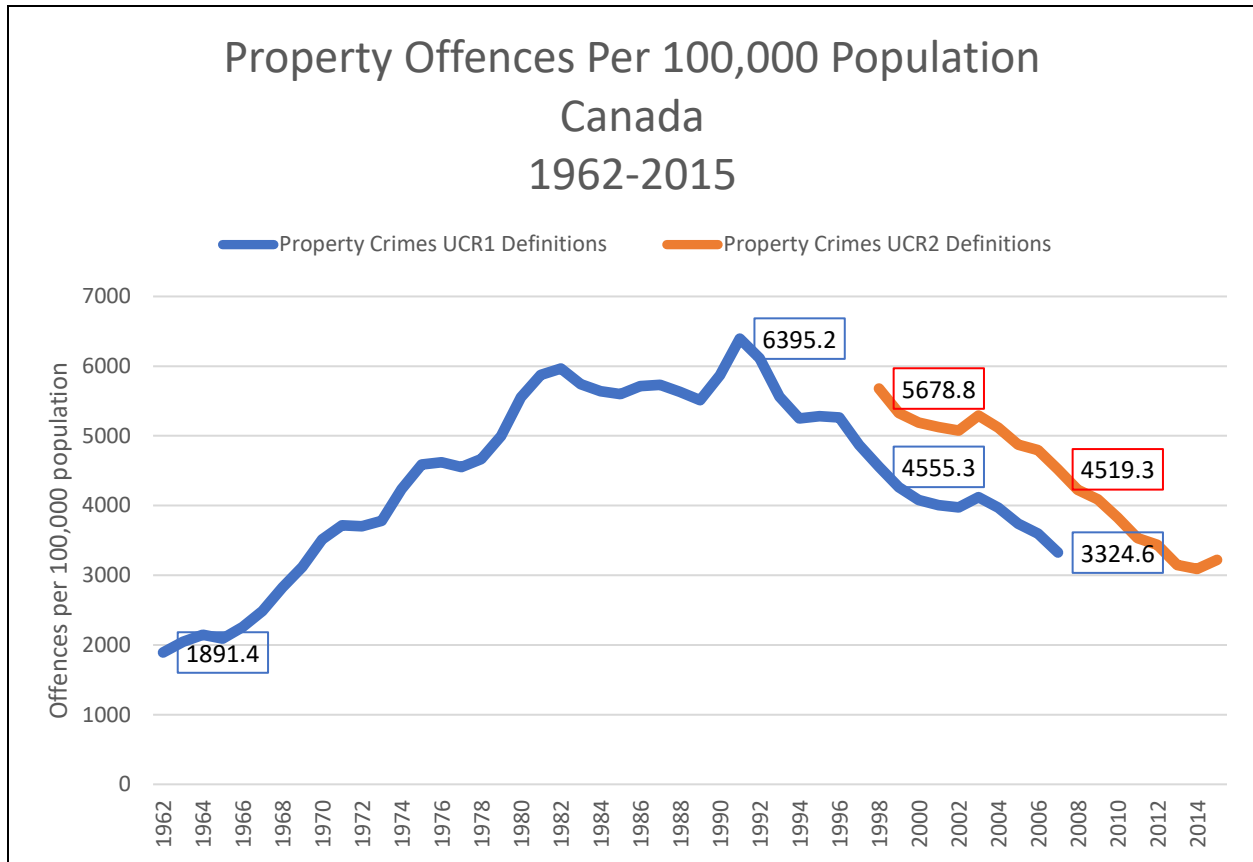
Figure 2 Trends in Property Crime

While substantially more informative than nearly any other country's crime statistics, the UCR data must be used with care. First, offence counting rules have been set to overemphasize violent crimes against the person in comparison to crimes against property or other crimes. Violent crimes are counted as one discrete crime for each victim. Property and other crimes are counted per incident. So, for a violent crime such as robbery: if three people are accosted by a robber in a single incident and each has their wallet and watch taken, that would count as three crimes in the UCR1 and UCR2 systems. If someone broke into an apartment shared by three roommates while they were sleeping and stole each of their wallets and each of their watches, that would be recorded as a single case of breaking and entry in the UCR1 and the UCR2 systems. In both cases three people lost their watches and wallets: the UCR statistics would show three robberies but only one crime of breaking and entering. Second, scoring rules direct the police to record a criminal event as the most serious type of crime included in that event only, even though UCR2 permits showing more complexity. In the breaking and entering example, what really happened was a breaking and entry (most serious crime) followed by three thefts (less serious crimes): this event would be recorded as breaking and entering only. Third, as the criminal code has changed over time, crime types have been added to and subtracted from the list of crimes tracked by UCR1 and then UCR2. Highly aggregated crime categories such as "Violent Crime" and "Property Crime" have been particularly subject to sharp changes induced by changes in the set of crimes they consolidate. Figure 2 illustrates the apparent increase in the aggregate Property Crime rate per 100,000 population produced by a 2009 decision by Statistics Canada to move several crime types such Arson and Mischief from the aggregate category *Criminal Code -Other* to the aggregate category *Property*

Crime. Note that although the Property Crime Rates jumped very substantially, the general trends shown by the two versions of the category were very similar. Figure 2 also illustrates a general trend in Canadian crime rates over the past half century: the volume of property crime dominates the trend for the overall crime rate. Trends for specific crime types may differ substantially from the overall trend. This will be discussed for British Columbia in more detail below.

Counts and Rates

The UCR and UCR2 produce several important counts of events: the number of actual offences known to police; the number of offences cleared by charge or otherwise; the number of persons charged with crime during a given year. The drawback in using counts is that they cannot easily be used to compare the crime situation in different places or in one place over time because populations differ from place to place and from time to time. For instance, the coastal city of Vancouver had a total of 54,513 crimes known to the police in 2015, the interior city of Williams Lake had 3,206 police recorded crimes that year. Which had the worse crime problem? On simple event counts the answer is Vancouver. But Vancouver had a population of 650,575 in 2015, Williams Lake had only 11,215 residents in that year. Comparison, which is fundamental to any evaluation of a condition or situation, requires adjustment of the data to take differences in the size of the two cities into account. To do this, criminologists calculate crime rates.

Crime rates are standardized statistics that, in the best case, allow comparison of the risk of crime incurred by residents in different police jurisdictions. The crime rate for a particular jurisdiction is calculated by dividing the police recorded number of a particular type of crime by the resident population, then multiplying the result by some standardizing number, for instance 100,000, of population. In theory, this permits comparison between large population and small population jurisdictions and permits comparison of the crime rate in the same jurisdiction over time. In 2015 Vancouver's total crime rate was 8,379 per 100,000 population, Williams Lake's total crime rate was 28,586 per 100,000 population. In comparison, Williams Lake had a crime problem that was more than three times as bad as Vancouver's crime problem.

The standard crime rate provided by Statistics Canada has several known drawbacks, some of which substantially limit its utility as a measure of police performance:

- It is based on a subset of the crimes known to, dealt with, and recorded by police (Criminal Code offences excluding traffic). As a result, it reflects only a portion of police work. Based on 2013 UCR statistics for BC police jurisdictions, the crime rate on average excludes 21% of the crimes with which police must deal and the range across BC police jurisdictions runs from a low of 7% excluded to a high of more than 60% of crimes excluded from the official standard crime rate for a particular jurisdiction.
- Even if fully incorporated into the calculated crime rate, the Uniform Crime Reports collects data on federally defined violations of law only. Police activity related to provincial law and municipal by-laws is excluded. Recent examination of Calls for Service Data suggests that UCR records reflect only around 30% of the total calls for service received by police.
- The standard crime rate also treats each recorded crime as identical to every other recorded crime so that a first-degree murder counts for no more than a violation of the Excise Act. Clearly, different crimes require different police responses and absorb different levels of

resources in those responses. Identical crime rates generated by different mixtures of crime types could absorb very different amounts of police resources.

- Crime rates often inflate the apparent crime problem in smaller communities – a function of small numbers. To illustrate: a single murder in the Yukon generates a murder rate of 4.0 per 100,000 population; one murder in Vancouver generates a murder rate of 0.165 per 100,000.

The Dark Figure and Victimization Statistics

One additional problem with police statistics is that they only record crimes which have been brought to the attention of the police. Many crimes occur that, for a variety of reasons, are never brought to police attention. The gap between all the crimes that occur and the crimes are brought to police attention is called "the dark figure of crime." Social scientists attempt to address this problem by conducting surveys asking people about crimes which they have suffered or asking people to describe crimes they have committed. The latter kind, called *Self-Report surveys*, are thought to be less likely to capture an accurate picture of the extent of the dark figure of crime for the obvious reason – risk of prosecution for the respondent. Victimization surveys are thought a more reliable gauge of the dark figure for the crimes respondents are asked about, but have limited scope. Canada has conducted national victimization surveys about every five years since the early 1990's. These surveys have produced estimates of the total volume of crime that are about three times the total number of offences known to the police. The magnitude of the dark figure varies by type of crime: it is highest for sex offences and lowest for motor vehicle theft. They also suggest that there has been a small but steady decline in the proportion of crime reported by victims to the police.

Trends in Crimes Known to the Police in British Columbia

At the most aggregate level, British Columbia crime rates per 100,000 persons have been similar to the Canadian trend shown in Figure 2 above. Overall crime rates rose steadily from 1962 until 1991 and have since declined. This generalized pattern is dominated by trends in theft and breaking and entering offences. Figure 3 charts the trends in British Columbia's theft rate from 1962 to 2015. The patterns for other types of crime are sometimes quite different from the overall picture.

Homicide and Fraud both showed sharp increases in the 1960s with peaks in the early 1970s and sustained declines since those early peaks. In contrast, Motor Vehicle Theft and Disturbing the Peace offences grew slowly for several decades before exploding to sudden highs in recent years, followed in the case of vehicle theft by a very sharp drop following mandated changes in the design of vehicle security equipment. Figure 4 charts the Homicide rate in British Columbia over the past half-century. Figure 5 charts the trends in disturbing the peace offences.

Appendix B charts the long-term trends in the rates of 13 types of crime: homicide; sexual assault; assault (non-sexual) kidnapping; abduction; breaking and entering; theft; motor vehicle theft; fraud; mischief; disturbing the peace; drugs offences; and, prostitution offences. Note that some offence types such as mischief and disturbing the peace have only been tracked and published in the UCR since 1974 and that tracking of some other offences such as kidnapping and abduction dates from 1983. British Columbia has tracked and published data on selected offence types for larger municipalities since 1977.

Figure 3 Theft Trends

Since reaching a historic low in 2012, homicide rates have increased by 25%. They remain at less than half the peak rate of 1974.
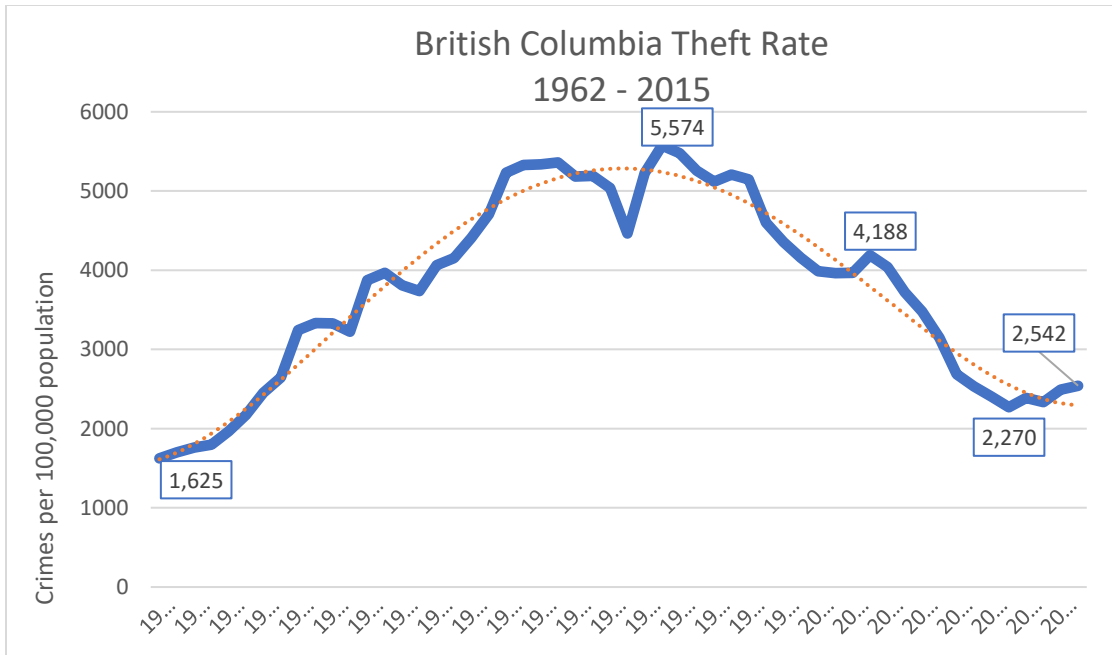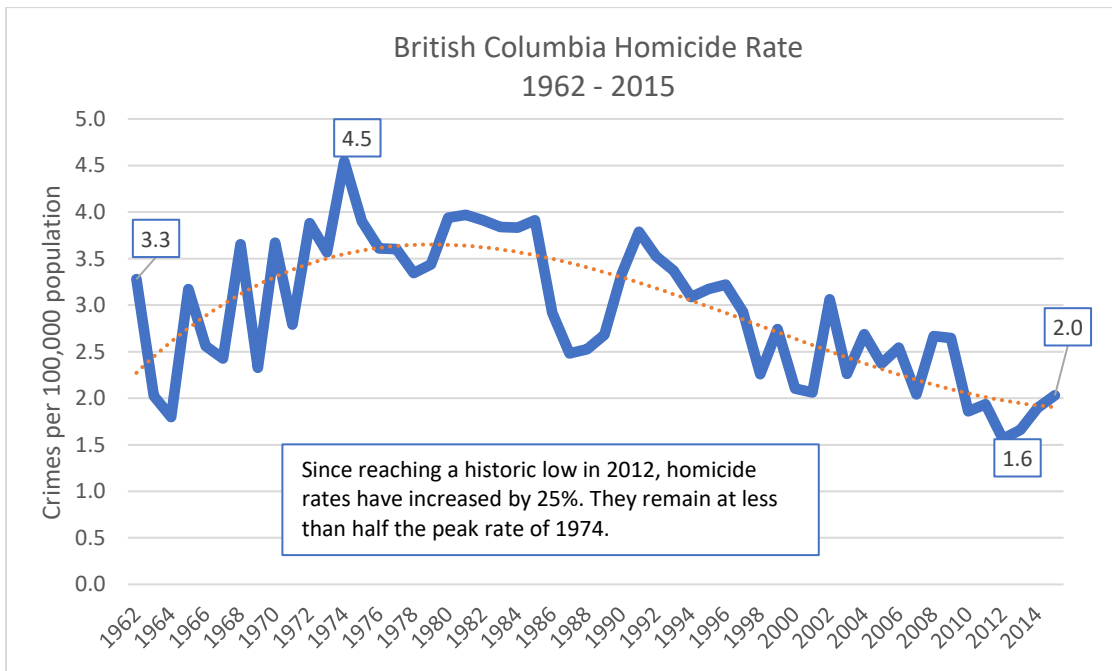
Figure 4 Homicide Trends

British Columbia Disturbing the Peace Offence Rate 1974-2015

Disturbing the peace incidents follow a pattern very different from most crime trends in British Columbia: they nearly tripled between 1993 and 2007; they have since declined by about 20 %.
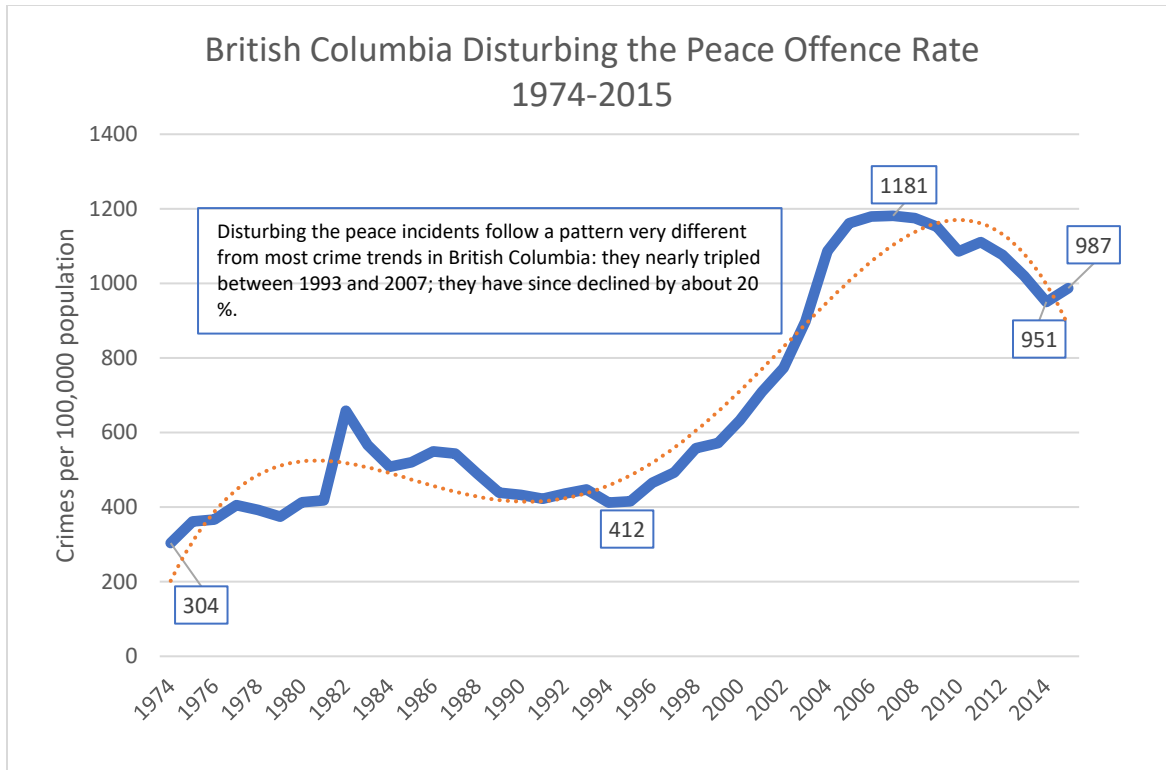
Figure 5 Disturbing the Peace Trends

Trends in Police Costs

The large drop in overall crime rates over the past 25 years has been accompanied the observation that the cost of police services has increased, in the aggregate, despite this drop in the number of crimes recorded. Figure 6 Illustrates the starting point for this discussion.

Discussed in isolation, it appears that policing costs have skyrocketed while criminal caseload has dropped. But all social services have become more expensive over time. For instance, over the past decade education costs have about doubled while primary and secondary school enrolments have dropped as shown in Figure 7.

Figure 8 (below) shows the increase in spending by the Province of British Columbia for four major areas of Provincial responsibility: policing; health; education; and, recreation and culture. Figures have been normalized with spending levels for each area of responsibility in 1989 set at 100. Numbers for 2009 show the amount of increase through 2009. Spending for each area of responsibility more than tripled: policing expenditure increases fell into the mid-range of increases.[1]

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[1] Statistics Canada terminated collection or publication of data on health expenditures and recreation and culture expenditures following 2009.

Crime Rate and Expenditures for Police Operations
Canada
1986-2015
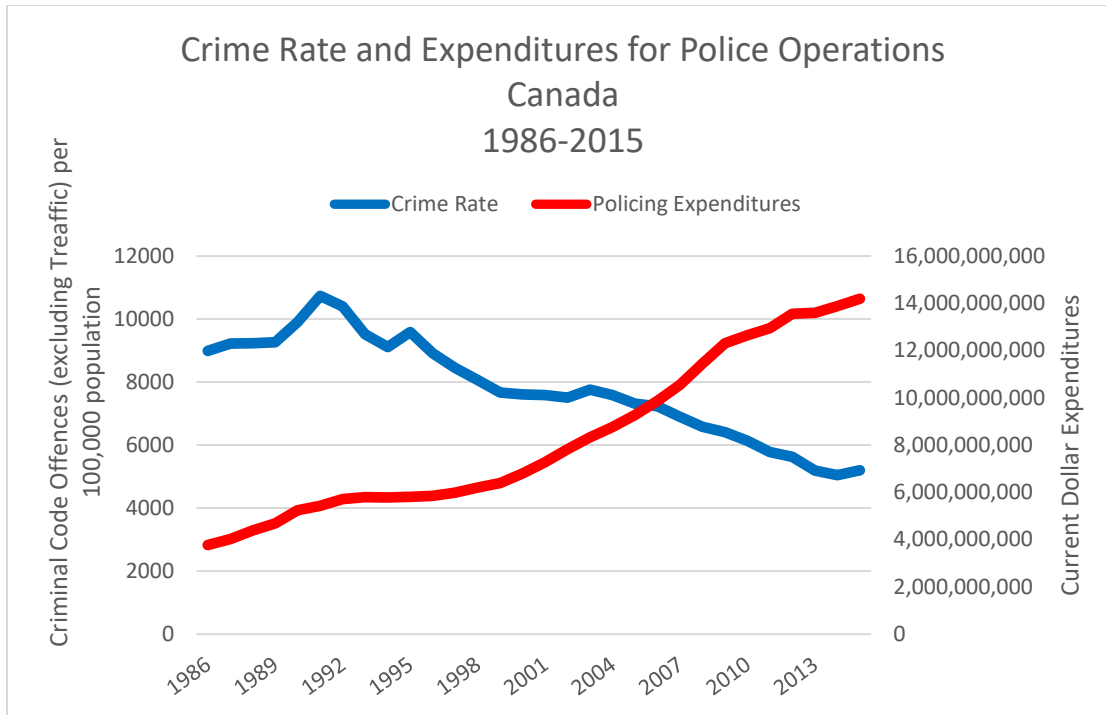
Figure 6 Trends in Crime and Expenditures for Police

Public School Enrollments and School Board Expenditures
Canada
1997-2014
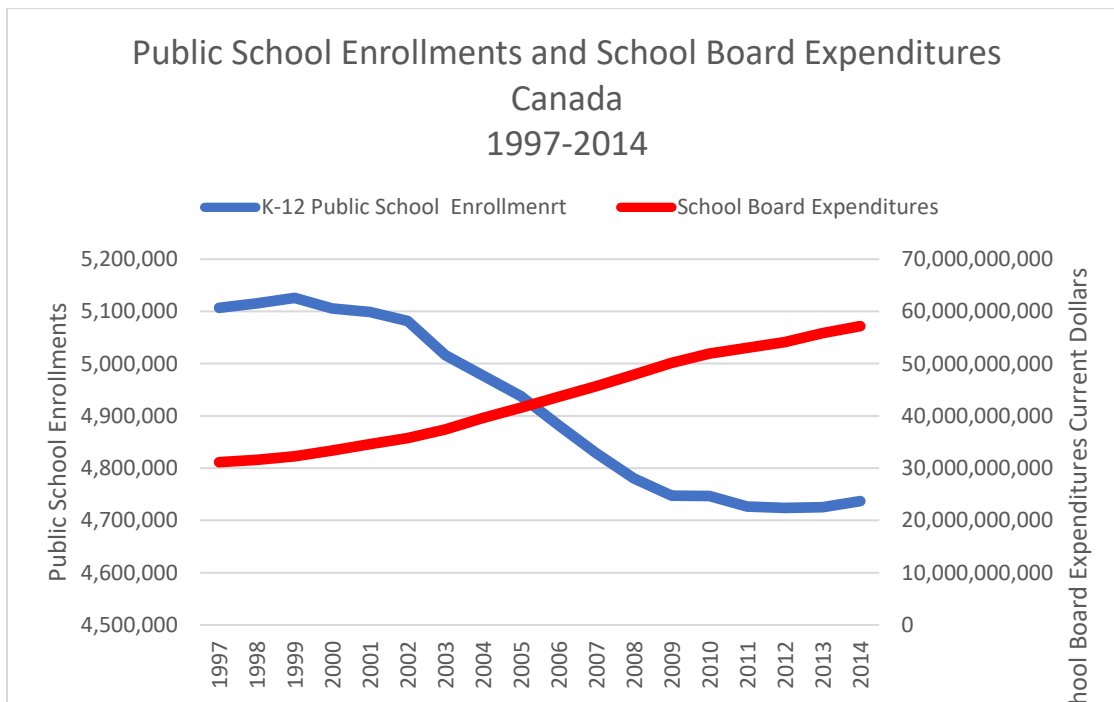
Figure 7 Trends in School Enrolments and School Board Expenditures

As Figure 9 makes clear, the average expenditure for policing by municipal governments across British Columbia in 2015 was very similar to expenditures for other protective services such as fire and rescue services and by-law enforcement services and on average took up a smaller share of municipal expenditures than expenditures for parks and recreation or for amortization. There was, of course, variation in this general picture: policing costs took up a larger share of municipal expenditures in the largest cities and in some cities with high crime rates. The Federal contribution to the Police Service Agreement cost-sharing formula provided under the British Columbia- RCMP policing contract reduced the cost to municipalities contracting with RCMP to provide municipal police services relative to the cost of policing in the municipalities maintaining independent municipal police departments.
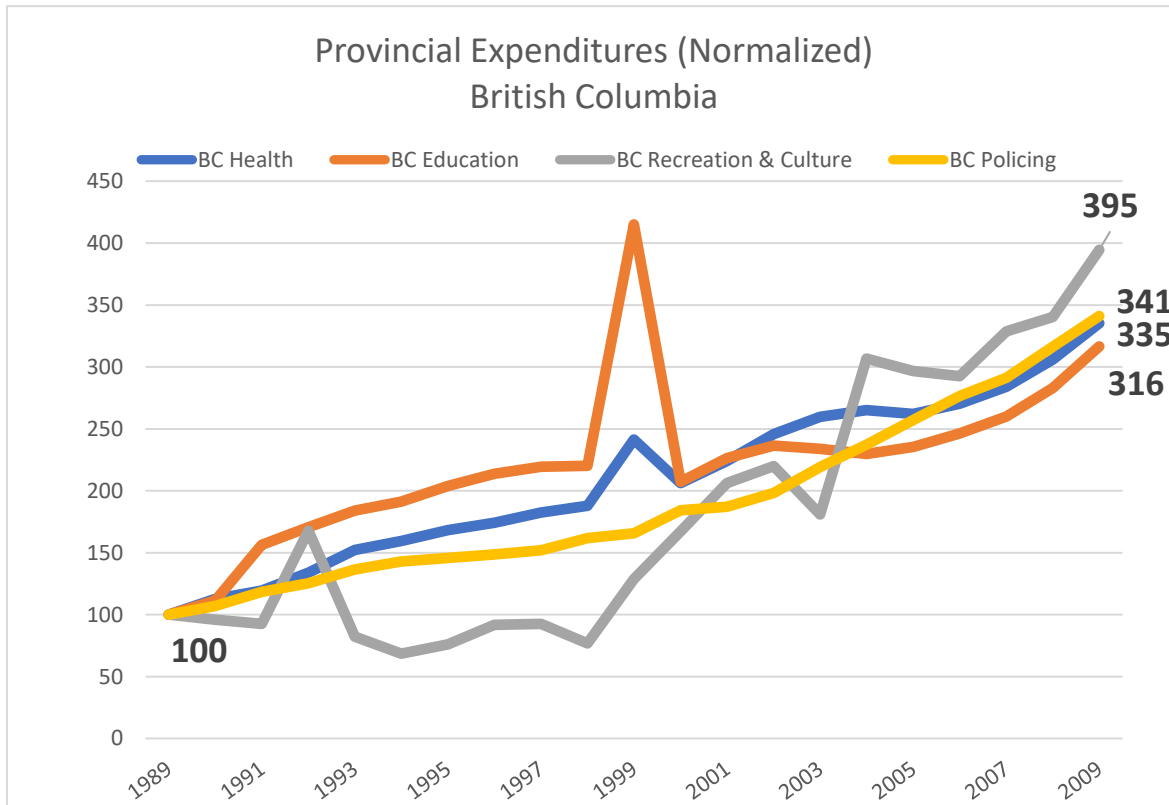
Figure 8 Normalized Expenditure Trends

Appendix C provides trend charts showing expenditures for policing as a percentage of municipal operating expenditures for 62 municipal governments that are required to provide annual financial reports to the Provincial government. Appendix D places those trend charts in context by adding trend lines for the share of municipal expenditures committed to General Government and to Parks, Recreation and Culture. Data are taken from Schedule 402 as published annually by the Local Government Division of the BC Ministry of Community, Sport, and Social Development. As Figure 10 demonstrates in showing the average trends across all BC Schedule 402 municipalities, municipal spending for police services did not grow disproportionately to spending in other municipal operating categories. In fact, spending for Parks, Recreation & Culture matched or exceeded spending for police over the past three decades. Naturally, the relative expenditure patterns are different in different municipalities and have sometimes changed in the same municipality over time as different situations and needs have developed.

Average Expenditures by Function
BC Municipalities
2015

Legend:
- General Government
- Police
- Other Protective Services
- Solid Waste Mgmt and Recycling
- Health, Social Services and Housing
- Development Services
- Transportation and Transit
- Parks, Recreation and Culture
- Water Services
- Sewer Services
- Other Services
- Amortization
- Other Adjustments

Pie chart values: 10%, 0%, 13%, 12%, 4%, 1%, 3%, 10%, 17%, 7%, 6%, 2%, 15%

Figure 9 Average Municipal Expenditures by Function

Share of Municipal Expenditures
Average Across All BC Sch. 402 Municipalities
1983-2015

Legend: Police Services — Parks, Recreation & Culture — General Government
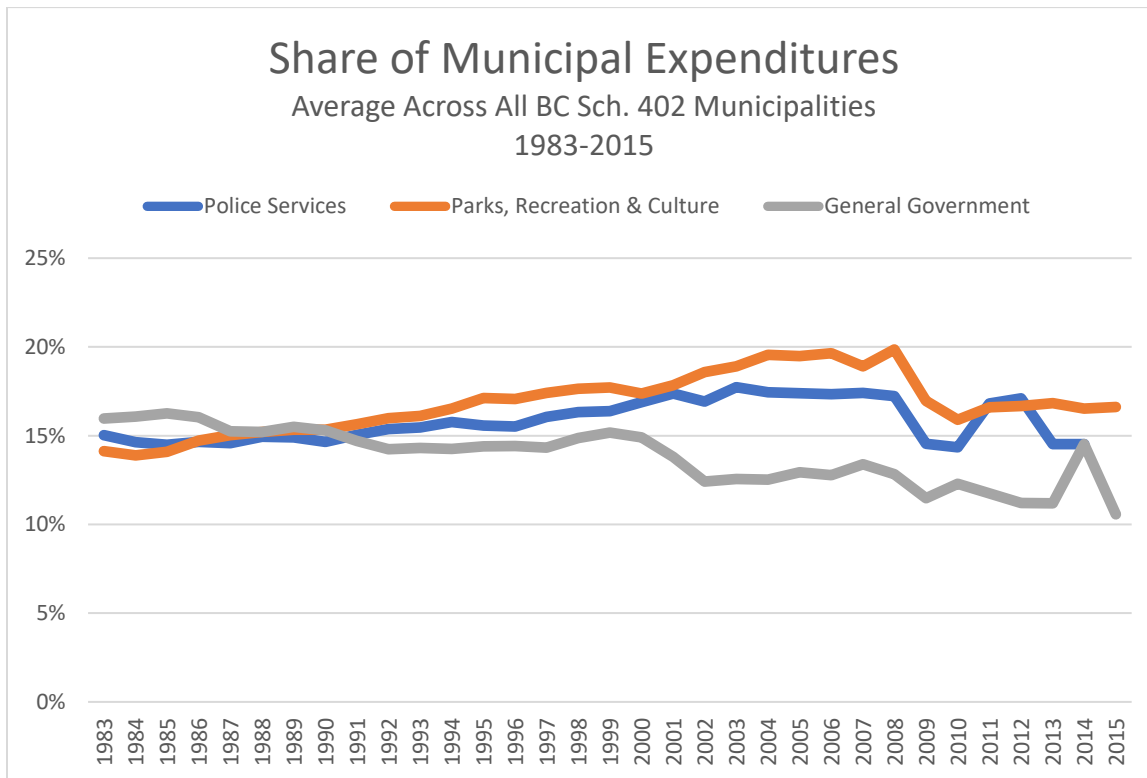
Figure 10 Trends in Percentage Share of Municipal Expenditures

The "cost disease" issue

Policing is a service industry. The vast majority of expenditures for police services are for salary and benefits for sworn and civilian staff. For instance, salary and benefits accounted for 83% of planned expenditures in 2017 budget for the Vancouver Police Department (Vancouver Police Department, 2016). This is very much in line with expenditures by most Canadian police services. It means that salary and benefits is the major driver in changes in the cost of police services to their communities. It also means that police services are subject to Baumol's idea of "cost disease."

The idea behind cost disease originated in an economic analysis of the reasons why ticket prices for live theater or live classical music concerts escalated so rapidly (Baumol & Bowen, 1966). The explanation had two components: First, wage competition for skilled personnel across sectors of the economy. Second, the relative ability of different sectors to increase the productivity of their workers. Huge increases in per worker productivity in industrial jobs owing to commitment of capital expenditures for better tools and working conditions made it possible for workers in these sectors to demand and employers to pay increasing wages over time.

Productivity growth and consequent wage growth in other sectors of the economy placed pressure on live performing arts because it is difficult to increase productivity: An orchestra that played Beethoven's Ninth Symphony twice as fast could perhaps increase the number of performances it gave on a single night, but the quality of the product would be materially reduced. Similarly, presenting a musical such as *Matilda* or a play such as *Death of a Salesman* twice as fast would reduce the quality of the product in unacceptable ways. While some gains in quality have occurred through introduction of technology (better acoustics in concert hall; Wi-Fi microphones enhancing the sound of singers in musicals) this has done little to increase the *quantity* of live performances that can occur during any given time period. Yet to continue to attract good quality workers, the performing arts had to increase ticket prices in order to pay competitive wages despite their inability to increase productivity per worker.

This general problem applies to many sectors of modern economies such as nursing and education in which human activity provides services rather than physical product. A Dutch researcher (van Reenen, 1999) has shown that it applies to police work. There are limits to the speed with which police work can be conducted because police work involves human interaction within the context of the *Charter of Rights and Freedoms* and other laws. Introduction of improved technology and capital equipment, which has increased the speed with which some tasks can be done (for instance, computerized fingerprint identification can sometimes speed the completion of a particular investigation) while other improved technology can actually slow investigations and reduce productivity in terms of case completions per unit of time (extremely small amounts of DNA collected at crime scenes can now ultimately make case solution and conviction much surer, but crime scenes must now be searched in microscopic detail to look for that DNA sample and there is a long queue of DNA samples waiting for analysis).

Police salaries and benefits must, according to the Baumol effect, continue to increase in order to attract good personnel even though the productivity of a police constable, in terms of the number of calls for police service that can be properly handled per unit of time, cannot be much increased. This is an important consideration in thinking about the overall cost of police services over time.

Section 3: Core Policing

Within the broader discussion on the issues of the economics of policing have been suggestions from many quarters that police should focus more of their efforts on core policing duties and leave or devolve some non-crime functions that the police now undertake to other agencies. Underlying the interest in refocusing the police functions are concerns about increasing policing costs, primarily police compensation, in a time when reported crime rates had been declining. These concerns about the perceived scope creep of police duties is not unique to Canada, but have been raised in many countries. These assertions force us to ask 'what is core policing?' This question becomes important in order for there to be an understanding of what the police are currently doing before there can be meaningful discussion about refocusing or reforming police mandates.

A review of literature on the subject of core policing found no generally accepted definition of core policing, though some authorities have made an effort to detail the police role. Interestingly, in those cases some non-crime duties are included in the role of police. For example, it is recognised that police have a role to play in dealing with disasters, major events, and ensuring general well-being of the public.

What was found were broad descriptions of the responsibilities of policing, and generally include: keeping the peace; investigating crime; preventing crime, and; maintaining order. These broad functions are considered the cornerstone of public policing, and of necessity, given the differing contexts of policing throughout Canada; the responsibilities must remain broad and responsive to public expectations.

> *Although there is no agreement on core duties at the provincial or national levels, this discussion has been proposed as a crucial input to progress on professionalization* (Council for Canadian Academies, 2014, p. 29).

The Province of Québec has perhaps best articulated the basic duties of police based on population size of municipalities, and include the responsibilities of the Sûreté de Québec which has an overarching role as support to smaller forces, and to provide some very specialised services. The list of functions required of the police agencies in British Columbia and Québec is attached as Appendix E.

While it is debateable whether the costs to policing are increasing at a greater rate than other public sectors, or whether police are less busy as the result of a declining reported crime, the call for reform and getting a rein on policing costs has continued, often with demands for a return to 'core policing.' The underlying theme is that getting the higher paid, highly trained, sworn police officers to only respond to core duties, while the less-risky and non-crime responses, which consume a great deal of police time, should shift to non-sworn police or other agencies in order to reduce costs. These discussions often occur as part of the broader demand for a need for the police to become more efficient and effective. While there should be continuous improvements and an evolution in policing in response to environmental changes, there would be significant implications, not just to policing, but too many other government services, and the general public. Therefore, a true understanding of what the police are currently doing and what public expectations are is essential to moving ahead with any reform.

> *While finding some efficiencies would be desirable, this might do little more than delay the more difficult conversation about whether the police are filling the right roles and doing so in a way that the community values. This requires ongoing good decisions around role and value*

as time unfolds and the environment changes (Caputo & McIntyre, 2015, p. 269).

One common conclusion found in the reports of various commissions and studies in recent years, is that the nature and complexity of policing has changed significantly, and continues to change. Policing is complex, influenced by many external factors, including changes in legislation, in case law, in public expectations, the ever-changing nature of crime itself, and technological changes.

> *The Canadian policing landscape is characterized by the vastness of our country, its cultural diversity and its jurisdictional framework. This reality is at the core of many of the challenges inherent to the delivery of efficient and effective police services* (SECU, 2014, p. 2).

While reported crime has declined, as noted elsewhere in this study, the calls for service have remain relatively constant (*Police Modernization*, p. 26, and, *Economics of Policing,* ICURS, p. 24,), therefore, the police report being as busy as ever, and even busier as the calls for service have become more complex. There has always been a significant amount of police time devoted to non-crime activities, such as investigations into missing persons, sudden or unexplained deaths, calls for service to deal with persons with mental health issues, and responses to major events and disasters. As an example, police executives and government agencies have highlighted the rapid increase in incidents that police are responding to that involve persons with mental illness and addictions, and the resulting significant impact on police time and resources. It is often said the police are the only true 24-hour response that the public rely on, so it is reasonable to believe, in absence of significant reforms in policing functions, that there is public expectation that police will continue to take a lead role in these incidents and activities.

Caputo and McIntyre concluded that:

> *The public police routinely deal with the consequences of poverty, homelessness, addictions and mental health. Communities have come to expect the police to shoulder the responsibility for many non-criminal code related issues in addition to their law enforcement obligations* (2015, p. 268).

What activities consume police time and efforts – and in differing contexts.

An understanding of broad police activities is necessary as a foundation to consideration of any reform of policing mandates. Such analysis must also consider that context of differing policing environments. The Policing Complexity Study (2010) proposed matrices which consider different questions to understand complexity of policing from the perspectives of Reactive, Proactive Resourcing and Contextual Complexity, found in Appendix A. These are considered valid in looking at the issues of police activities.

This section expands on Figure 1, which shows Computer Aided Dispatch (CAD) calls over a 4-year period for all RCMP units in British Columbia with the majority of the calls for service being non-crime related. Here we look more closely at the context of police activity, and for the purposes of examining what the police are doing, and what portion of police activities are core policing duties, PRIME BC data and CAD data (computer-aided dispatch), were analysed under four categories of police jurisdictions in British Columbia: large municipal, medium municipal, medium municipal/rural (with a built up surrounding rural population), and, rural/remote jurisdictions.

The PRIME data for the years 2013 – 2015 inclusive was analyzed looking at the UCR events, by category, and by whether they were actual offences or unfounded or some type of assistance, and other non-crime type events:[2]

1. 1000 series: Crimes against persons
2. 2000 series: Offences against property
3. 3000 series: Other Criminal Code violations
4. 4000 series: Controlled drugs and Substances Act violations
5. 6000 series: Other Federal statute violations
6. 7000 series: Provincial Statistics codes
7. 8000 series: RCMP Statistics codes (all non-crime events), and
8. 9000 series: Traffic violations

As noted in Section 2 of this paper, under Statistics Canada Statistics Canada reporting rules only founded criminal offences are included in police reported crimes, and in cases where there are multiple offences arising from the same incident, only the most serious is reported.   Reliance on Statistics Canada police reported crimes underreports the actual number of offences in Canada, and also does not recognize police activities for those events which are unfounded.   In addition, police routinely deal with a multitude of non-crime activities.   Many events have additional UCR codes associated with that event, indicating the event had many elements requiring police attention.

Events that are not reportable to Statistics Canada that might otherwise be an offense, are identified by a Z-code prefix in this data set. Again, these are various police activities which are not reported to Statistics Canada, but can consume a considerable amount of police effort.

The analyses of CAD calls provide a different perspective of police activities, as these generally indicate what events the police actually expend energy on.   A number of PRIME event files are recorded for information only and there is no police effort expended.   Examples might be minor thefts or frauds where the value of the goods stolen or fraudulently obtained is not of high value and there are no suspects or leads.   Some larger police jurisdictions have implemented on-line reporting of these crimes.   CAD data therefore, provides some insight into what events police attend and take some action on.   Examination of the CAD data reveals some concerns about missing data.   For instance, the times recorded on the CAD file do not accurately reflect the actual efforts of all police on scene and once the CAD file is converted to a PRIME file, the follow times for investigation, paper-work, and other requirements to complete an investigation are not recorded.   Regardless, the analysis does provide insight into what events the police are responding to and taking some action. Appendix F contains a list of the CAD categories.

Figure 11 and Figure 12 show the breakdown of the categories of UCR events for the four jurisdictional groupings.   It becomes evident that there are differences in the types of activities police routinely engage in when considering the context of the different policing environments.   For example, police in rural and remote jurisdictions investigate more criminal activity and report fewer events in the 8000 series of non-crime events.

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[2] Note: There was no 5000 series data available or provided.
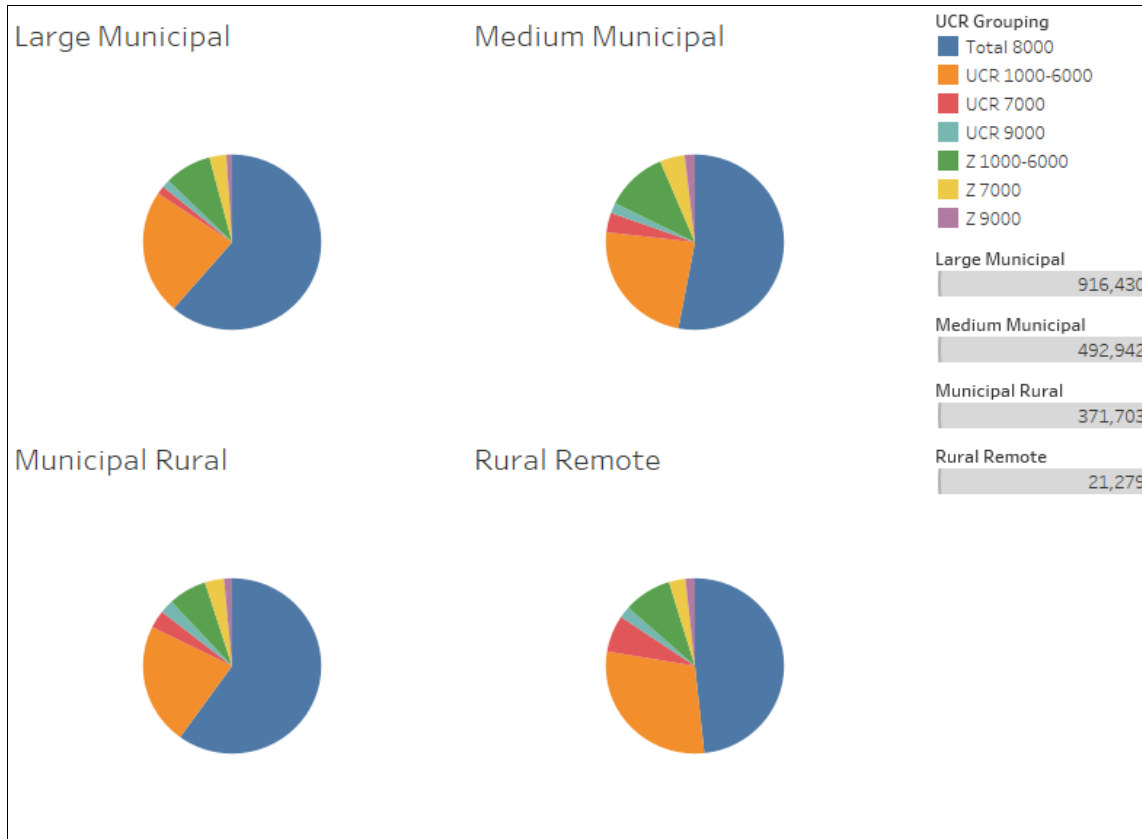
Figure 11 Municipal Size by Selected UCR Groupings (a)

Figure 11, uses the PRIME data set to examine only the events reported to Statistics Canada, and again there are differences noted between jurisdictional groupings. For example, there are more Crimes against Persons reported in rural and remote jurisdictions. This is significant as these more serious crimes require more police effort to investigate, and we know from the workshop interviews of police personnel in the ICURS Economics of Policing study (2014), that there is less support services and less specialised services readily available in the rural and remote areas.
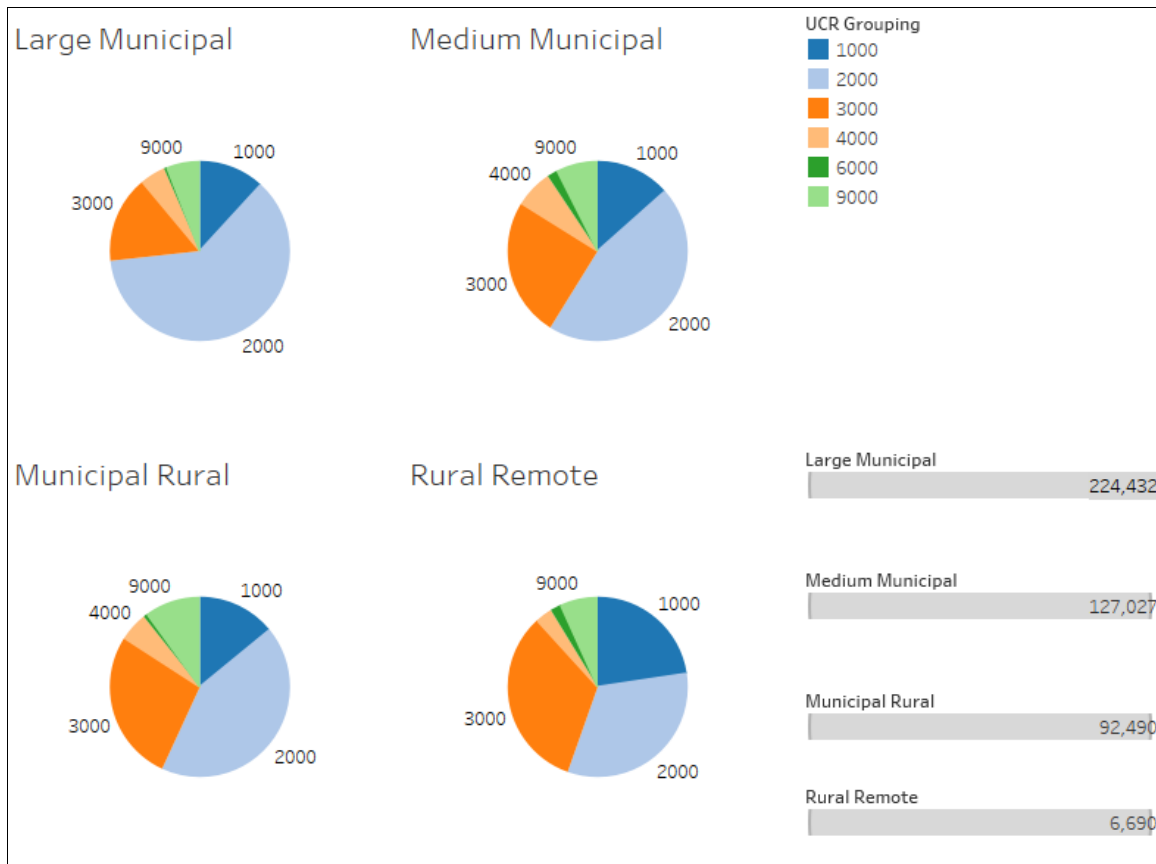
Figure 12 Municipal Size by Selected UCR Groupings (b)

The CAD Calls for Service for the same jurisdictional groupings were analyzed for the year 2015, Figures 13, 14, 15 and 16. For the purposes of this paper only the top twenty CAD calls for service, initial category, for each jurisdictional groupings are shown, and the percentages show are the percentages within the top ten CAD calls for service. Once again differences are evident in the types of calls for service reinforcing the argument that the context of policing matters.

It is also of particular interest that a majority of these CAD calls for service are not crime related, but nevertheless, require some level of police response.
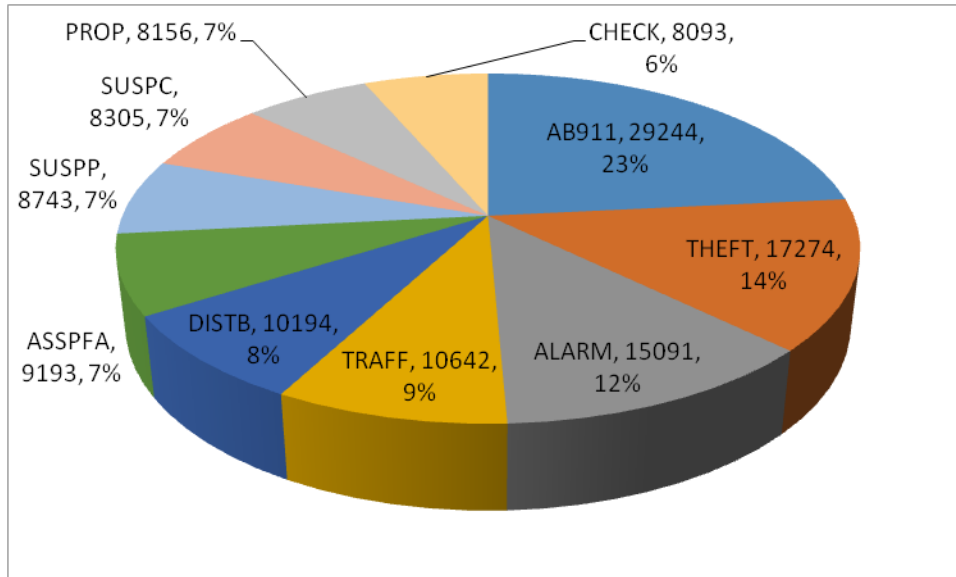
Figure 13 Top 10 Large Municipal CAD Calls, 2015
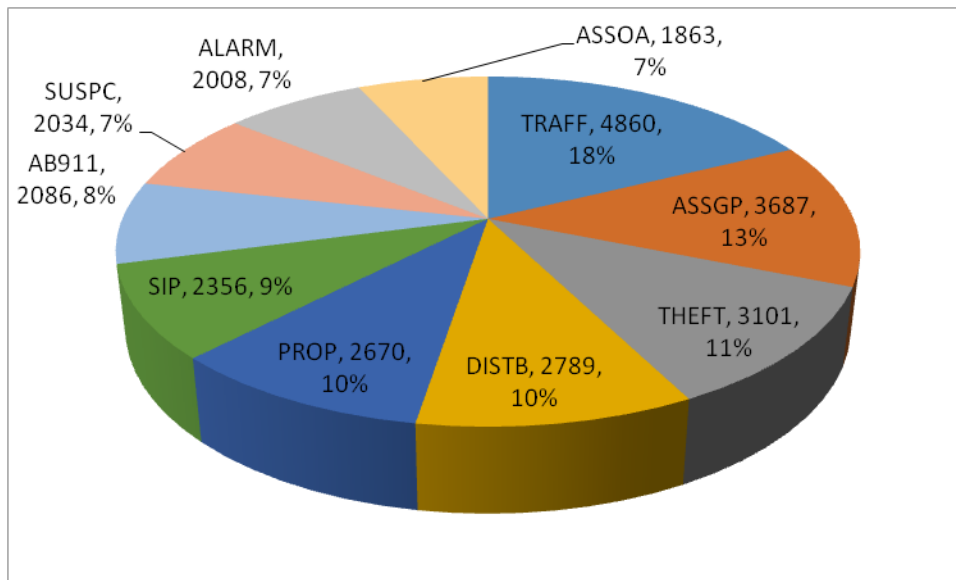
Figure 14 Top 10 Medium Municipal CAD Calls, 2015
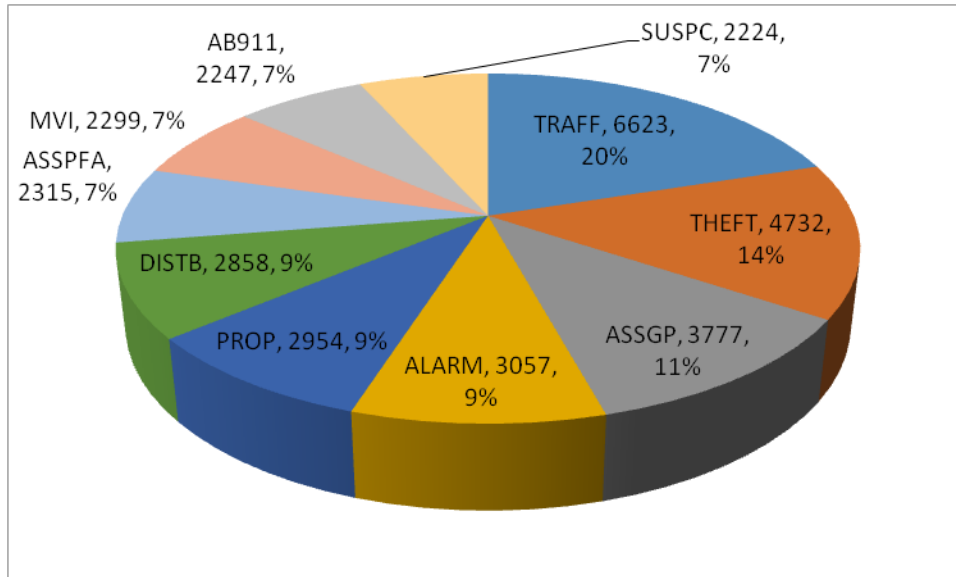
Figure 15 Top 10 Municipal Rural CAD Calls, 2015
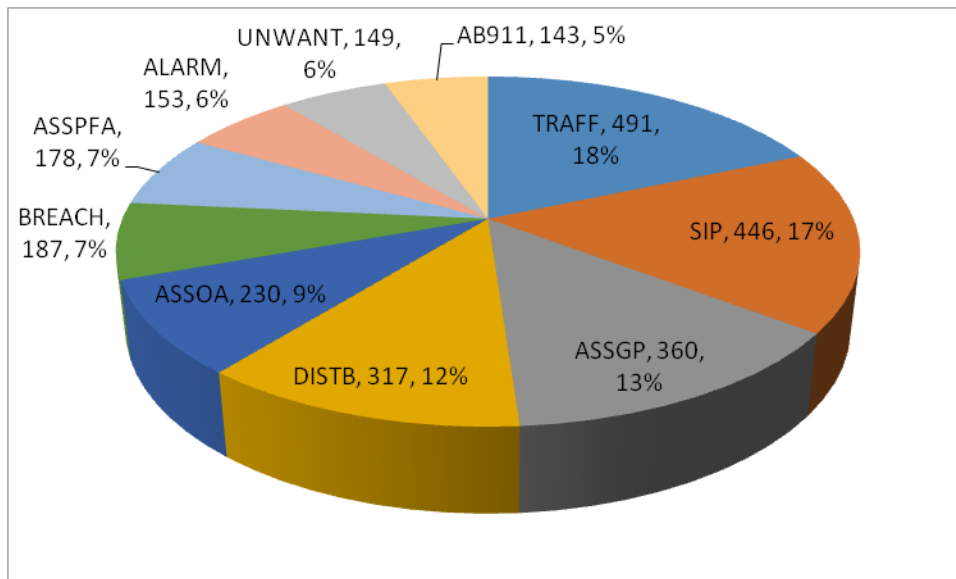
Figure 16 Top 10 Rural Remote CAD Calls, 2015

Table 1 shows that there are sixteen CAD calls for service codes which make up the top ten found in the four different jurisdictional groupings. If is quite likely that some of the differences may be the result of differing recording practices. Though there is a universal standard for recording CAD calls, there is

always some discretion in how record the initial calls are recorded, and also, some localized interpretations and practices.

Table 1 20 CAD Calls by Jurisdictional Grouping (By Count), w/ Percentages

Top 20 CAD Calls for Service by Jurisdictional Grouping							
Large Municipal		Medium Municipal		Municipal Rural		Rural/Remote	
Top 20 CAD Calls	% of all CAD Calls	Top 20 CAD Calls	% of all CAD Calls	Top 20 CAD Calls	% of all CAD Calls	Top 20 CAD Calls	% of all CAD Calls
AB911	11.94	TRAFF	8.52	TRAFF	9.84	TRAFF	10.34
THEFT	7.05	ASSGP	6.46	THEFT	7.03	SIP	9.39
ALARM	6.16	THEFT	5.43	ASSGP	5.61	ASSGP	7.58
TRAFF	4.34	DISTB	4.89	ALARM	4.54	DISTB	6.68
DISTB	4.16	PROP	4.68	PROP	4.39	ASSOA	4.84
ASSPFA	3.75	SIP	4.13	DISTB	4.25	BREACH	3.94
SUSPP	3.57	AB911	3.66	ASSPFA	3.44	ASSPFA	3.75
SUSPC	3.39	SUSPC	3.56	MVI	3.42	ALARM	3.22
PROP	3.33	ALARM	3.52	AB911	3.34	UNWANT	3.14
CHECK	3.3	ASSOA	3.26	SUSPC	3.3	AB911	3.01
ASSGP	2.69	ASSPFA	3.08	SIP	3.02	ASLT	2.95
UNWANT	2.42	MISCH	3	ASSOA	3.01	DOMI	2.46
MVI	2.32	DRUGS	2.6	SUSPP	2.82	THEFT	2.44
MISCH	2.23	SUSPP	2.55	MISCH	2.66	MISCH	2.32
DRUGS	2.18	MVI	2.51	UNWANT	2.27	DRUGS	2.15
SUSPV	2.18	DOMI	2.29	DRUGS	1.95	OCC	2.02
BNE	2.16	UNWANT	2.26	BYLAW	1.78	THREAT	1.98
BYLAW	1.94	BREACH	2.16	THREAT	1.77	MVI	1.85
FRAUD	1.92	CHECK	1.99	BNE	1.72	CHECK	1.83
ASSOA	1.84	THREAT	1.98	ASLT	1.69	SUSPC	1.77
Top 20 CAD Calls % of Total CAD Calls in Grouping	72.89%		72.54%		71.83%		77.66%

Some observations are that Abandoned 911 and Check Well-Being calls are more prevalent in the large municipal jurisdictions, that Breaches only appear in the rural/remote jurisdictions, and, that otherwise there is some relevant consistency across the jurisdictions.

There are some interesting observations from Figures 13, 14 15 and 16 in looking at the top 20 CAD calls for service by jurisdictional grouping. There was found to be relative consistency for the top 10 calls for service, yet there were 16 different CAD call types in the top 10 grouping. The Abandoned 911 calls (AB911), are much higher in the large municipal grouping. BREACH and UNWANT were found only in the Rural/Remote jurisdictional group, while CHECK was found only

in the large municipal grouping. MVI was found only in the top 10 of the Municipal Rural grouping. TRAFF calls for service were lower in the large municipal group, however were found to be the most prevalent in the other groupings. PROP and THEFT appear in all groupings except Rural/Remote. Though there are common policies and procedures for creation of CAD calls for service for the RCMP, there may still be different localised recording practises due to interpretation by call takers. The differences in ASSGP/ASSOA/ASSPFA may reflect these differences. A closer examination by sampling of CAD Calls for Service would be necessary to gain a better understanding of these differences.

The top 20 CAD calls for service account for approximately three-quarters of the calls in each of the jurisdictional groupings. This is sufficient to provide an understanding of the majority of the types of calls for service, and to highlight, as we found in the PRIME Events, that there are differences based on the context of the local police environment.

Policing, with a foundation from British criminal justice has always involved a broader role, dealing with public safety and security, and societal issues affecting the general well-being of individuals and the community. Our understanding of the police role is not only shaped by our British roots, our constitution, legislation and common law, but by convention and societal expectations as the role has evolved in Canada.

Section 4: Efficiency, Effectiveness, Equity

What to measure?

In considering what to measure, one has to consider the desired outcome of those measures. To be sure, there are a number of stakeholders tied to policing, some of whom have different needs, therefore requiring different measures. Some of this is "bean counting" a necessary part of the business for any public service organization. Governments and police authorities need to be able to understand that public funds are being spent wisely and that there is an effective and a positive return on the investment they are making. Of course, this extends to the public given that they are ultimately paying all of the bills for police services. Then there are all of the traditional measures used in efforts to observe what is actually occurring with crime trends, is it trending up or down. How effective are the police, how many charges are they processing?

Another way of thinking about the breadth of the issues to be considered in performance measurement is what has been referred to as the three "E's", *Equity, Efficiency, Effectiveness,* Eck, J.E., & Rosenbaum, D.P. (1994), Bayley, (1994). Equity refers to the ethical standards and to the fairness guiding the organization and is emerging as one of the most important, yet perhaps the less understood of what might be considered as important measures.

The importance of these findings are significant and may explain, at least in part, why traditional measures of police performance do not seem to be as important to the public as they are to police and others. It was suggested by Murphy et al (2008) that "if members of the public perceive police as treating them unfairly, this signifies that police do not consider them to be important or valued members of the community." They also stressed the importance of these findings to the application of community policing strategies and the ability to encourage cooperation with police.

Both effectiveness and efficiency are tied more closely with traditional measures such as high clearance

rates, low rates of re-victimization, low crime rates and so on for the former and with the measure as to how resources are used for the latter. As noted earlier, it is important to note that an organization may perform well in one or two of these measures and poorly in others.

It has been suggested by some, that the perception of fairness, or how police approach and treat problems brought forth by citizens, is tied to legitimacy and is even more important to citizens than how effective the police are in dealing with those problems, Shilston, (2008), Tyler and Huo, (2002), Murphy et al, (2008). Furthermore, it is argued that enhanced legitimacy has a direct and positive impact on the level of public cooperation with the police, thereby improving their effectiveness, Murphy et al, (2008). They argued that effective policing requires cooperation and support from the public, given that police authority, in a democratic society, rests on public consent. Legitimacy has been defined as "a property of an authority or institution that leads people to feel that that authority or institution is entitled to be deferred to and obeyed", Sunshine and Tyler, (2003). Notwithstanding that legitimacy is defined as a property of an institution, research has demonstrated that it is either damaged or enhanced through encounters with individual employees of a police agency, Skogan and Frydl, (2004) and for this reason, it is important to consider appropriate measures to capture information which would provide a clear picture of the organization's performance in this area. Evaluations of police legitimacy have consistently demonstrated the point that "If people believe that an authority's procedures are fair, research suggests people will trust the motives of that authority and develop a commitment, or sense of obligation, to accept and follow its decisions and rules," Murphy et al, (2008), p.140 and, "Research in the policing context consistently indicates that evaluations of police legitimacy are based more on how police treat people than on how well they perform their job."

We would argue that this concept of procedural fairness and legitimacy is therefore something that needs to be carefully considered in terms of effective performance measures and again, points to the need for highly developed engagement with the public in developing and evaluating performance. In recent years, this issue has received a great deal of attention in a number of important studies and papers produced in the UK, Moore and Braga, (2003), Flanagan, (2008), Casey, (2008), Shilston, (2008), O'Connor, (2010), Home Office, 2011). There is a consistent theme throughout that speaks to the critical importance of effective community engagement as a means to improve public confidence and to reduce the fear of crime.

The recognition that there were inherent problems with the focus on crime statistics as being important to public confidence was questioned as early as 2001 by Her Majesty's Chief Inspector of Constabulary (HMIC), Sir Keith Povey, ACPO, (2001). He concluded that current beliefs that reduced crime rates would lead to increased public confidence, were wrong and that indeed, the opposite seemed to be true. This was called the Success gap" or the "Reassurance gap" and for a considerable period of time, much thought and debate were given to this matter. From this, a new theory developed, that it was public confidence itself that would be the most valuable measure for police performance. It was recognized that "Crime rates, detection rates response times and the rest were mere outputs. The desired outcome was positive public perceptions of service delivery, an issue that needed to be both addressed and assessed", Shilston, (2008) p. 360. A number of programs, designed to address this issue, emerged over the following years, including the Police and Performance Assessment Framework (PPAF) and the Assessment of Policing and Community Safety (APACS) framework. This movement towards greater community engagement was strongly endorsed in Sir Ronnie Flanagan's work in 2008, The Review of Policing Final Report and in Louise Casey's report, Engaging Communities in Fighting Crime. Neither could have made it more clear that they were of the strong view that this singular issue was of utmost importance. Equally convinced of the importance of these measures, Shilston, (2008) put it this

way;

> *What really matters in maintaining and building public trust and confidence in police seems then not to be those elements captured by traditional police performance indicators, nor does it seem to be the views held by those who have no contact with the police and whose support can reasonably be assumed in most cases. The real battleground for public perceptions is at the personal level and amongst those who have been direct and recent recipients of police services. A wide range of studies in a variety of circumstances and over a long time period have concluded that public trust and confidence in legal authorities, including the police, is not a product of the outcome of an intervention but of the perception of procedural fairness involved in reaching the outcome* [3]

He notes that the positive lesson here is that the fact that police may not be able to deliver the outcome sought by a member of the public and that the primary concern is their perception of how their issue was dealt with in terms of fairness. Treating people with respect, being courteous and sensitive to their needs, will generally produce a satisfied reaction to what could be done and in turn, leads to enhanced public confidence. This important fact needs to be ingrained in the training of police as well as any of the support staff who are in contact with the public in the course of their duties and organizations need to have measures in place to monitor how well it is being done. Shilston concludes his thoughts on performance measures by acknowledging that quantitative measures indeed have their place in measuring police performance, however, it is not possible to measure public perceptions with this methodology. Once again, it is suggested that the active and meaningful engagement of the public in designing performance measures would be important.

Continuing this call for better community engagement, O'Connor, (2010), coined a new term to describe it: "Performance from the Outside-In". Denis O'Connor was uniquely trained and positioned to understand the importance of this relationship between police and the community. At the time of this article, he was Her Majesty's Chief Inspector of Constabulary but had served with the Metropolitan Police as an Assistant Commissioner, was Chief Constable of Surrey and Deputy Chief of Kent. He had also served as Vice President of ACPO for a time. He too noted the fact that notwithstanding crime rates at an all time low, public confidence levels seemed to ignore that fact. "Inspecting Policing in the public interest", became the key driver in the work of the HMIC under his leadership. It meant putting the public at the fore, starting with their questions, their understanding and their concerns. He described this as a wholly new way of communicating with the public, setting out four key goals;

(1) Tackling topics that the public value
(2) Providing them with accessible information
(3) Assessment based on public experience
(4) Assessment of the likelihood of progress

Based in part on the findings of the 2008 Green Paper, "From the Neighbourhood to the National: Policing our Communities Together", he described the HMIC as a "fierce advocate and more explicit guarantor of the public interest". Recent surveys, such as the MORI 2007 survey confirmed what others had, that costs of fighting crime were continuing on the rise with reported crime falling and the fact that most of the public did not believe that crime was falling. Determined to discover what it was that the public wanted to know, it came down to three essential points;

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[3] See also Tyler, 2001; Tyler and Huo, 2002; Sunshine and Tyler, 2003; Murphy, 2005).

(1) Staffing (balance of staff, numbers office/ street based, time spent on particular tasks)

(2) Crime statistics (current levels of crime, anti- social behaviour, comparative data, explanation of any changes, action plans)

(3) Police professionalism (how are the public treated/serviced, satisfaction of service 'users')

This no doubt looks familiar from earlier discussion about the three "E's" – *Efficiency, Effectiveness and Equity*. O'Connor concluded that he had discovered the reason for this disconnect between police and the public, that the public has not been well or properly informed about policing, that effective communication strategies must be developed and deployed and that the type of information the public wants and needs about policing must be readily accessible. He concluded that absence of clear information breeds uncertainty and scepticism while good communication breeds understanding and public confidence. O'Connor was one of many beginning to talk about the need to devolve responsibility for policing downward, become less risk adverse and to give great responsibility to local governments, Flanagan, (2008), Casey, (2008), Home Office, (2008).

Further Understanding the Success or Reassurance Gaps.

One of the peculiar phenomena that confront police is that levels of fear of crime often go up when crime rates are clearly going down. This is viewed by some as a result of a disconnect between the public and the police. This has negative associated impacts on public trust and an ongoing negative effect on cooperation levels by the public with police. This phenomenon seems to be relatively identical in most of the western democracies, (Farrell et al, 2011). Notwithstanding the numerous claims specific policing activities of having influenced the crime drop, there is little agreement as to which police activities, if indeed any, played a major role.

Community Based Policing, while important in terms of building relationships between police and communities, marked the beginning of the era where police, particularly in large urban settings, were beginning to cut back on services they felt they could no longer justify doing in terms of costs or risk to the public. Responsibilization held that the public needed to take greater responsibility for their own protection and for that of their property. Gradually, through a process essentially entirely in the domain of police, increasingly more serious crimes were deemed to be "not serious enough to require a police response". Clearly, although crime rates have dropped, there has been a significant increase in unreported crime, essentially the result of the public being conditioned to understand that police no longer considered certain crimes worthy of response. In terms of O'Connor's approach to "outside-in" measures, the opposite had been true; "inside-out" measures were designed by police, for the most part devised on an assessment of what they saw as important. Problem Oriented Policing and Intelligence Led Policing exacerbated the situation by working hard to figure out what the most important things to do and to pay attention to would be. This eventually led to hierarchal lists of criminals and of crime groups with the idea that police would target those that "posed the most significant threat" again, assessments made in absence of the public, for the most part. Levels of "acceptable crime" today are at an extremely high threshold in many large urban areas, to a lesser extent in rural areas. There is reason to believe that fear of crime and confidence in police are at better levels in rural jurisdictions. It would also appear that when police, on their own, make decisions about what is "right for the public" in terms of which crimes are important, they do so at the risk of widening the reassurance gap and reducing trust levels that the public has about their police agency. The reality is that volume crime such as property crime and public order crimes comprise a significantly large proportion of all crime and that when citizens become victims of crime, it will likely be as a victim of one

of these types of crimes. Recent research by Myhill, A. and Quinton, P., (2010), suggests that dealing with the concerns of local communities is likely to increase confidence. They suggest that while Reassurance Policing initiatives has yielded some positive results, that there are real threats to the ability of police to maintain confidence and trust. Quinton and Morris, (2008), p. 279, suggested through their research that "public perceptions may be adversely affected by a move away from local policing", noting that it would also be inevitable that police would attend less frequently to disorder and anti social disorder problems. Myhill and Quinton reference the situation in Chicago in the mid 2000's when the department shifted its community policing approach to one of tackling gangs and violence. Several observers saw danger in this approach, Rosenbaum, (2007), Skogan, (2008) predicting that this shift could lead to dire consequences for community policing and the relationship between the police and the public and early research seemed to validate these concerns, Rosenbaum, (2007). Fundamentally, the sometimes held concept that the role of the police is only to investigate crime and to bring offenders into the justice system, disregards the importance of the integration and collaboration of all of the players in the criminal justice system. Indeed, police should be considered as "social workers" in that context of working collaboratively to address societal problems, again, a concept not necessarily widely embraced.

There remains a significant problem in terms of attempting to set performance measures for policing when in fact, there is this shared responsibility for the effectiveness of the Criminal Justice System.   This goes to the effective integration of all of the various parts of the systems which must include police, courts, probation, corrections, social services related to poverty and all of the parts of health which have a role to play in addressing criminal behaviours associated with addictions and mental health. In recent years, we have seen signs of a more collaborative relationship developing which still has some distance to go.

Section 5: Common Measures

Measuring police activities has a long history, but what most people remember are the enumeration statistics developed in 1962 and updated since that provide counts of crime known to and recorded by the police and published as the Uniform Crime Reports (UCR)[4]. These counts are collected monthly from policing jurisdictions within Provinces and Territories and published annually (typically at mid-year) by Statistics Canada. Before development of the UCR, Canadian crime data were collected through a criminal courts survey focused on charges laid and convictions for serious crimes. The UCR were a major step forward in understanding of demand for some types of police service. Criminal court statistics provided counts of crimes after they had been thinned by judicial process – they reflected smaller counts of different types of crime from those originally made known to police.

As the 2014 British Columbia Crime funnel illustrated in Figure 17 makes clear, estimates based on the Canadian Victimization Survey suggest that less than a third of criminal offences are ever reported to the police; less than a third of crimes the police know about are solved; only about 60% of crimes that are solved by the police are prosecuted; only about 70% of cases prosecuted result in a conviction. Put another way, the crimes for which people are convicted represent only about 2% (1 in 50) of the crimes known to police.

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[4] These statistics have appeared under a variety of names over the past half-century. They long carried the Statistics Canada catalogue number 85-205. They have most recently appeared as *Juristat* publications titled *Police-reported crime statistics in Canada*, followed by a calendar year designation.
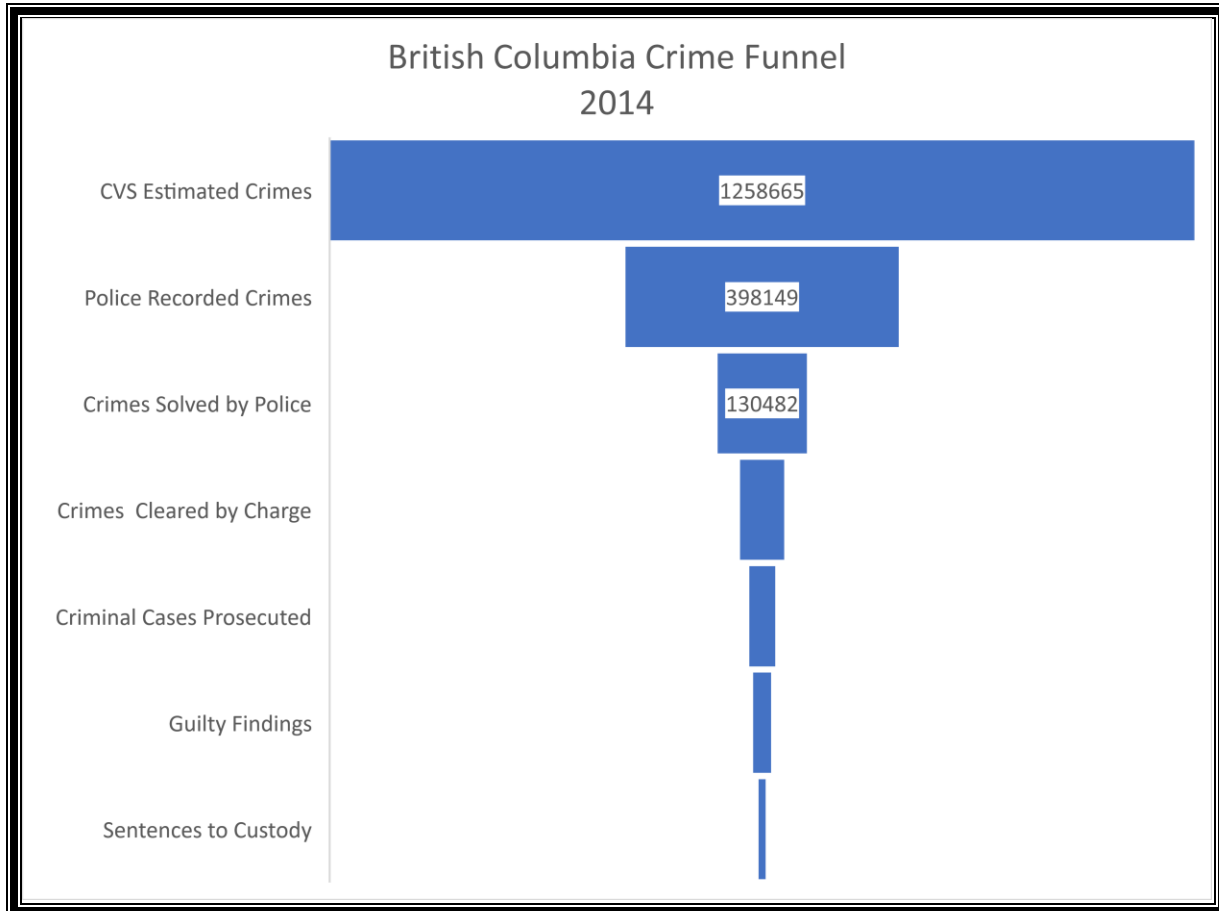
Figure 17 The 2014 Crime Funnel

UCR data should be used with some care in historical analysis. The creation of the UCR predated use of computers to any significant degree in collecting crime statistics. They were manually collected and subject to human error in transcription. The introduction of computers made the collection of all data more regularized, but still subject to error and to interpretative differences from place to place and time to time. More importantly, the UCR statistics basically remained unchanged for almost 50 years except for minor modifications as the *Criminal Code* changed and recalibration in calculating rates whenever there was a census.

The UCR counts and rates by Province and municipality still have a large impact in the media and are used by all levels of government in measuring police performance. But, as was noted in the prior section on efficiency and effectiveness, policing is part of a larger justice system and an even larger social service system.

Statistics Canada and academics across the country engage in research using the UCR data to better understand what is driving changes in the general crime rate and in the rates of specific types of crime.

Research generally finds that trends in crime are influenced by trends in demographics (age of population); by trends in socio-economic conditions and individual socio-economic status; and by trends in population movement and physical infrastructure. Basically, in this research the police are found, in most cases, to be responders to demand for police services and not the generator of that demand[5] (President's Commission, 1967; Reiss, 1971; Wuschke, 2016).

As already discussed in Section 2, Statistics Canada has followed the lead of many other nations in developing victimization surveys to try and estimate the total amount of crime that occurs to understand how much crime is made known to the police. Victimization surveys began in Canada in 1981 with studies conducted by the Ministry of Solicitor General in seven metropolitan areas: Vancouver, Edmonton, Winnipeg, Toronto, Montreal, Halifax, and St. John's. Statistics Canada has subsequently conducted national victimization surveys on a five-year cycle as a component of its General Social Survey. The most recent was conducted in 2014. In addition, the Department of Justice Canada has separately participated in several cycles of the International Victimization Survey which is conducted in many countries under the auspices of the United Nations.

Measures of Productivity and their Problems

Traffic tickets

An early measure of police productivity was number of traffic tickets written per unit of time. Such a measure assumes that activity is more important than outcome. The goal of traffic enforcement is reduced traffic accidents and reduced highway injuries and deaths. Traffic tickets are a meaningful measure only to the extent they can serve as proxies for reduction in traffic harms, however, systematic analysis of road violation data as reflected in criminal code traffic charges and provincial traffic citations can be used to target enforcement at high risk locations to reduce traffic crashes and injuries. The RCMP TSMIT analysis system, developed in part by ICURS staff, provides this sort of safety targeting information and is integrated into the enforcement tactics for a particular area for most effect. The use of such analysis is an integral part of the police contribution to the Road Safety Strategy 2020, a cross-sector strategy to make roads safer. Direct measures of reduced accidents and injuries, both generally and at evidence-selected, high-risk places, would be a better measure of performance or of outcomes.

Response times

The time it takes for police to respond to a call for police services by having a police officer arrive at the location of the call has long been a staple measure of police performance. Most police forces routinely monitor their average response times by call priority classification. Rapid response times can be especially important in emergency situations in which dangerous events or crimes are in progress and immediate police intervention can reduce harm or ensure capture of offenders or both. Beyond highest priority types of situations, response time measurements may be most important as an indicator of the adequacy of police resources for meeting public expectations of police services rather than as indicators of police performance. High priority calls for service have median response times ranging between seven and eight minutes across most police jurisdictions in British Columbia. Longer high priority times are more common in some police jurisdictions with small populations spread across large areas, particularly in the northern parts of the province. Response times for lower priority calls for service may be better indicators of the adequacy of police resources than of police performance.

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[5] As will be described later in this section, police are sometimes the initiators of crime statistics and not just responders.

Case Clearance

Case clearance, as measured by arrests or charges laid has been a traditional method of assessing police performance. In British Columbia police recommend charges to Crown Prosecutors, but it is the Crown Prosecutors who decide whether to lay charges or to proceed with a prosecution once charges have been laid in criminal court. Police record a case as cleared by charge once a recommendation to Crown has been made, regardless of whether Crown actually prefers charges or not.

Trends in Crimes Cleared by Charge
British Columbia
1998-2015
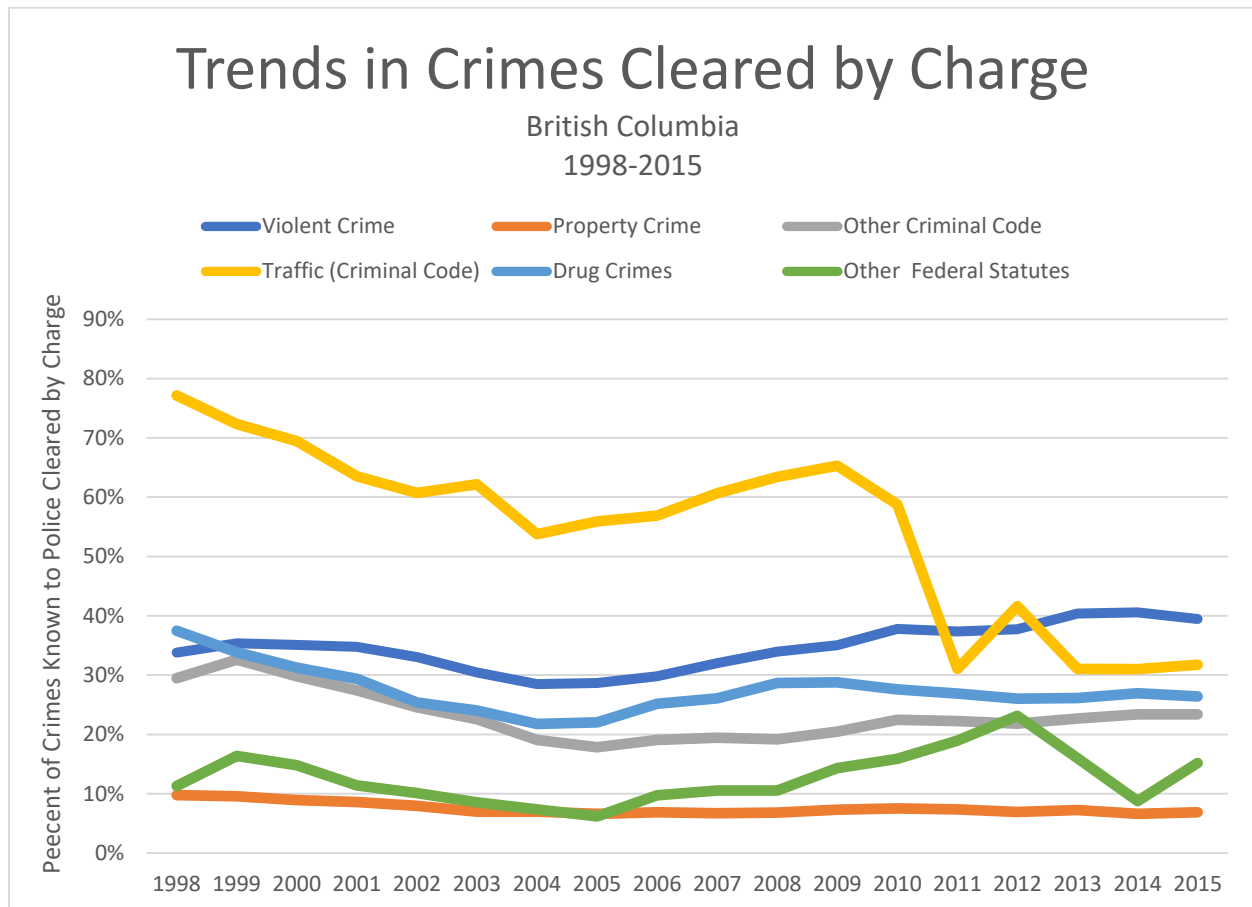
Figure 18 Trends in Crime Cleared by Charge

Criminal events recordable in the Uniform Crime Reports comprise only a minority of police work. Crimes cleared by charge are surprisingly low: on average only about 40% of violent crimes are cleared by a charge recommendation; less than 10% of property crimes are cleared by charge. Figure 18 shows that high volume crime categories such as property crime and *Criminal Code* traffic offences have trended down throughout this 17-year period. Other crime categories have followed a curvilinear path, dropping from 1998 until about 2004 or 2005, the rising through 2015. Only violent crimes had higher cleared by charge rates in 2015 than in 1998.

In addition to crimes cleared by charge, police clear crimes without recommending charges for a variety of reasons. For instance, the police may clear the crime without recommending charges because, although the act amounts to behaviour that would otherwise be a crime, the actor is below the age of

criminal responsibility; or because the actor clearly exhibits a mental health problem as is referred to the mental health system for evaluation and treatment; or because the identified offender has died. Police may also decline to recommend charges and clear a case "otherwise" based, experientially, on their assumed little likelihood of Crown Counsel pursuing a prosecution in cases of a particular sort: in essence, using their police discretion in dealing with less serious offences.

In the late 1970s and early 1980s police in British Columbia cleared slightly more cases without recommending charges than they cleared by charge. That ratio has steadily declined and in recent years the police have cleared only about 8 cases otherwise for each crime cleared by charge.

Convictions

Convictions are sometimes used as an indicator of police performance. As indicated by Figure 17 above, only about 40% of the crimes police clear by charge recommendation eventually result in a conviction. The criminal prosecution process is subject to a wide variety of limitations designed to protect the civil liberties of accused persons that bias the system against prosecution. Moreover, police in British Columbia become advisers and witnesses in the prosecution process, but have no direct control over the conduct of prosecutions. Any use of convictions as a measure of police performance must be situated within some broader sets of measures of the performance of the criminal justice system as a whole and of its other constituent parts. As Figure 19 shows, conviction rates for both crimes against the person and crimes against property have risen since 2000.
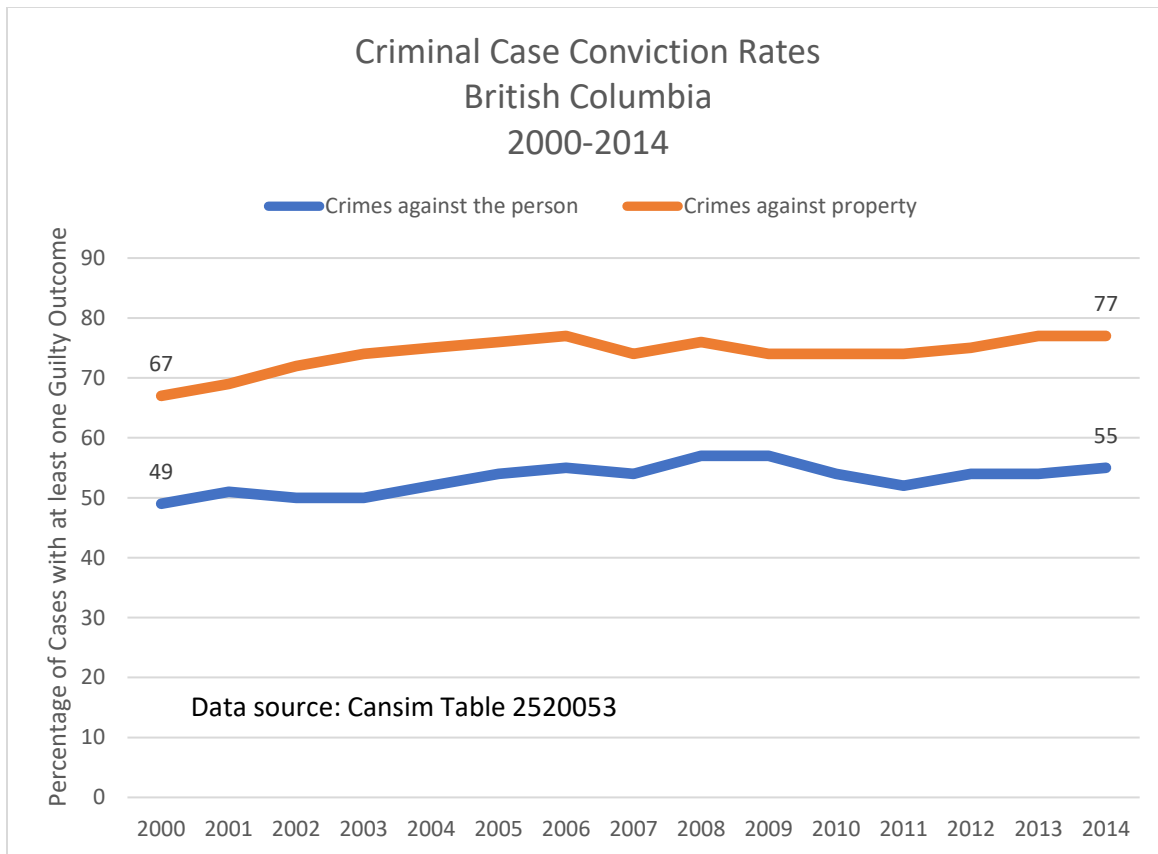
Figure 19 Criminal Case Conviction Rates

Section 6: State of the Art Measures

As described in the ICURS Policing Complexity Report (2010), research on the economics of policing is not yet developed to a level where we understand all that influences police performance sufficient to develop one (or even five) measures that represent the levels of efficiency and effectiveness for all of core policing or specialty units.

The basic direction is, however, understood. Efficiency measures can be developed for some routine policing activities where the demand is predictable and reasonable short-term projections can be made. For these types of core policing and associated services, efficiency can be measured and, as technology advances, improved. The police engage in such measures in contracting for equipment and in hiring civilian staff for clerical and other support functions. Administration and management of these types of services and equipment is essential. The standards of what can be used, how long equipment will last, what training is needed for staff, how measures of efficiency for computer services or even fuel efficiency for police cars are not static and will continually change, but are manageable. For some limited activities such as libraries, support services and infrastructure and equipment, policing can be expected to follow best practices and efficiency standards like any other business.

For routine policing procedures, as well, it is also possible to consider cost-effective measures. That is, determine where core policing is routine and with no risk so that persons providing the services will need training but would not need full police training. Alternative models of delivery by Community

Safety Officers (CSOs) or other new providers should be considered. Determining which police services can be converted to delivery by alternative modes would require an intensive risk evaluation with a test period.

Cost effectiveness can also be considered for specialty services that are highly dependent on technical expertise in such areas as forensic accounting, informatics, and cybercrime. In the 21st Century we are in a period of rapid change in computers and social media. Cyber security issues and requirements change almost daily. The Dark Web expands criminal capabilities; social media provides a means of disseminating information as well as uncovering private information. Setting goals in cybercrime and informatics used end up resulting in the need to use experts in computer science and Big Data. Cost-effective work in this domain will require police to work interactively with technical experts.

The rapid growth in cybercrime may be an indication of a crime shift, masquerading as a crime reduction. The 21st Century is likely to have an upturn in crime, but most likely in areas not well covered by traditional police training, expertise or resource deployment models. In fact, many people who are victims of cybercrime do not even consider contacting the police. Some businesses are reluctant to disclose their cybercrime losses for competitive reasons, in part because they are able to pass cybercrime costs on to their customers. There are very serious government and public discussions needed to determine whether police, from their position within government, are going to be part of what is currently a *de facto* decriminalization of many kinds of cybercrime or whether the police are going to work collaboratively in public/private partnerships to become effective in cybercrime reduction.

Within the provincial and municipal levels of policing there are ways to address the effectiveness and equity of services by using new measures that consider the context of the local, regional, provincial, and more global environments. The complexity of policing as described in ICURS report on the *Feasibility of Developing a Policing Complexity Index* from currently extant Statistics Canada measures (2010) means that police do not control the demand for their services[6]; and, because they work within the justice system and the broader government system, they cannot control the end results of the handling of individual cases (See, also, College of Policing 2015). As shown in Figure 17, the crime funnel, a large proportion of cases solved by the police are not prosecuted; a large proportion of cases prosecuted do not result in conviction; and only a minority of convictions result in any kind of custodial sanction in provincial jails or federal prisons. In 2014-15, the median length of custodial sentences for violent offences was 70 days in jail; the median length for property offences was 30 days in jail; the median length for drug possession was 14 days. Judicial action narrowing the number of cases resulting in correctional control of offenders and the limited time during which correctional treatment can be applied to offenders combine to limit the ability of police actions to control crime or the demand for police services. (Maxwell, 2017). Courts and Corrections are the parts of the criminal justice system that ultimately influence the effectiveness of the justice system in reducing crime.

ICURS completed a feasibility study in 2014, the Development of Policing Performance Indicators in British Columbia, which reviewed performance measurement of policing organisations, and made recommendations in order to create effective police performance indicators.   ICURS found that

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[6] The exception might be the "victimless crimes" – sumptuary offences that result from agreements between actors such as unlicensed gambling, prostitution, and traffic in criminally prohibited drugs. In such offence categories police proactivity is required to discover these criminal events and then act against the actors.

development of performance indictors was feasible and recommended the following would be necessary: the creation of a repository for data that would integrate the various data sets required to do full analyses; that baseline analysis would be necessary; and that a Victimisation survey, a Service Delivery survey, and a Morale survey be developed and form part of the long-term indictors. Also, ICURS recommended that specific measures to show the impact of the courts, corrections, housing and health have on policing requirements and efforts.

Police, through investigation, develop evidence and provide expert opinion, but in British Columbia Crown Prosecutors lay charges, judges decide outcomes, and corrections agencies provide treatment when possible. Probation has a supervisory role, but is staffed to levels permitting only limited actual supervision. For addiction related offending, treatment is a potential option but is often resource limited.

Effectiveness measures, when fitted within the cone of criminal events (Figure 17) would fit better within measures of performance of all parts of the criminal justice system. As observed in Section Two, crime is disproportionately attributable to a few repeat offenders, but the criminal justice system is organized to deal with individual events, not criminal careers. In the worst case, the system functions more as a revolving door, with offenders being cycled through with little actual time spent off the streets or in treatment before they are returned unimpeded to the community by the system. BC pursued a formal crime reduction policy aimed at prolific offenders from 2005 until about 2012. Currently the Province is undertaking pilot project in crime reduction utilizing community based, multi-agency collaboration approaches in Williams Lake. In this project community stakeholders are identifying local programs that address primary and secondary crime prevention strategies.

As with primary, secondary, and tertiary crime prevention (Brantingham and Brantingham, 2012; Brantingham & Faust, 1976), it is probably best to look at the process of criminal events and other situations in which police are expected to act o behalf of public safety and welfare. These analyses should be used to develop measures that make it possible to understand the patterns of demand for police services. These in turn should allow development of measures of the effectiveness of police in delivering primary, secondary, and tertiary prevention of crime and other social problems within the context of what, exactly, police activity can be expected to accomplish given its position within the criminal justice and social systems.

In Figure 20 demand for police services increases if at risk or vulnerable populations increase. Police influence the identification of persons who might receive treatment through alternative pre-charge diversion into voluntary treatment or restorative justice programs, through some other resolution external to the criminal justice system, or through the courts after charges have been laid. If treatment works on persons who are convicted or who receive alternative services, then the at-risk population decreases. If treatment does not work then the at-risk population does not decrease. This is the best measure of effectiveness for the police. However, past research indicated that this is related to specialty units and number of police so the issue is really one of cost-effectiveness.
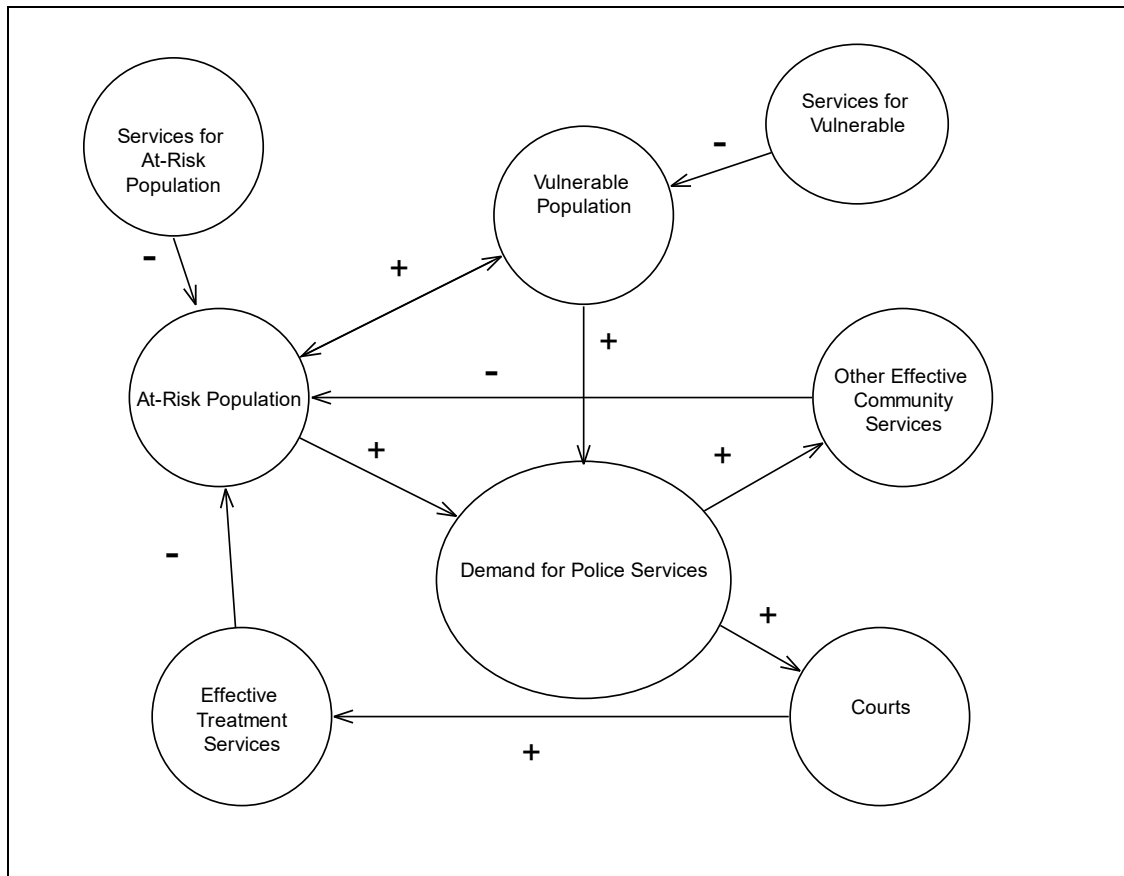
Figure 20 Influences on demands for police services and police response

Basically:

- Crime rates reflect demand for police investigative services.
- Crime clearance rates reflect the effectiveness of police investigative services.
- Crime trends reflect:
    - Demand for police services;
    - Effectiveness of criminal justice treatment programs;
    - Effectiveness of other services for at risk populations;
    - Changes in community economic conditions and social expectations; and
    - Changes in community infrastructure that add or subtract crime generators and crime attractors

Every community will have high and low crime areas occurring during high and low crime times. Understanding these patterns may aid investigations of criminal events or in helping police to determine where special programs for at risk or vulnerable populations should be focused. Systematic analysis of patterns in crime, in other types of calls for police service, and in need for actions by other social service agencies should be conducted beginning with the most detailed spatial and temporal levels available and then aggregating upward because patterns can appear very different at different levels of aggregation (Brantingham, Brantingham & Dyreson, 1976).

Several examples of this complexity are given in the following examples drawn from British Columbia as a whole and from Metro Vancouver. The Metro Vancouver data was extracted from the PIRS data set that preceded PRIME BC as the police records management system for most police agencies in the province.[7]

Crime Prevalence

One way to understand demand for police services is to explore the *prevalence* and *diversity* of crime types reported across police jurisdictions. Prevalence measures the number of different police jurisdictions that record a particular type of crime as having occurred at least once during a calendar year. Diversity measures the mix of different types of crime recorded in a police jurisdiction during a calendar year.

High prevalence indicates that most police jurisdictions must develop the expertise to deal with that type of crime. Low prevalence suggests that the crime type might be most efficiently investigated by some specialized regional unit. High diversity requires a police jurisdiction to develop a broad range of investigative expertise. We illustrate prevalence and diversity utilizing UCR2 event count data from Statistics Canada for the calendar year 2015.

During 2015, the UCR2 system tracked 220 discrete crime types. This study of prevalence examined the number of different crime types reported by 193 different police agencies across British Columbia in 2015. These agencies included: the 11 independent municipal police departments, all RCMP municipal detachments, and all RCMP Provincial detachments. (Some specialty agencies were excluded: the BC Transit Police, The RCMP West Coast Marine Services, the CN Railroad Police, and the CP Railroad Police.)

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[7] ICURS was never granted access to or permission to use address level data from PRIME BC provided E-Division of the RCMP. PRIME BC data were supplied at the six-digit postal code level of spatial aggregation, which poses major modifiable area unit issues for crime analysis. Data from the PIRS system, which was supplied at the address level, are utilized in where relevant to illustrate possibilities.

Table 2 The Twenty-Five Most Prevalent Crime Types in British Columbia 2015

Rank	Crime Type	Number of PJ Reporting Crime Type	Percent of All Police Jurisdictions	Number of Crimes	Cumulative Percent of All Crimes
1	Disturb the peace	193	100.0%	46228	10.9%
2	Mischief	193	100.0%	45100	21.6%
3	Breaking and entering	192	99.5%	29927	28.6%
4	Assault, level 1	192	99.5%	22242	33.9%
5	Possession, cannabis	192	99.5%	12424	36.8%
6	Impaired operation of motor vehicle, vessel or aircraft	192	99.5%	9684	39.1%
7	Uttering threats	191	99.0%	10437	41.6%
8	Total other violations	191	99.0%	7375	43.3%
9	Theft $5,000 or under	190	98.4%	43624	53.6%
10	Theft $5,000 or under from a motor vehicle	184	95.3%	51304	65.7%
11	Fraud	184	95.3%	15876	69.5%
12	Total theft of motor vehicle	183	94.8%	14697	72.9%
13	Fail to comply with order	183	94.8%	10306	75.4%
14	Assault, level 2, weapon or bodily harm	181	93.8%	6841	77.0%
15	Indecent/Harassing communications	179	92.7%	4885	78.2%
16	Breach of probation	175	90.7%	5634	79.5%
17	Sexual assault, level 1	173	89.6%	2362	80.0%
18	Total other Criminal Code traffic violations	170	88.1%	4022	81.0%
19	Other federal statutes	162	83.9%	2865	81.7%
20	Criminal harassment	162	83.9%	1997	82.1%
21	Total possession of stolen property	161	83.4%	3120	82.9%
22	Theft over $5,000	160	82.9%	1742	83.3%
23	Utter threats to property or animal	158	81.9%	1045	83.5%
24	Shoplifting $5,000 or under	154	79.8%	22380	88.8%
25	Obstruct public or peace officer	150	77.7%	1778	89.2%

Two crimes tied as most prevalent, reported by all 193 police agencies: disturbing the peace and mischief. The 10 most prevalent offence types accounted for almost 70% of all criminal events recorded by BC police agencies in 2015. The 25 most prevalent crime types together accounted for 89% of all criminal events recorded by all BC police agencies. Put another way, the 10 most prevalent crime types, 4.5% of all the crime types tracked by the Uniform Crime reporting system, accounted for 70% of all the

crime reported to police in 2015; the 25 most prevalent crimes, about 11 % of all the crime types tracked by the UCR2 system, accounted for 9 out of 10 crimes reported to the police across the province.

It is worth noting that most of the very serious types of crime tracked by the UCR2 system have both low prevalence and low incidence. Homicide, for instance, the most serious of all crime types, occurred in only 41 of the 193 police jurisdictions in British Columbia in 2015. The two large jurisdictions of Vancouver and Surrey together accounted for 25% homicides reported in the province; half of these jurisdictions reported a single homicide during the year. Put another way, 152 jurisdictions (79% of all BC policing jurisdictions) did not record a homicide in 2015. Of the 25 most serious crimes as rated by the most recent Statistics Canada Crime Severity weighting scale, only four additional crime types occurred in more than 10 jurisdictions province wide: attempted murder (39); kidnapping (27); discharge a firearm with intent (25); and incest (19).

Conversely, the most prevalent offences tend to have low crime severity weightings. Of the five most prevalent offences, none ranked among the 50 most serious crime types. Disturb the peace ranked 207th out of 220 offence types in terms of seriousness. Mischief ranked 173rd; breaking and entering ranked 66th; level 1 assault ranked 124th. Possession of cannabis, which was ranked fifth in terms of the number of police jurisdictions in which it occurred, ranked 208th in severity with a weight of 6.71 compared to the murder seriousness weight of 7041.

Crime Diversity

Crime diversity looks at the mix of crime from place to place and over time. Two jurisdictions that have similar numbers of crime and similar crime rates may still have very different policing problems depending on the mix of crime, the diversity of their respective crime problems. We illustrate the difference in crime mix across policing jurisdictions by charting the aggregate crime mix for selected police jurisdictions located in the Lower Mainland in 2015. As is apparent, property crime generally dominates all jurisdictions, but the relative share of different categories is quite different from one jurisdiction to the next – demand for policing capabilities varies with the crime mix. Police resources committed to solution of different crime types and therefore the policing cost of investigation vary quite substantially.

Vancouver and Surrey have the most intense problems with violent crimes against the person among this set of police jurisdictions: violence comprised 15% of the Vancouver crime mix in 2015 while violence accounted for 14% of the crime mix in Surrey. Property crime dominated the crime mix in Burnaby, Vancouver and Langley Township, accounting for 72% of recorded crimes in Burnaby, 69% of recorded crimes in Vancouver and 66% of recorded crimes in Langley Township. In contrast, property crimes accounted for less than half of the crimes recorded in Whistler (42%), Sechelt (46%) and Langley City (48%). Other criminal code offences accounted for more than a third of recorded crimes in Langley City (34%) but only one-thirteenth (7.5%) of recorded crimes in Vancouver. Drug offences were highest in Whistler where they accounted 15 % of recorded crime and lowest in Mission, where they accounted for less than one in twenty offences (3.4%). Finally, Criminal Code traffic offences made up the greatest share of recorded crime in Delta (7.9%) and comprised the lowest share of Vancouver's recorded crime at less than 2%.
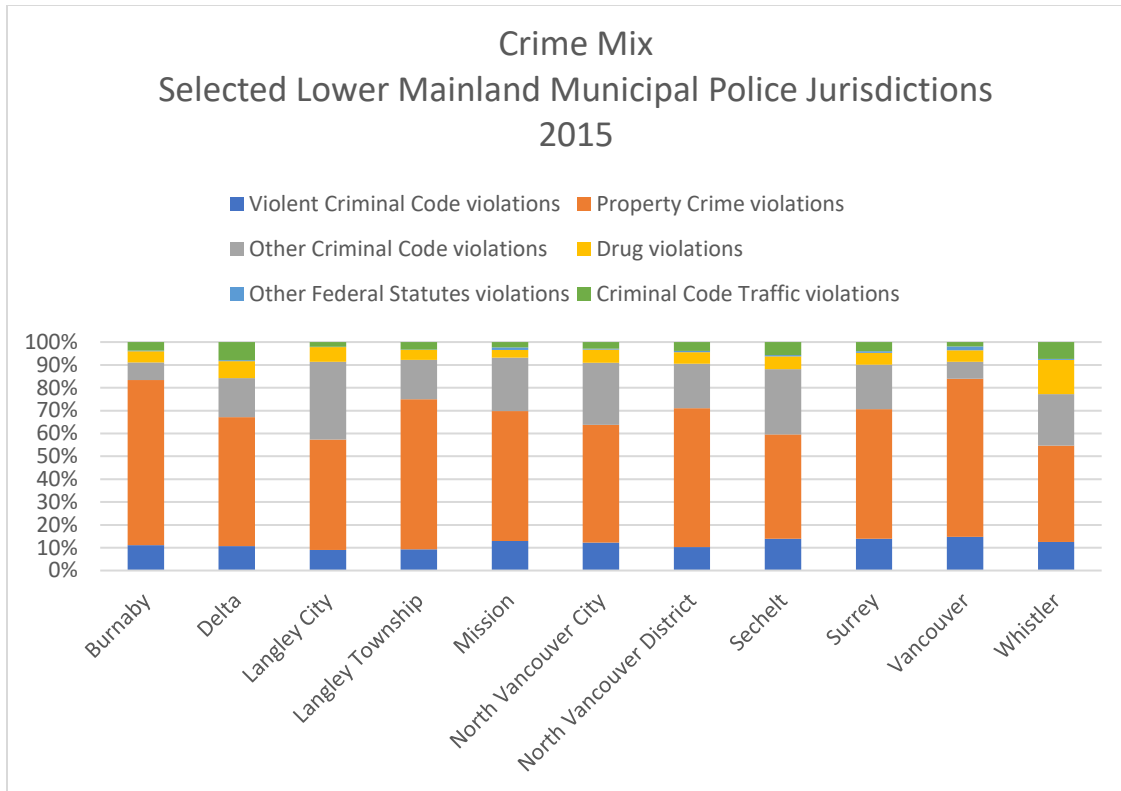
Figure 21 Lower Mainland Crime Mixtures

Another way to look at crime mix is to consider the number of different crime types reported in a police jurisdiction during a particular year. During 2015, the Incident Based Uniform Crime Reports (UCR2) managed by Statistics Canada tracked 220 discrete crime types. Some 178 of those crime types, or 80% of the possible types tracked by UCR2, were reported as having occurred at least once someplace in British Columbia that year. That percentage score can be viewed as a crime diversity score. The diversity score range across the individual police jurisdictions ran from a high of 66% to a low of 6%. The higher the diversity score the greater range of investigative expertise a particular police jurisdiction requires.

Table 3 presents the 15 highest diversity scores for police jurisdictions in 2015. Note that only three jurisdictions had crime diversity scores amounting to half the possible crime diversity during 2015. Diversity is strongly correlated with a jurisdiction's total recorded crime count (R^2=0.93) and population (R^2=0.81). Larger jurisdictions have both larger volumes of crime and more complex mixtures of crime with which to deal. As the following sub-section shows, however, the largest police jurisdictions do not necessarily have the highest crime rates or, in relative terms, the most serious crime problems.

Table 3 Police Jurisdictions with Highest Crime Diversity Scores 2015

Police Jurisdiction	Diversity Score
Surrey	66%
Vancouver	57%
Richmond	50%
Kelowna	47%
Chilliwack	45%
Burnaby	44%
Victoria	44%
Abbotsford	43%
Prince George	42%
Coquitlam	41%
Langley Township	41%
Nanaimo	41%
Maple Ridge	41%
Kamloops	40%
Saanich	40%

Crime Severity and Crime Gravity

The Crime Severity Index

The Canadian Centre for Justice Statistics, working with the Canadian Association of Chiefs of Police, developed the Crime Severity Index (CSI) in order to address the problem of all crimes being treated equally in the standard crime rate statistic.

This statistic uses crime weights derived from the average number of days to which a person convicted and imprisoned for a particular type of crime is sentenced by Canadian judges. For instance, a murder carries a (rounded) weight of 7142; Robbery, 583; Breaking and Entering, 187; Mischief, 30; Disturbing the Peace a weight of 9; etc.

For each police jurisdiction, the Crime Seriousness Index is calculated by multiplying the count of any particular crime by its weight, summing the weighted numbers resulting, and then dividing the sum by the total resident population. The value derived by this calculation for Canada as a whole for 2006 was set at 100. Such values were then calculated for every police jurisdiction for every year beginning in 1998 and indexed according to the Canadian 2006 value. Like the standard crime rate, this weighted crime rate has declined consistently over this time frame[8]. As is well known, British Columbia police

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[8] The weights were recalibrated in 2011 based on further sentencing data and have since been used by Statistics Canada to calculate the CSI. An adjusted factor is used to ensure that post recalibration CSI scores are consistent with the original weights and calculated CSI scores.

jurisdictions in general have historically had much more intense crime problems than those of police jurisdictions in many other provinces.

Crime Rate and Crime Severity Index Scatterplot
BC Police Jurisdictions
2013

$y = 101.37x - 873.85$
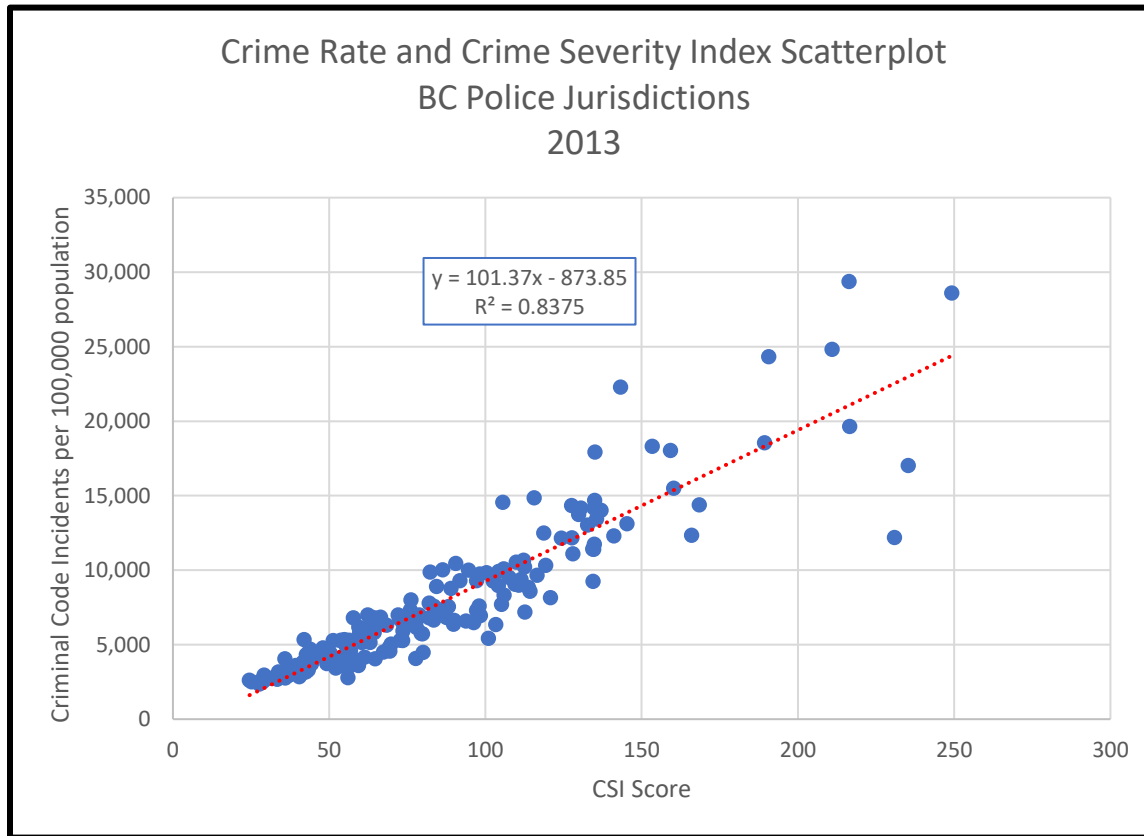$R^2 = 0.8375$

Figure 22 Crime Rate and Crime Severity Index

The Crime Gravity Score

An alternative way of understanding the crime patterns to which police in a particular jurisdiction must respond is to utilize the crime count, rather than the population count, as the basis for calculating a statistic weighted by the seriousness of the set of crimes in that jurisdiction. This approach allows
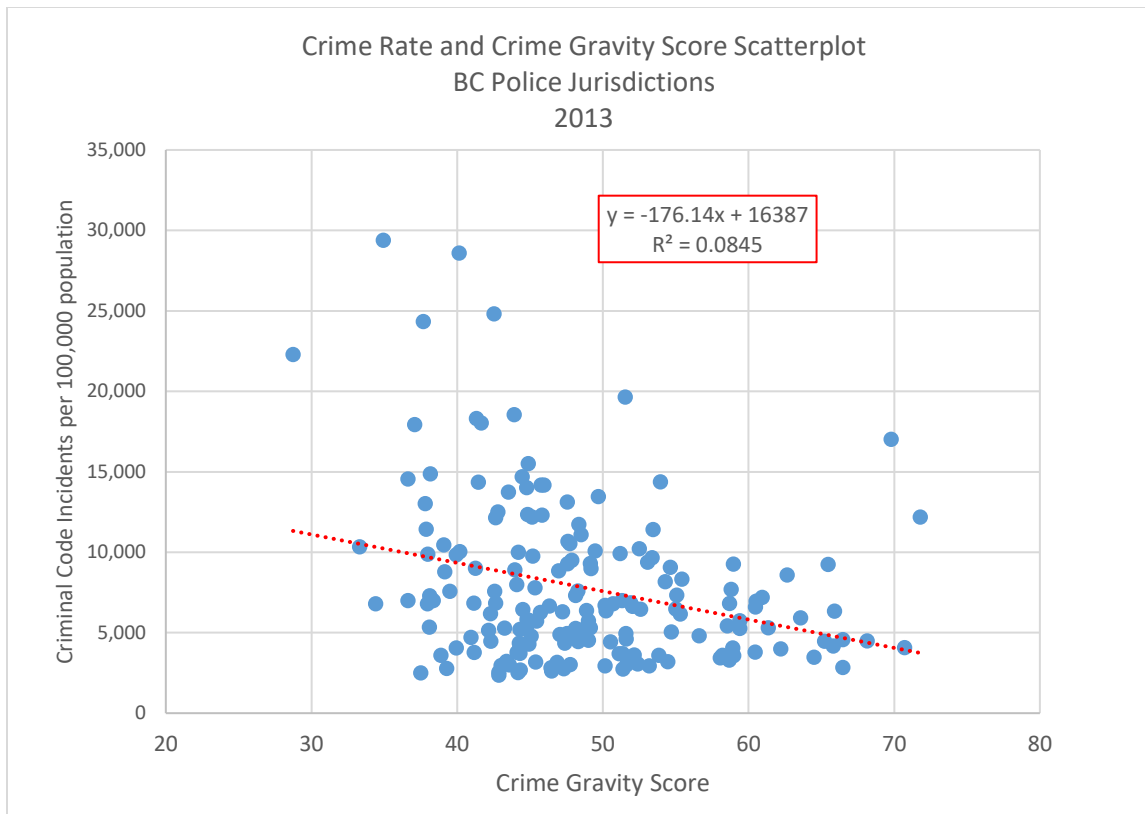
Figure 23 Crime Rate and Crime Gravity Score

comparative examination of the crime situation in different police jurisdictions, even those small ones where a small population base makes crime rate and CSI calculations unstable at best. This is particularly important in British Columbia where many small population centres policed by detachments of the RCMP acting in its role as the Provincial Police force face a relatively small number of crimes which nevertheless are quite serious both in terms of legal treatment and consequences to victims.

The Crime Gravity Score (CGS) calculation begins in the same way as the CSI: for each policing jurisdiction: the count for each UCR crime type reported in the jurisdiction is multiplied by its CSI Weight (which is, remember, based on the average imprisonment sentence imposed by Canadian judges on persons convicted of that particular crime) and the resultant weighted counts are then summed. The difference is that in the CGS the weighted sum is then divided by the total number of recorded violations in that jurisdiction. The resultant score represents the gravity of the set of crimes that police jurisdiction was required to handle during that year and allows direct comparison with the CGS of any other police jurisdiction. It provides a clear basis for comparison of the crime component of police work required in that jurisdiction that year.[9] The fact that while the CSI is correlated with the crime rate at r=0.83 while the CGS is correlated with the crime rate at only r= -0.08 indicates that the CGS is in fact providing a new and different measure of the conditions in different police jurisdictions.

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[9] Note that CGS could be computed for some other time frame such as the month or even the police shift, something that cannot be done with either the crime rate or the CSI because population estimates for short time periods are not available.

This difference in what is measured by the Crime Gravity Score, the Crime Severity Index and the Standard Crime Rate is illustrated in Table 4 and Figure 24. Table 4 lists, respectively the fifteen police municipalities with the highest standard crime rate (Criminal Code offences [excluding traffic offences] per 100,000 population); the fifteen municipalities with the highest crime severity index scores and the fifteen municipalities with the highest crime gravity scores in 2015. While the lists for the standard crime rate and the crime gravity score are very similar, the crime gravity list of municipalities is quite different. Only one of the CGS top fifteen (Victoria) also appears on either the standard crime rate list or the Crime Severity Index score list. Thirteen of the top fifteen cities for standard crime rate and crime severity index score appear on both of those lists. With the exception of Victoria, which appears on the CSI list, none of the top fifteen standard crime rate or crime severity index municipalities appear on the CGS list. Provincial police detachments were almost as differentially ranked as Municipal police jurisdictions. Eleven of the top fifteen provincial detachments on the crime gravity score list did not appear on either the top fifteen list for the standard crime rate or the top fifteen list for crime severity index scores. Nine of the top fifteen detachments for standard crime rates also appeared on the crime severity index top fifteen list. Only one provincial police respondent, Agassiz, appeared on all three lists.

Figure 24 shows the province-wide trends in standard crime rates, crime severity index scores and crime gravity scores for the years 1998-2015 utilizing UCR2 data derived from the Statistics Canada Cansim data base. Crime Severity Index scores and Crime Gravity scores are plotted against values shown on the left-hand vertical axis. Crime rate values are shown on the right hand vertical axis. Note that the standard crime rate and crime severity index score trends are nearly identical and show very sharp drops over this 18-year period. Standard crime rates declined by 40% and crime severity index scores declined by 43%. In contrast, crime gravity scores declined by only 14%. Declines in the Standard Crime Rate and Crime Severity Index were driven by a combination of rising population counts and large

Table 4 High Ranked Municipalities on Crime Rate, Crime Severity and Crime Gravity

Top 15 BC Municipalities 2015					
Standard Crime Rate		**Crime Severity Index**		**Crime Gravity Score**	
Williams Lake	27825	Williams Lake	225	Burnaby	70.5
Terrace	22534	Dawson Creek	179	Abbotsford	70.2
Prince Rupert	20612	Quesnel	178	Vancouver	69.7
Quesnel	19021	Fort St John	165	West Kelowna	67.9
Smithers	16350	Hope	164	Langley Township	62.5
Hope	15543	Northern Rockies	163	Surrey	61.9
Fort St John	15454	Langley City	161	New Westminster	60.5
Prince George	14689	Prince Rupert	161	West Vancouver	60.0
Dawson Creek	14631	Prince George	150	Qualicum Beach	59.5
Langley City	14402	Merritt	147	Peachland	59.1
Merritt	14140	Penticton	145	White Rock	58.9
Penticton	13040	Victoria	140	Summerland	58.9

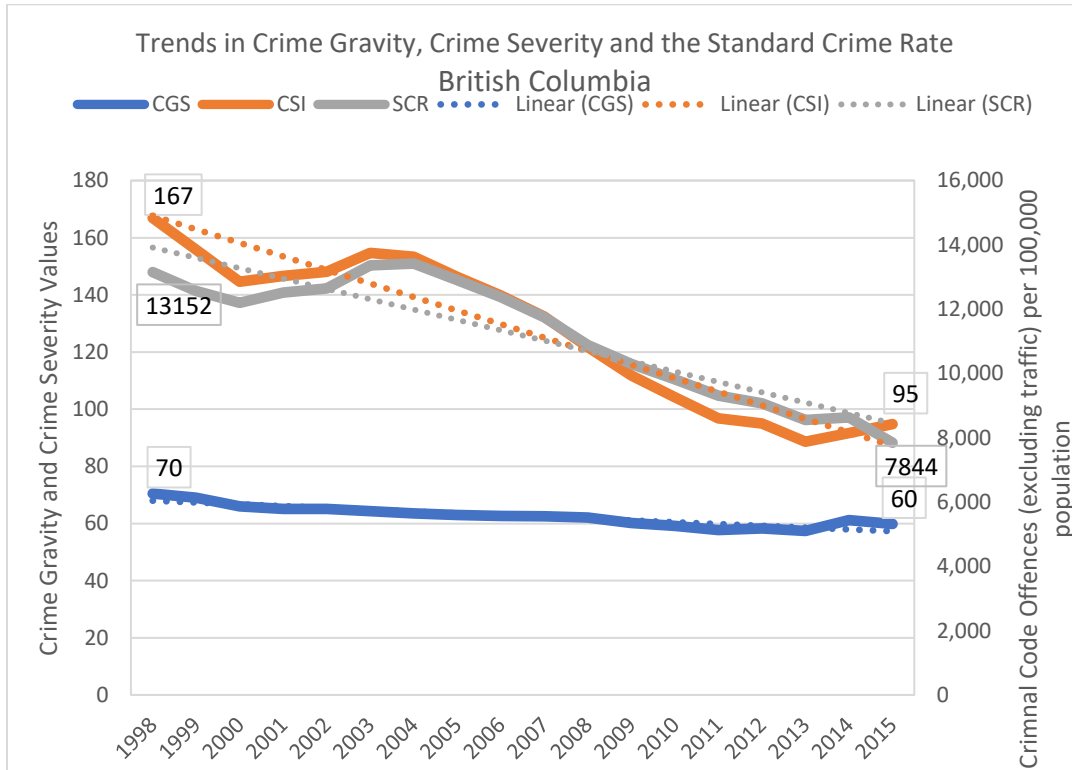| Whistler	12236	Terrace	140	Victoria	58.0
Northern Rockies	12158	Smithers	138	Richmond	58.0
Port Alberni	12139	Mission	131	Saanich	57.1

Figure 24 CGS, CSI and SCR Trends since 1998 (BC)

declines in relatively low seriousness crimes. The much more modest decline in the Province's Crime Gravity Score, which is based on the total count of crime rather than the population, reinforces this conclusion.

Trend charts showing the Standard Crime Rates, the Crime Severity Index scores and the Crime Gravity Scores for the years 1998 through 2015 for 190 police departments, municipal RCMP detachments and provincial RCMP detachments are available in Appendix G.

CASPR – Crime Analysis System for Police Records

CASPR is a Decision Support System (DSS) developed at ICURS which allows users to conduct data mining and computational analysis of trends and patterns of change in crime data and police records. CASPR allows for, among other features, Crime Basket analyses discussed in the next subsection. CASPR has two versions.

CASPR-DSS-I uses publicly available crime data and is written based on Microsoft office suite of products. The database contains 9 years of monthly aggregated data (2000-2008) collected by the Canadian Centre for Justice Statistics at Statistics Canada through the Uniform Crime Reporting Survey (UCR) about reported and cleared crimes. The data provides utilities for longitudinal statistical analysis of crime and police performance. Its dashboard allows easy identification of statistically significant and

operationally important trends in crime and different types of clearance rates, in thousands of Jurisdiction-Crime combinations through an intuitive charting graphic user interface (GUI). The system can also be used for many comparative purposes and for intervention impact analysis. The program is written in Visual Basic for Applications and is executed within Excel with minimal setup.

CASPR-DSS-PRIME is client server application that uses a subset of PRIME data stored in a secured data server. The data covers a time span between 2008-2015 and includes information about PRIME events and subjects and CAD calls for service. The system allows the decision makers to identify and chart the trends of criminal events and statistical records. This means that police activities, not usually captured in reported crime data, can be identified and a realistic picture of all recorded police activities in all jurisdictions is available to decision makers. Comparative analysis of one or more crimes and/or statistical records in all the jurisdictions is easily available through intuitive GUI. Comparative analysis of all the crimes or statistical codes in one jurisdiction is available through a similar interface. Identification and reporting of frequent clients of the police, such as victims and witnesses, as well as apprehension of prolific offenders and their networks in a time interval or in longitudinal analysis, is also available through a GUI dashboard. The system is also able to identify crimes and statistical records that happen together through Crime Basket Analysis.

Crime Baskets

Historically, crime analysts and criminal case operations analysts have been limited by small and impoverished data sets. The development of comprehensive digital records management systems has created big and rich data sets. PRIME BC is an important example of such a data system that captures detailed information about every event brought to the attention of the police in British Columbia. Limited computational power remains an impediment to analysis of big data for most justice analysts. Few conceptual approaches to analysis of big justice data have been developed to date. Crime baskets, as developed at ICURS, represent one new approach to understanding and utilizing big justice data.

Events are occurrences in space time. Events dealt with by the justice system have two aspects: a person aspect; and a case aspect. Both aspects of a criminal justice event have a *basket* of attributes. Some attributes of an event are inherent: a person's age, gender, race, weight, height, education, economic status, criminal justice history; a case's time, location, and specific risk or harm. Some event attributes are assigned by the justice system: a person's role as complainant, victim, witness, suspect, convict, or parolee; a case's substantive and procedural characteristics such as whether it is a civil matter or criminal matter, the crime type, its progression from cleared by charge to prosecuted, dismissed or convicted, sentenced, appealed, finally completed. We speak of *Crime Baskets* as convenient shorthand implying the various aspects of a criminal event and its many attributes. All of the information captured by the idea can be analyzed computationally to identify structures and patterns in the course of events.

Crime Baskets can relate criminal acts but also link to: alcohol abuse, drug abuse, mental health issues, cars, residences, interactions among people, and multi-dimensional networks of people, places and things. Crime baskets can lead directly to exploration of: event complexity; individual and group criminal careers; individual and group social service utilization histories; criminal typologies; justice system behaviour; and, social system behaviour. Crime Baskets also have the benefit of showing, to a limited extent, the number and types of police activities associated with certain types of events, and serves to complement other measures of police work load. This is illustrated in the types of crime basket examples below.

Crime Baskets can be analyzed in many ways. They can examine attributes at the individual level or at some aggregate level. They can be focused on cases or persons. They can be analyzed in both spatial and temporal dimension. The can be examined in terms of their functional nature or their procedural status.

Some Types of crime baskets

Many types of crime baskets can be defined using the event data the criminal justice system generates in the course of doing its business. We provide a few examples we have been researching at ICURS using big data from police and judicial information systems:

Police function baskets
- Calls for service basket: principal and subsidiary attributes
- Crime mix basket: principal and subsidiary attributes
- Charge recommendation baskets (crimes that occur together)

Court level baskets
- Charge baskets (crimes that are prosecuted as a group)
- Conviction baskets (convictions that occur together as a group)

System handling baskets
- Tracing charge baskets from police to prosecutor to conviction
- Tracing process and procedure in case handling baskets

Offender baskets (sets of crimes in criminal events)
- Occasional Offenders (group crime type baskets)
- Prolific Offenders
- Individual crime baskets over time

Figure 25 presents a sample screen from an early version of the CASPR-PRIME crime analysis system developed by Amir Ghaseminejad at ICURS for crime basket analysis of police data drawn from the PRIME-BC province-wide police records management system. There is a similar system, COUR-BC Analytics, developed for analysis of criminal cases flowing through the criminal courts of British Columbia. (Brantingham, et al., 2011; Ghaseminejad, et al., 2010; 2016).
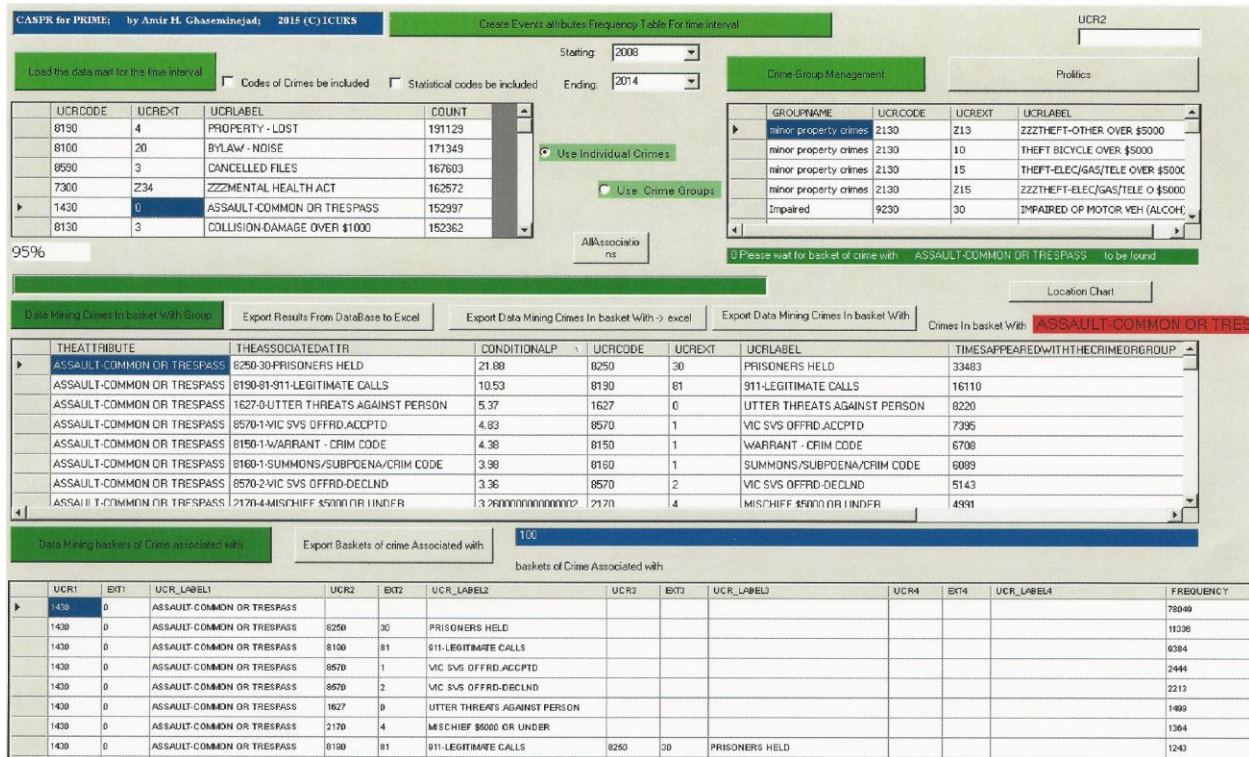
Figure 25 Sample Screen from CASPR-PRIME

Community Crime Baskets

Community crime baskets, the set of crimes that a police department must address, are well identified through the examination of crime prevalence and diversity and through the standard crime rate, the crime severity index score and the crime gravity score discussed above. Such analyses can be applied to subunits within a police jurisdiction such as police districts or police atoms or census tracts. Such analyses can be enhanced by utilization of crime location quotients which can identify the problems specific to a particular area relative to the crime basket for the police jurisdiction as a whole and help target both crime prevention and proactive investigation resources into the hot spots for particular types of crime and antisocial behaviour. Such analyses can be strengthened by analysis of the crime baskets of identified offenders, particularly those of repeat and prolific offenders.

Location Quotients of Crime

Location Quotients are a measure developed in regional planning and economics to try to address questions of the relative structure and importance of local economies while conceptually avoiding some of the stationarity problems of spatial analysis. Local areas are placed within a wider comparative context for analysis. Location Quotients indicate the mix of activities in one area compared to the mix of activities in the surrounding, larger area in which it is embedded. They can be used as a tool for assessing the diversity of crime or the diversity of calls for service with which a particular police service must deal in comparison with the diversity of crime or calls for service in some larger entity such as a police region or the province as a whole. That is the measure the community calls for service basket or the community crime basket in comparison to some larger community.

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From the planning perspective, the primary purpose of analysis is often to make predictions about future economic activity and to base those predictions on the way the area under study functions in relation to its surrounding area. What happens in one city is seen to depend not only on what happens in other cities but also on what happens or what exists in surrounding resources. For example, what happens in Vancouver or New York or Madrid depends on what happens in other large cities, but also depends on what happens in the local areas surrounding them. The interrelationship between and within urban areas, and between urban and rural areas is complex. Relationships can be explored within any particular area as well as between areas. What happens in one neighbourhood can be compared to what happens in surrounding neighbourhoods.

In criminology, of course, Location Quotients would use crimes or calls for service as the basic unit of count. Equation (1) states the Location Quotient formula in criminological form:

$$LQC_{i_n} = \frac{C_{i_n}}{C_{t_n}} \Bigg/ \frac{\sum_{n=1}^{N} C_{i_n}}{\sum_{n=1}^{N} C_{t_n}}$$

Where:

      n = small area under study

      N = total number of area

      C_i = count of crime i

      C_t = total count of all crimes

Using LQC, some towns and cities would be identified as centres for violent crimes; some for property crimes. Some are centres for robbery; some for burglary; some for automobile theft. The centre in one region might not appear to be a centre if compared to centres in other regions. So, a small town might be a centre of commerce in a rural area but not when compared to large urban area. It is perhaps more important to note that, since this is a relative measure, a centre cannot have high location quotients for all crimes. It is a measure that identifies relative area specialty in crimes and shows the diversity of the community crime basket that can present police forces of similar size very different sets of problems. (See Brantingham and Brantingham, 1997; Carleton, et al., 2014; Piza et al, 2017)

The advantage of an LQC in crime analysis is that there is no need to obtain a count of the number of targets as is necessary in calculating a crime rate. The LQC for robbery would be based on counts of robberies and all crimes, not population or number of target businesses. The LQC for motor vehicle theft would be based on vehicle thefts and total crimes, not the number of people or the number of motor vehicles. The problems highlighted by Boggs (1960) and Harries (1991) are minimized. Stationarity is still a problem, but can be addressed by recalculations for different time periods.

Statistical models using LQC's are different from the models most commonly constructed by criminologists. LQC's are relative measures and are potentially helpful when analyzing fear or concern about crime. A widespread fear of murder by a stranger can be triggered in a small community by one local crime. A similar level of fear might require clear evidence that a serial killer is active before it would be triggered in a large urban centre. Similarly, one or two bank robberies might seem like very little in Vancouver but a large number in Cranbrook or Fort St. John. LQC's may also prove good

predictors of local media response to specific reported crimes or even to variations in sentences in different places at different times.

LQC's are also indicators of what attracts people, both locally and from a distance, to a particular location. Some crime sites are crime generators, other are crime attractors. Crime generators are places that attract large volumes of people, generating criminal opportunities in the process. Some of the people attracted to a generator location will notice those opportunities and act on them even though they had not been intending to commit any crime in the first place. Crime attractors are places notorious for providing opportunities for crime. Offenders travel to crime attractors with the pre-established intention of committing some specific crime there.

LQC's also have a statistical model building strength. In many models using crime rates, the independent and dependent variables are both rates based on population. In such instances, the overall strength of the model may be the result of the same numbers being used as the denominators on both sides of the equation. With LQC's, the independent variable would not have the same base. Independent variables may even reflect routine activities in the LQ form. For example, a measure of the number of bars to total number of businesses in a town can be compared to the ratio for the region under analysis. It seems reasonable that as the local ratio begins to exceed the regional ratio the LQC for violent crime would also increase. This would not necessarily be found in an analysis of violent crime rates when population is used as the denominator. It might not even be found if the number of bars were used as the denominator in constructing crime rates.

Table 5 2015 LQC Scores for Offence Categories

Vancouver LQC 2015		Surrey LQC 2015	
Trafficking in stolen property	4.050	Total prostitution	3.843
Robbery	1.822	Other assaults	3.641
Extortion	1.738	Attempted murder	2.452
Total prostitution	1.697	Other Criminal Code traffic violations	2.039
Sexual Assault	1.536	Firearms, use of, discharge, pointing	1.762
Theft under $5,000	1.480	Motor vehicle theft	1.686
Kidnapping or Forcible Confinement	1.450	Fraud	1.642
Breaking and entering	1.393	Robbery	1.572
Theft over $5,000	1.353	Commodification of sexual activity	1.378
Attempted murder	1.348	Abduction	1.358
Homicide	1.273	Uttering threats	1.228
Identity fraud	1.244	Disturb the peace	1.216
Criminal harassment	1.219	Extortion	1.067
Other Federal Statutes	1.215	Total other violations causing death	1.004
Weapons violations	1.168	Theft under $5,000	0.963
Assaults Levels 1,2,3	1.115	Drug violations	0.949
Fraud	1.050	Weapons violations	0.947
Other violent violations	1.029	Breaking and entering	0.946
Identity theft	1.021	Kidnapping or Forcible Confinement	0.929

Arson	1.000	Arson	0.921
Assaults against a peace officer	0.938	Indecent/Harassing communications	0.908
Drug violations	0.924	Sexual violations against children	0.901
Commodification of sexual activity	0.922	Assaults Levels 1,2,3	0.887
Possession of stolen property	0.906	Identity theft	0.852
Administration of justice violations	0.902	Total other violations	0.840
Total other violations	0.857	Sexual Assault	0.826
Uttering threats	0.728	Possession of stolen property	0.816
Motor vehicle theft	0.724	Youth Criminal Justice Act	0.775
Indecent/Harassing communications	0.682	Criminal harassment	0.773
Mischief	0.679	Mischief	0.740
Sexual violations against children	0.578	Impaired driving	0.738
Impaired driving	0.509	Theft over $5,000	0.706
Total other violations causing death	0.504	Assaults against a peace officer	0.689
Abduction	0.496	Identity fraud	0.686
Other Criminal Code traffic violations	0.421	Other violent violations	0.667
Firearms, use of, discharge, pointing	0.307	Administration of justice violations	0.653
Youth Criminal Justice Act	0.265	Homicide	0.634
Other assaults	0.225	Other Federal Statutes	0.472
Disturb the peace	0.080	Trafficking in stolen property	0

Table 5 provides the 2015 LQC tables for UCR recorded crimes at the first level of aggregation for Vancouver and Surrey, British Columbia's two largest cities. In the LQC the proportion of the total local basket of crimes comprised by a particular type of crime is compared to that crime's proportion of the provincial crime basket. Where the local and provincial proportions are the same the LQC value is 1.0. As a particular local crime type comprises a larger share to the local crime basket (and hence poses a larger problem for policing) the LQC value increases above 1.0, sometimes to many multiples of one. As a particular local crime type comprises a smaller share to the local crime basket, its value drops below 1.0. By convention, values close to 1.0, typically ranging from a low of 0.75 to a high of 1.25 are considered as presenting problem and workload levels like the provincial pattern for that crime type. LQC values above 1.25 are considered as presenting more intensive problems than typical in the province. Values below 0.75 are considered to be less of a problem for police locally (Carleton, et al., 2014).

As shown in Table 5, which compares the 2015 LQC for Vancouver and Surrey, the crime mix for cities of similar size can be quite different. Crime groups that occurred with more intensity in Vancouver or in Surrey than in the Province as a whole are tinted red; crime groups that occurred with less intensity in Vancouver or Surrey than in the Province as a whole are tinted green. Note that while Trafficking in Stolen Property had the highest LQC of any crime type group in Vancouver, not a single instance of this crime was recorded by police in Surrey. Note that while Motor Vehicle Theft, Abduction and Uttering Threats all had LQC values in Surrey that were more intense than Provincial levels for these crimes, Vancouver's LQC scores were below Provincial averages. The two largest cities in British Columbia had very different crime mixtures recorded by police in 2015, requiring different types of expertise and

different mixtures of resources to handle their crime problems. Similar differences in crime mixture and intensity are apparent across all BC police jurisdictions.[10]

Repeat and Prolific Offenders' Crime Baskets

Repeat offenders constitute a major burden on criminal justice resources and present a major challenge in crime and disorder reduction. A small proportion of all offenders commit a very large share of all the offences known to police. For instance, analysis of the RCMP E-Division PIRS data set for the years 2001-2006 showed that highly prolific offenders, those defined as having been charged with a crime on six or more separate occasions comprised less than 5% of all persons charged with an offence, but were responsible for 25% of all offences for which police were able to recommend charges. Conversely, individuals who were charged for an offence just once in that six-year period comprised 72% of all persons charged but were responsible for only 40% of all charges recommended by police. (Croisdale & Brantingham, 2008: Croisdale et al., 2009a, 2008b). Moreover, prolific offenders tend also to be prolific victims of crime and active participants in criminal justice as witnesses. Using crime basket analysis to help identify and target prolific offenders can produce major reduction in crime.

Prolific offenders are often prolific actors across a range of crimes and antisocial behaviours. The BC PRIME data set makes it possible to analyze the ways in which repeat and prolific offenders use up criminal justice resources. The following example, which utilized the de-identified PRIME BC extract for 2007-2014 provided to ICURS by RCMP E-Division, traces through information on a highly prolific offender, the individual who was charged most frequently with common assault (Assault Level 1) over this eight-year period.[11] ; This offender was charged with common assault some 14 times and was involved in a total of 30 assaults as offender, suspect, victim or witness 30 times. Overall, this offender was involved, in one of these capacities, in 106 separate police incidents across four police jurisdictions over this period of time.

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[10] Note that some currently unmeasured component of these differences may be due to differences in crime classification and recording rules in different police jurisdictions notwithstanding efforts by British Columbia and Statistics Canada to standardize classification and recording rules for crime statistics.

[11] The de-identification procedures utilized by ICURS protects the identity and privacy of individual subjects in the data file but still permits linkage of events in which any particular individual person becomes involved.
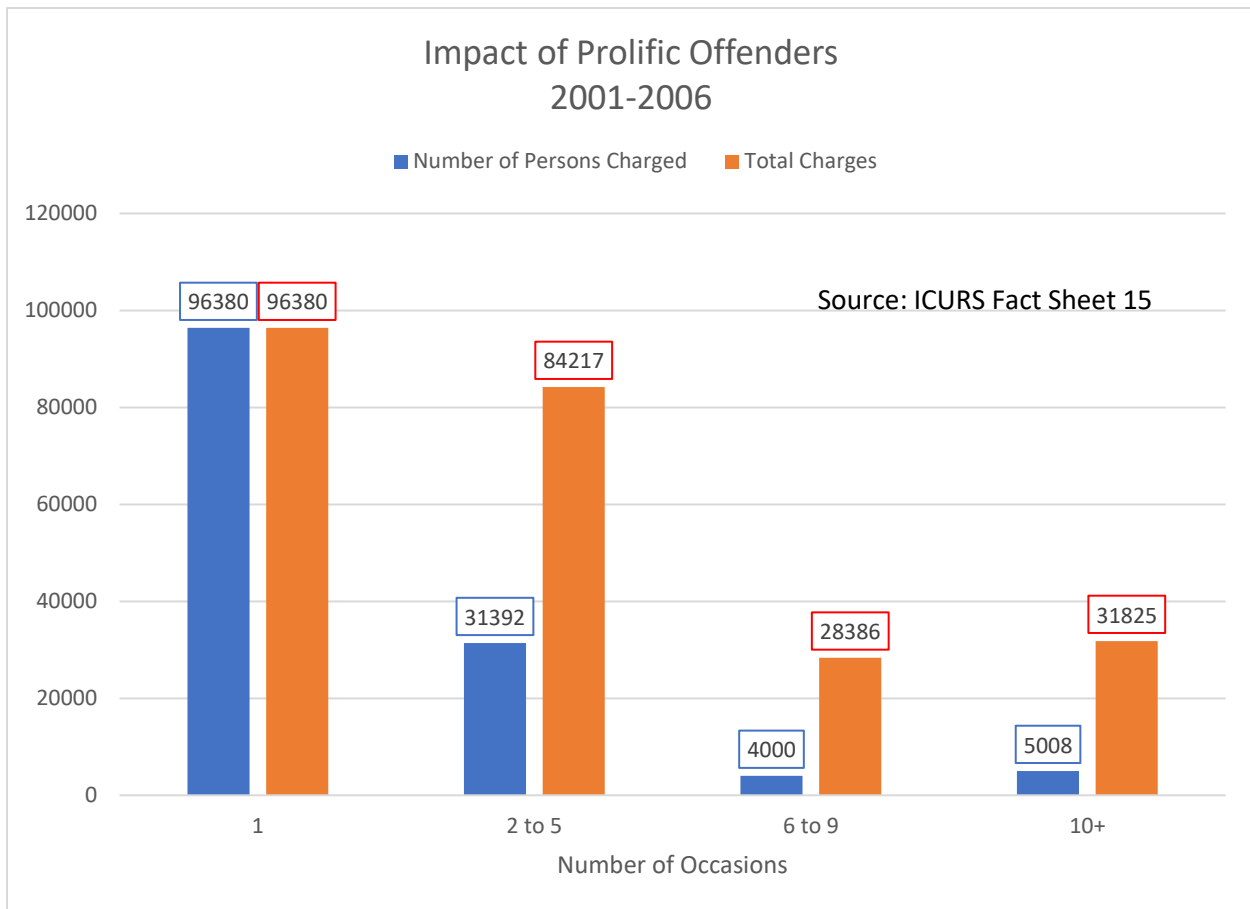
Figure 26 Prolific Offenders and Charges, 2001-2006

This offender's repeated contacts with police were dominated by assault and uttering threat offences and by disturbing the peace offences. This offender also had substantial problems with administration of justice offences including failure to appear, bail violations and breach of probation offence; with drug and alcohol offences; with breaking and entering and theft offences; and with a wide miscellany of other forms of minor crime and anti-social behaviour.

Most (70%) of this prolific offender's assault related police contacts were for common assault, but substantial proportions involved Level 2 Assault (with a weapon or causing bodily harm) (13%) and there was one case of Level 3 Aggravated Assault as well. About one in seven of the assaultive offences involved uttering threats against a person.
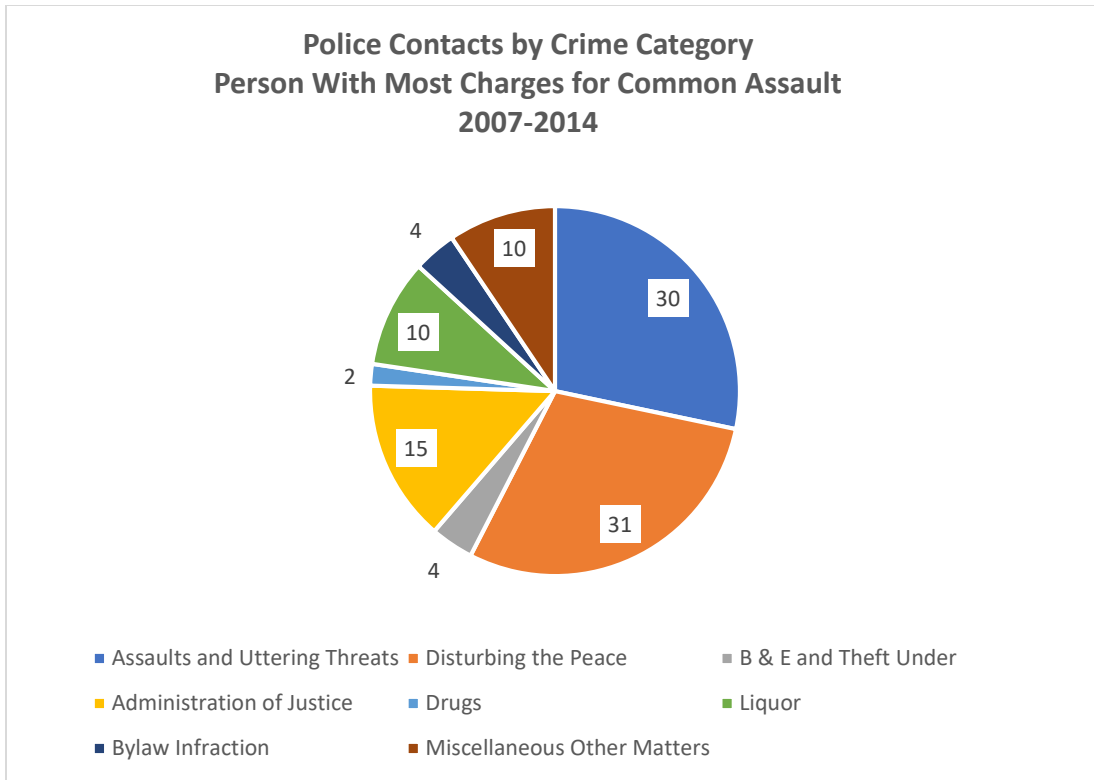
**Police Contacts by Crime Category
Person With Most Charges for Common Assault
2007-2014**

Legend:
- Assaults and Uttering Threats
- Disturbing the Peace
- B & E and Theft Under
- Administration of Justice
- Drugs
- Liquor
- Bylaw Infraction
- Miscellaneous Other Matters

Figure 27 Most Prolific Common Assault Offender by Police Contact Category

**Police Contacts by Assault Level
Person With Most Charges for Common Assault
2007-2014**

Legend:
- ASSAULT-AGGRAVATED
- ASSAULT-W/WEAPON OR CBH
- ASSAULT-COMMON OR TRESPASS
- UTTER THREATS AGAINST PERSON
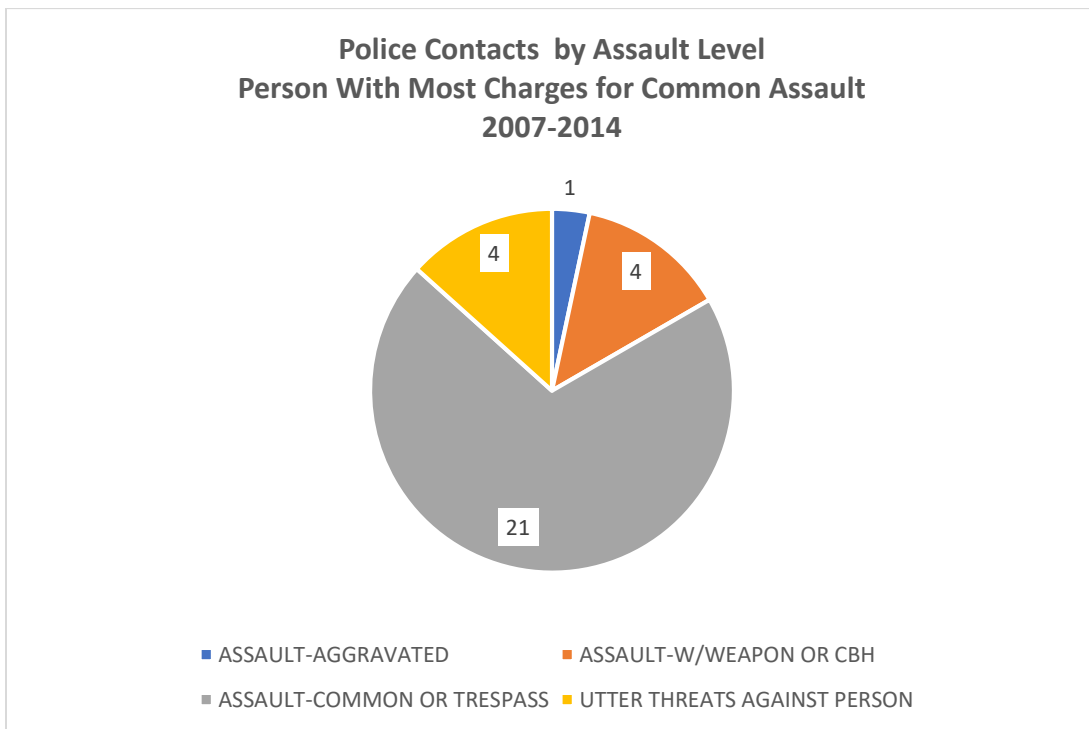
Figure 28 Most Prolific Common Assault Offender's Police Contacts by Assault Type

All Roles in Common Assault Events
Person With Most Charges for Common Assault
2007-2014

Legend: CHARGED ■ SUBJECT OF COMPLAINT ■ COMPLAINANT ■ VICTIM ■ WITNESS ■ OTHER
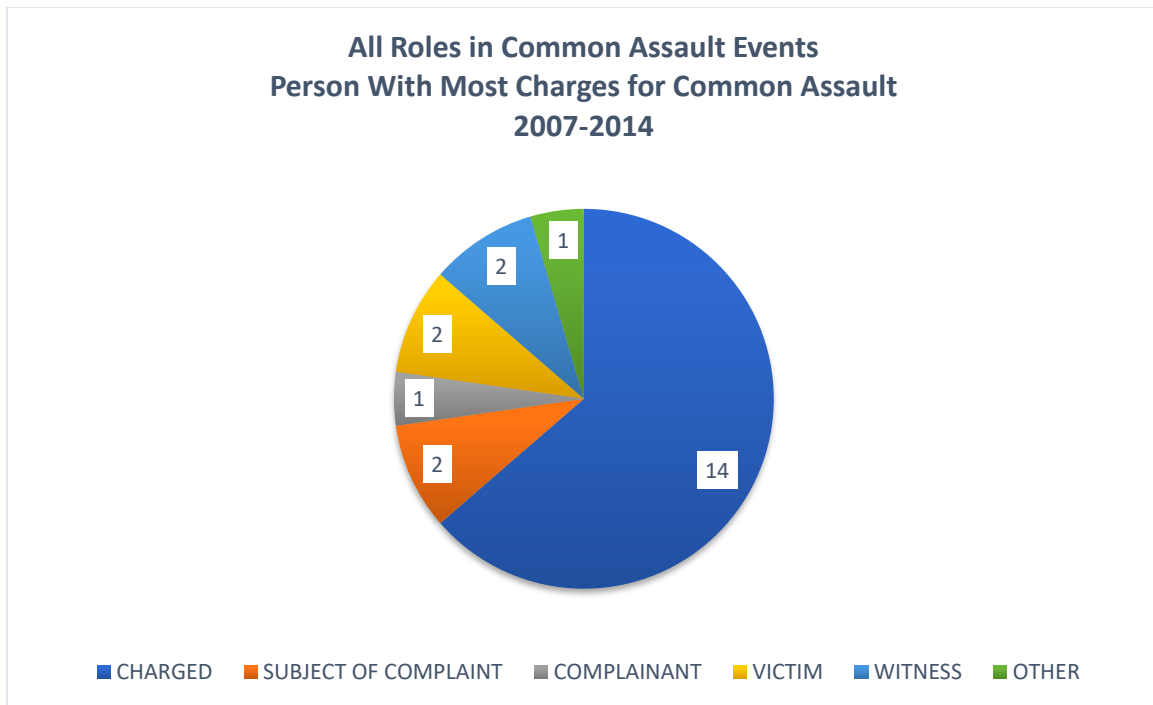
Figure 29 All Criminal Justice Roles in Common Assault Events

In terms of police contacts related to common assault, this offender was charged 14 times (64% of common assault contacts) and was the subject of complaint in two additional events. The offender was also involved in common assault as a victim, as a complainant, as a witness and in some other capacity in different events.

This form of analysis has been systematized in an analytic package called CASPR-PRIME that utilizes a de-identified PRIME extract by ICURS fellow Prof. Amir Ghaseminejad. CASPR-PRIME system could be made available to police and to the Ministry of Public Safety and Solicitor General on request.

Repeat Offenders' Crime Baskets and The Journey to Crime

Repeat offenders also return to the same or similar locations to commit crimes. Using metropolitan urban planning and crime data, police can develop a good picture of crime patterns in their region by identifying crime attractors and the mobility patterns of offenders. Offenders often commit crime close to home but also often journey to crime using the same travel and transit corridors they use to go to work or school, to shop and to go places for recreation and entertainment. Crimes tend to occur along the travel corridors, around travel transit stations and around other activity nodes. Many crimes are opportunistic but some are the product of systematic searches and some are the product of criminal intelligence gathering. (Brantingham and Brantingham, 2013)

Figure 30 shows the movement patterns of repeat offenders in Metro Vancouver RCMP detachments in terms of direction of movement from home to offence sites. As can be seen from the figure, high repeat offenders are drawn toward large shopping areas across the Lower Mainland. This pattern fits with theft from motor vehicle being both one of British Columbia's most prevalent crimes and one of its most

frequent (See Table 2 above). It also suggests that crime catchment areas area correspond with the catchment areas of high activity nodes such as shopping centres.

The catchment power of regional centres as crime attractors is very powerful in British Columbia. Figure 31 shows the movement of persistent and prolific offenders from home toward the location of their crimes. Crime volumes concentrate around shopping centres and along major arterial roads.
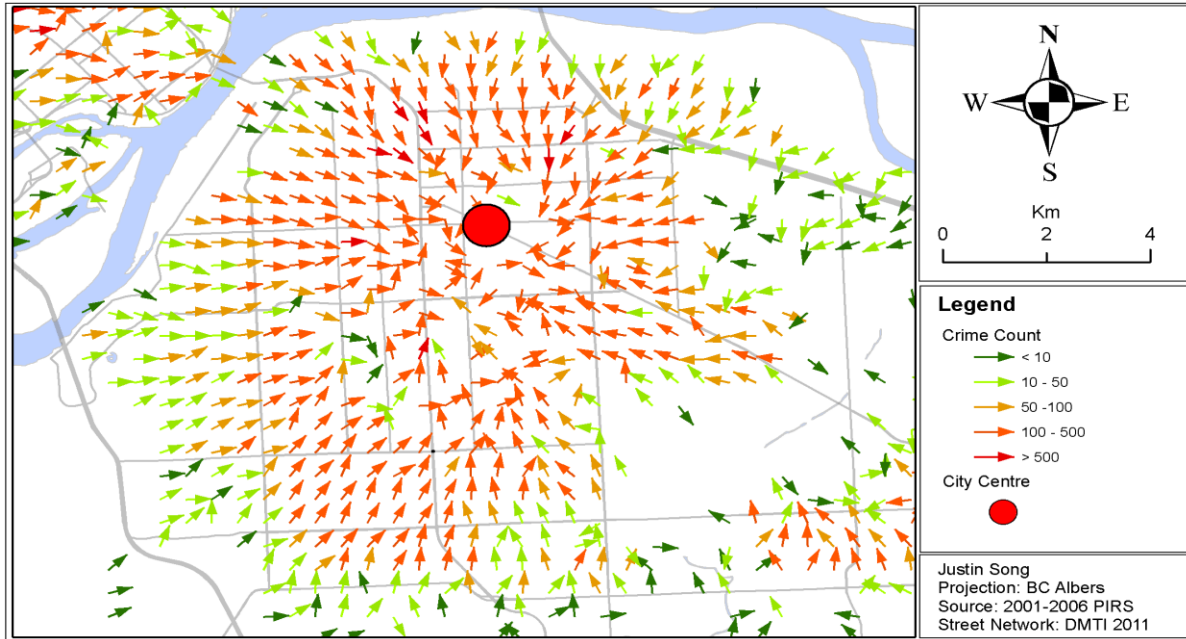

Figure 30 Directionality of Offender Flow in the One Community
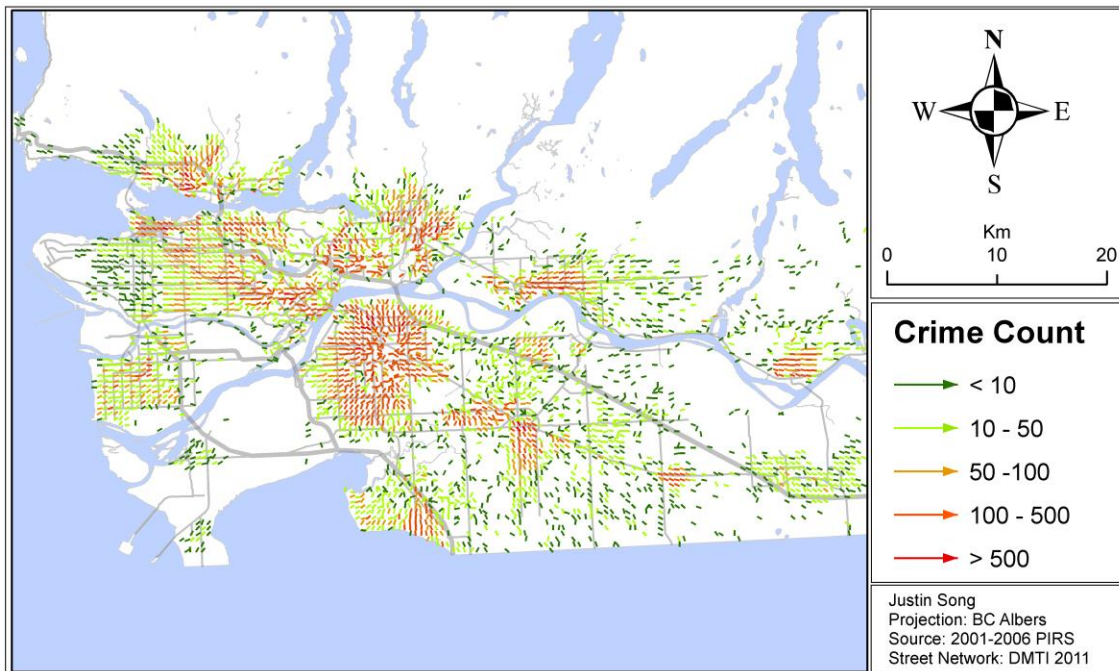
Figure 31 Movement of Persistent and Prolific Offenders in the Lower Mainland

Figure 32 shows the catchment power of one major shopping centre, focusing on the home locations of prolific offenders who committed offences at that shopping centre.
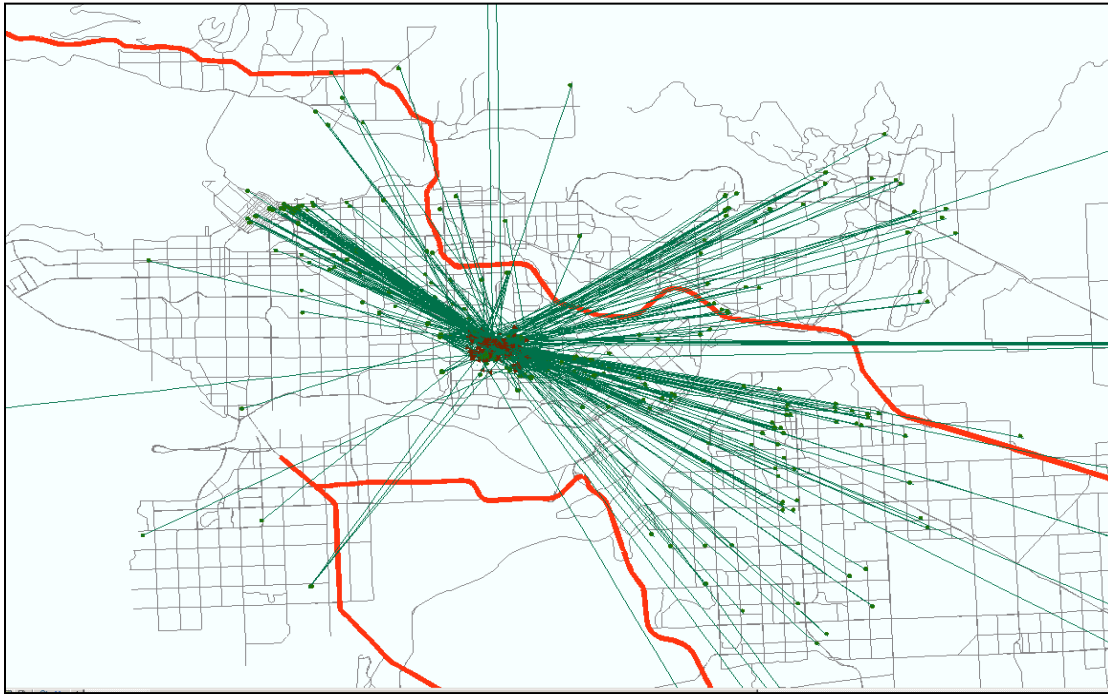

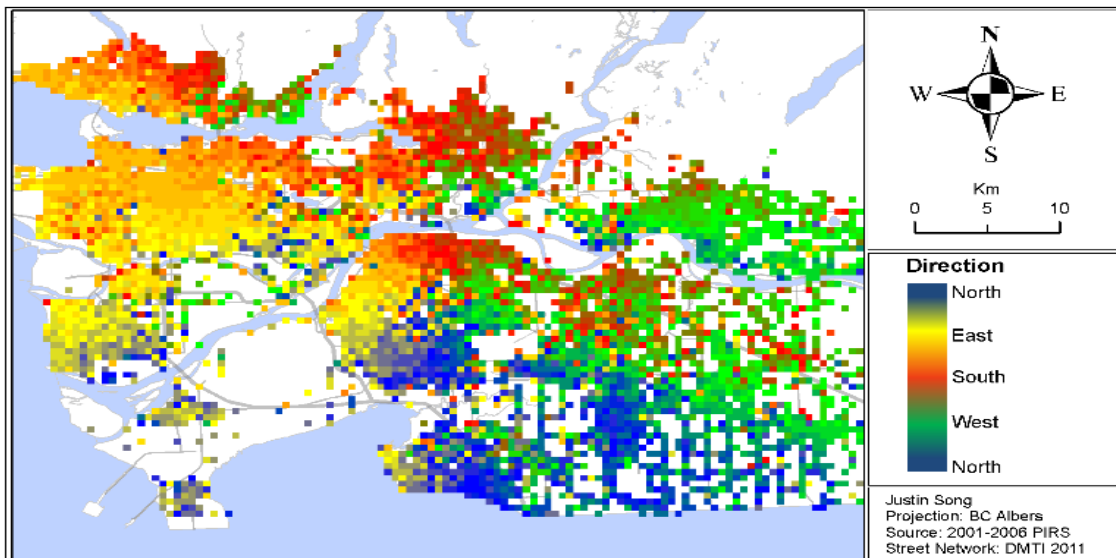*Figure 32 Crime Catchment Area of a Major Shopping Centre*

Figure 33 Offender flow across the Lower mainland

Figure 33 shows the directionality of movement by offenders known to E-Division across the Lower Mainland in their journeys to crime. Constrained by the physical barriers of mountain, sea and

international border, offenders flow in a generalized way toward centralized activity nodes. Journeys to crime do not always, or even usually, travel all the way to the attractor node that orients travel, but heads toward the node until a criminal opportunity is encountered. The journey stops at the opportunity location and the crime is committed there. Directionality in the journey to crime is colour-coded. Movement in a northerly direction is shown in blue. Movement to the west is shown in green. Movement south is shown in red and movement east is shown in yellow.

These figures (and PRIME BC data more generally) make it possible for police to pursue hot spot policing and for analysts to predict where crimes by high repeat offenders are likely to be displaced as a result of intense surveillance or other interventions. Surveillance or other types of intervention that leads to deterrence of high repeat offenders is more likely to work if it is designed to be implemented at common alternative crime attractors as well (Brantingham & Brantingham, 2003).

Crime Corridors

From an operational perspective, current computing algorithms make it possible to present data in a manner that is more valuable to constables. Figures 34, 35. and 36 present several *Crime Corridors*. Many crime analysts use something called *kernel density estimation*. This is a technique that is good for presentation but has statistical and practical limits. Most notably it will identify as high crime locations many areas where no crime is ever reported yet miss critical patterns in the spatial distribution of crime (Weisburd, Seattle, Curman, et al., 2015). Crime Corridor analysis restricts the mapping of criminal events to streets since crime locations are recorded by street address in nearly all police information systems.
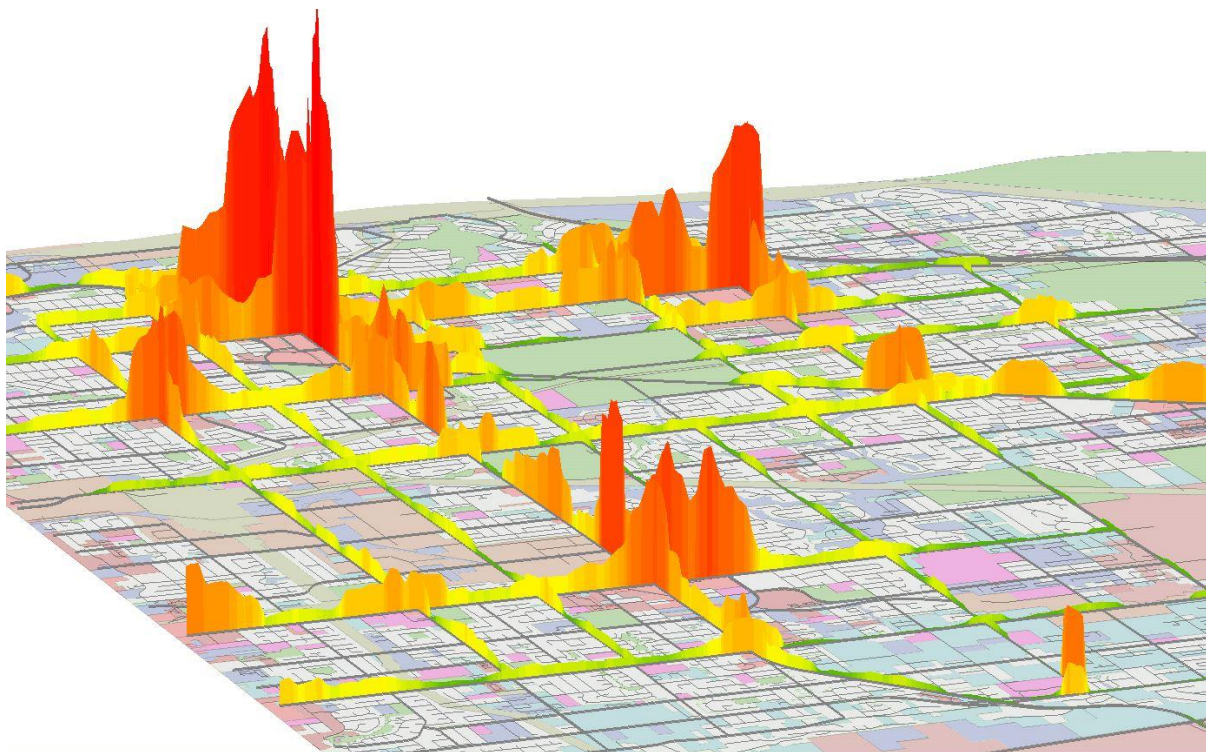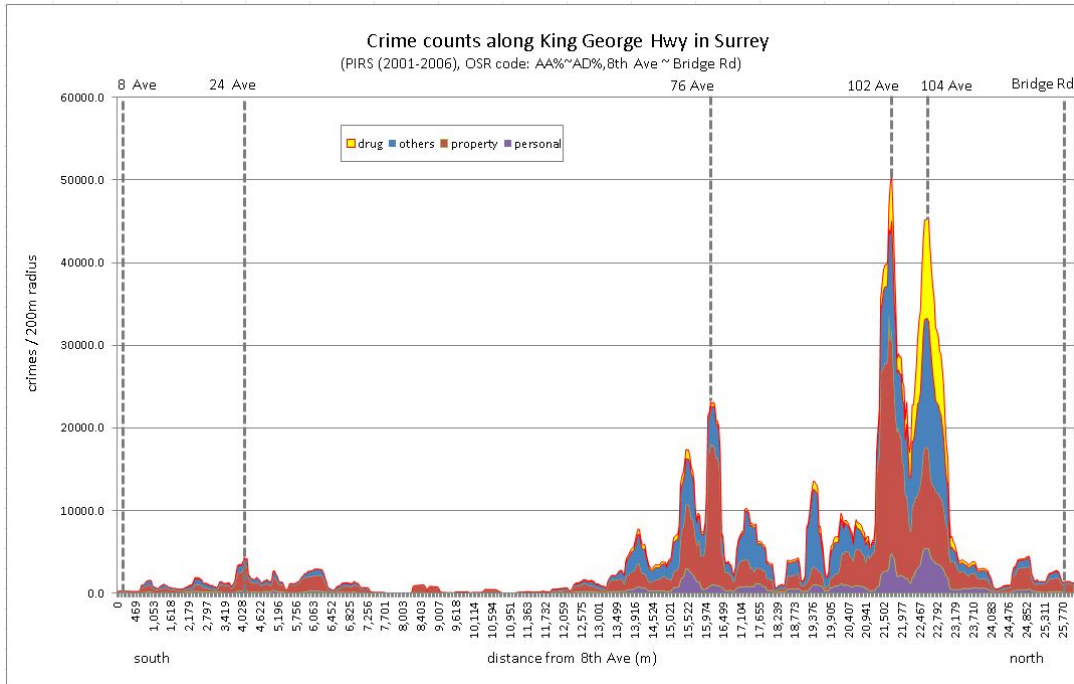

Figure 34 Crime Corridors in One City

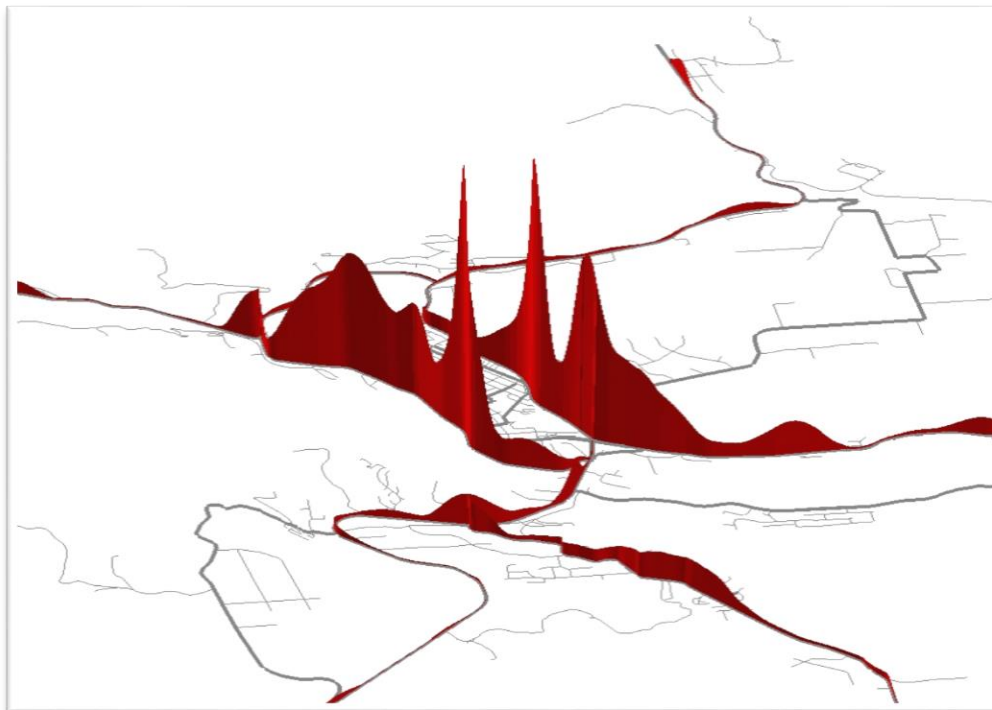Figure 35 Multi-Crime Analysis Along One Crime Corridor

Figure 36 Crime Corridors in an Interior City

Crime Corridor programming does smooth crime address patterning in a way that makes it easier to understand while maintaining the essentially linear character of the data. We have found that it helps people understand more about the patterns in calls for police service (Song, et al., 2013).

Crime Baskets and Criminal Networks

It is, of course, important to understand organized crime and co-offending networks. The types of crime committed by criminal networks and the locations of those crimes depend on network anchor points; crime attractors like break-in-bulk points, cash collectors and people concentrators; internet and other communication connections; transport modes; and of course, the communication between and movement by members of the network. (Brantingham, et al., 2011, 2012; Croisdale, et al., 2009, 2010; Tayebi et al, 2014). Figure 37shows a summary image of one of the more than 400 co-offender networks that can be identified in British Columbia. This network is really composed of two nearly independent networks of co-offenders who are connected through a single key individual who co-offends with members of both networks.
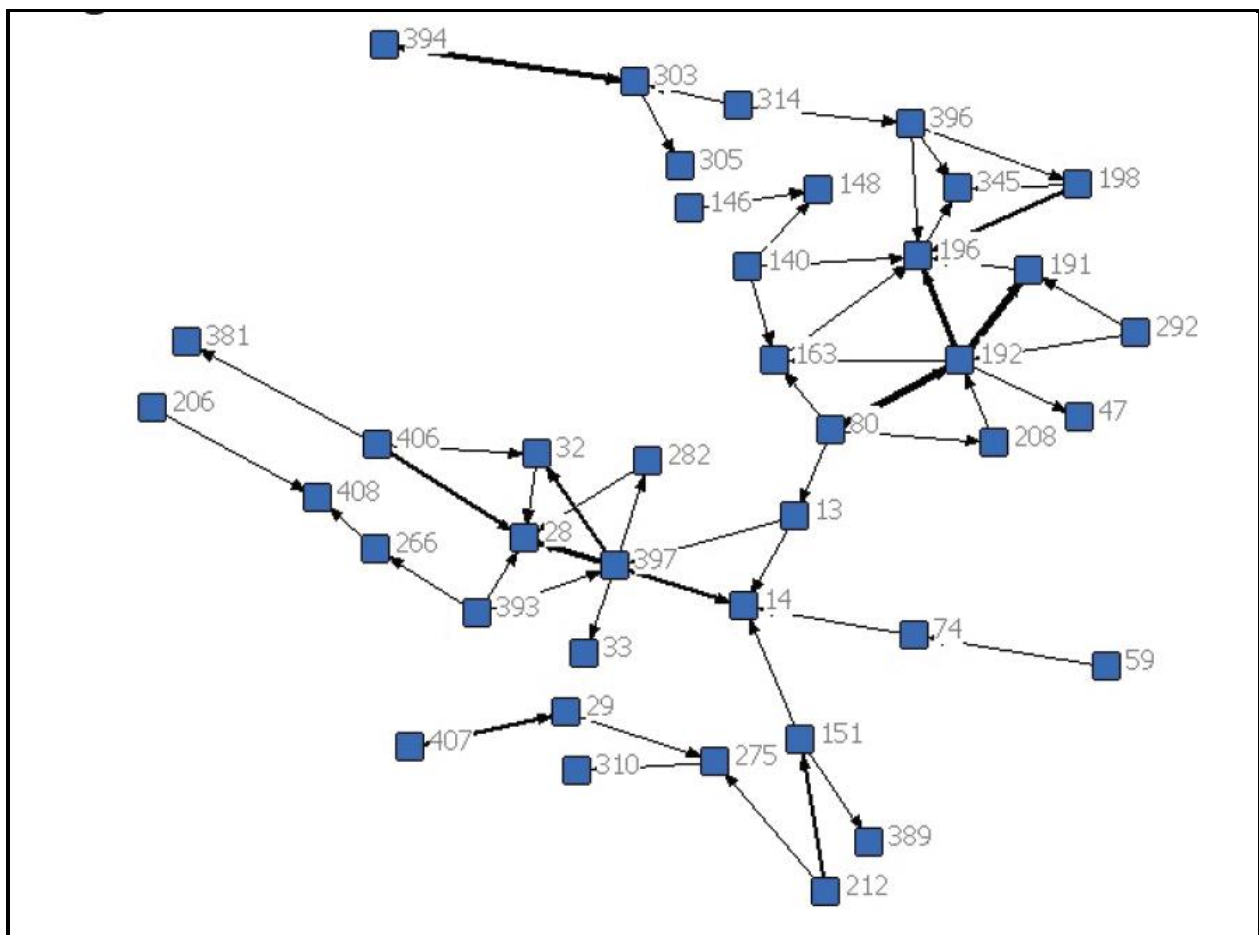

Figure 37 A Prolific Offender Network

Additional research by ICURS has looked at the target selection of offenders and co-offenders; journey to crime patterns of co-offender; has explored the baskets of crime attributable to different criminal co-offending networks; and has examined how criminal co-offender networks evolve over time. From the viewpoint of designing effective and cost-efficient crime prevention and crime reduction programs, much more research into the spatio-temporal activities of criminal networks is needed.

Target selection and offender navigation on street networks has lead to development of the suspect investigation method of *SINAS* that uses machine learning to develop sets of repeat offender awareness spaces. *SINAS* stands for *Suspect Investigation using offenders' Activity Space*. SINAS uses offenders, co-offending networks, road networks, road features including past offending patterns and anchor locations or crime attractors. Using starting point, movement directionality and stopping point criteria, probability predictions are developed for likely offenders from data on known repeat offenders (Tayebi, et al, 2017). As shown in Figure 26-32, the patterning of offending is strong enough that selecting potential targets bears similarity to market geography. Analysis, investigation, and prosecution of criminal networks often involve mega-case structures and issues in which aggregate measures of efficiency and effectiveness are often impossible and even when possible are often not useful. The quality of such work cannot be measured like routine work with simple outputs (e.g., number of traffic tickets written per shift) or like the output of production lines in factory. Assessment of quality in these mega-cases depends on expert views where judgments are made by people who understand the complexity of the work and the ramifications of results for crime reduction and social tranquility. Costs need to be determined and considered in comparison to process, expected and unexpected actions and outcomes, and the operation of the complete criminal justice system.

Section 7: Equity

The prior sections addressed formal measures derived from the Uniform Crime Reports, PRIME BC, BC CAD records and activity costing data. But a major part of policing is equity in the handling of matters brought to police attention. Redressing violations of the law is a core aspect of policing, but democratic policing includes fairness and adherence to ethical standards. Assessment of fairness and ethical behaviour is framed within legal standards but is a critical component of public expectation and frames the public view of policing as an institution. In measuring policing it is also important to consider public confidence in the police and it is particularly important to consider the views of people who come into frequent contact with the police.

In general, Canadians strongly support the police as an institution. Research on point by Statistics Canada as part of the criminal victimization component of the 2014 General Social Survey found that 75% of Canadians overall and 74% of British Columbians express confidence in the police (Cotter, 2015). Persons who frequently come into contact with the police represent an informed and better indicator of police performance. While healthy majorities of those in frequent contact with the police also express high confidence in their local police, those majorities are smaller than amongst the population at large. There are those who have first contact with police, but there are also those in frequent contact with police: repeat victims; vulnerable persons with social issues and in need of police support; persons who repeatedly call the police about crime or public disorder; and, of course, repeat criminal offenders. There also people who live in areas with concentrations of crime or public disorder problems. All of these people may have different expectations of police service and different views of police

performance on those expectations. Similarly, major stakeholders who interact with police management and policing in general have specific interests and views on how those interests are being served.

In understanding the economics of policing, it is good to understand formal use of internal procedures for ensuring equity and fairness. Policing organizations in British Columbia keep formal records on these activities. They can be analyzed by type of issue and by characteristics of event. They can be analyzed ascertain whether there is an individual problem, an organizational problem or a geographic concentration of problems. Identified patterns can point to managerial, administrative or educational considerations as well as individual decisions on a case-by-case basis.

For police as a whole, advances are being made in understanding fairness, equity and fear levels for persons who have frequent contact with the police or frequent contact with solutions that appear to trigger fear and shape the expectation that police can handle the situation.

Public wishes and expectations vary between jurisdictions. Policing addresses local community standards as well as Provincial standards. The constraints of resources place particular pressure on services developed to address public wishes and expectations that may be pressure to limit communication time with victims or vulnerable populations. Simple measures of efficiency are frequently time restrictive, but reduced time spent per event can have negative impact on public views of equity.

Before exploring this in more detail it is worth describing a major study on police as seen by persons with mental health issues conducted in Metro Vancouver by James Livingston, Simon Verdun-Jones and associates (2014). As seen in the policing and emergency room report, police spend a high proportion of their time reducing risk to individuals with mental health issues. This frequently involves trips to hospital Emergency Rooms. These same individuals often have other encounters with the police through involvement in crime (as victims, as witnesses, or as offenders) or public calls for assistance. In the instant study, conducted through interviews and surveys, the researchers found that most (around 75%) of these persons with mental illness and frequent police contacts had positive memories of the contacts, seeing the police as helpful and fair. This is important because these are some of the police-citizen encounters that present the most potential difficulty. The results are very positive for Metro Vancouver police agencies and indicate that police can impact public satisfaction and public views of the equity of police activity through the quality of citizen encounters.

Research like that undertaken by Livingston, Verdun-Jones and associates, focusing on the perceptions of persons who are in frequent contact with police, should become a more regular part of police performance measurement. Detailed surveys like this research may be especially necessary in the case of highly vulnerable populations.

Surveying Perceptions of Community Safety and Satisfaction with Police Services

The Commercial Drive Studies

For more standard research on community safety and police performance, ICURS developed structured surveys supplemented by interviews for assessing public perceptions of crime, safety and quality of life in a large community within the City of Vancouver. Conducted in the original research neighbourhood in 1997 and repeated in 2007 (Mosca & Spicer, 2007; Spicer, 2012), the survey has since been used in several other communities across Metro Vancouver (Guterres, et al., 2009a; 2009b). There is now a handbook for use by local community groups in conducting such studies (Mosca & Spicer, 2008).

Such surveys, in combination with crime analysis, make it possible for police to structure and target crime prevention and community well-being programs to the concerns of neighbourhoods and to the locations of problems in time and space. Figures 38 and 39 show where concerns about crime and disorder are focused in the Commercial Drive neighbourhood in Vancouver, and how that focus changed as the major transportation hub for the community moved from a bus station located where Commercial Drive intersects Hastings Street, to a mass transit/Sky Train hub at Commercial Drive and Broadway, some kilometers away. The survey found that community concerns followed street concentrations of youths and other persons perceived as risky as well as indicators of disorder and incivility. As Figure 40 shows, the patterns in fear of crime were only partially congruent with the spatial patterns in criminal events known to Vancouver police.

The Commercial Drive studies also explored the specific indicators of disorder that caused community concern. As Figure 41 shows, the rank ordering of the 10 most troubling disorder indicators remained the same in 1997 and 2007. Most intensely disliked was litter from the illicit drug use in the form of discarded hypodermic needles and from street sex work in the form of discarded used condoms.

The Community Policing Office located on Commercial Drive was able to utilize the findings of the surveys to engage Vancouver Police, the Vancouver City government, the public transit authority, Vancouver Coastal Health authority, the BC Ministry of Public Safety and Solicitor General and local business and community groups in development and execution of projects to reduce crime and fear while improving community perceptions of safety and quality of life in the community.
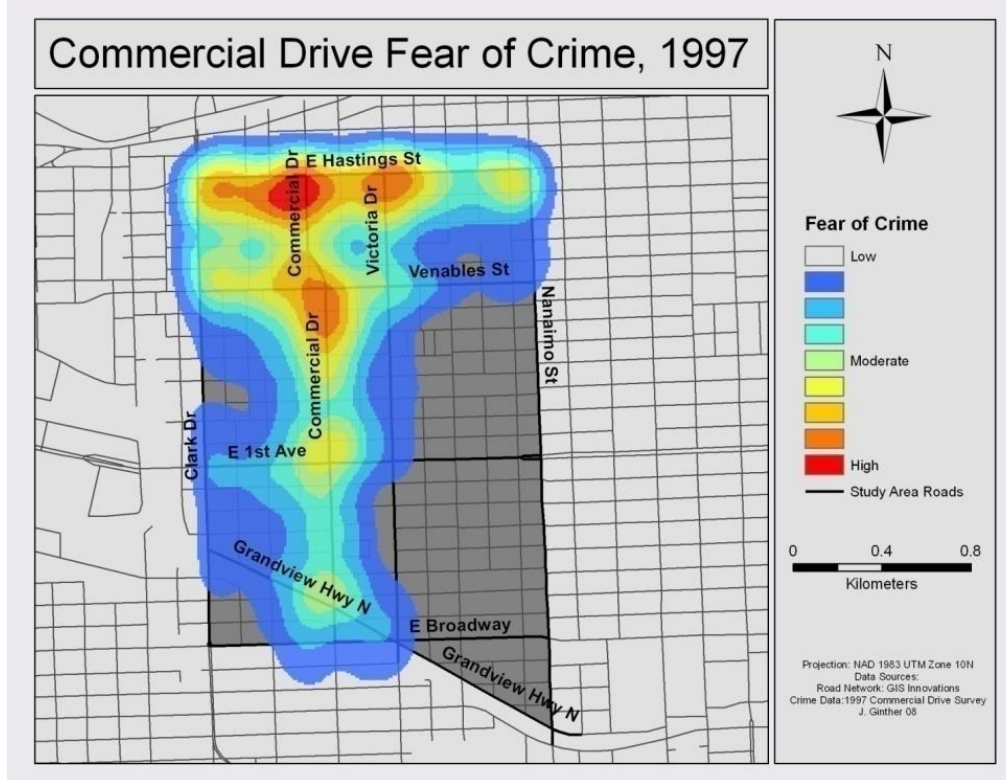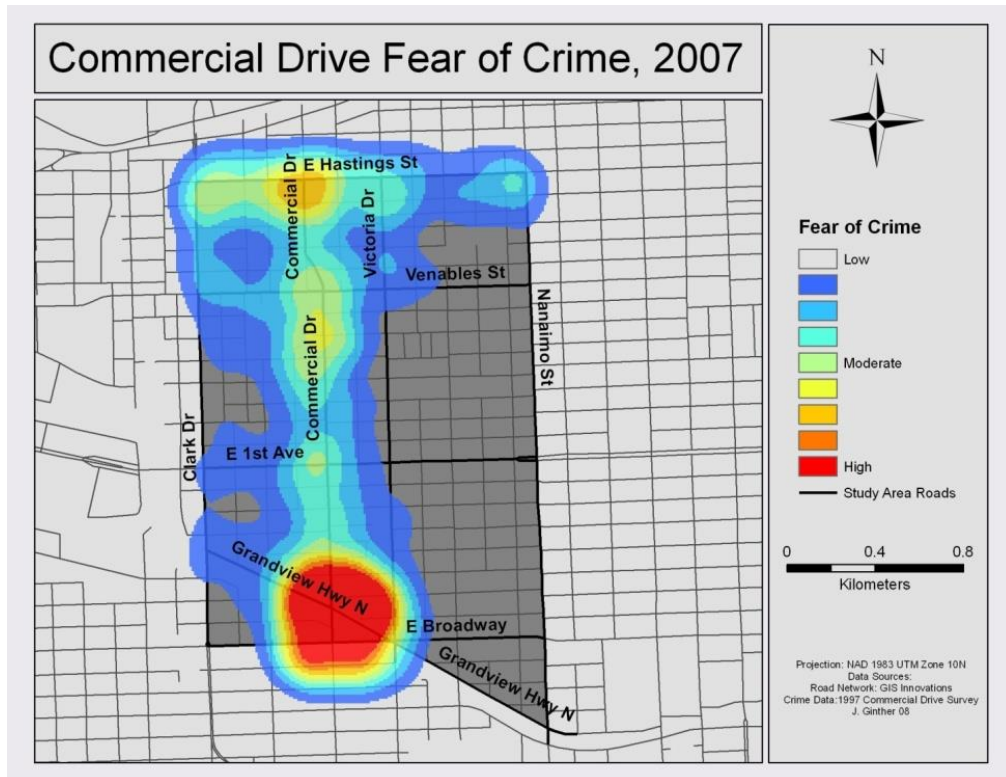
Figure 38 Neighbourhood Fear in 1997
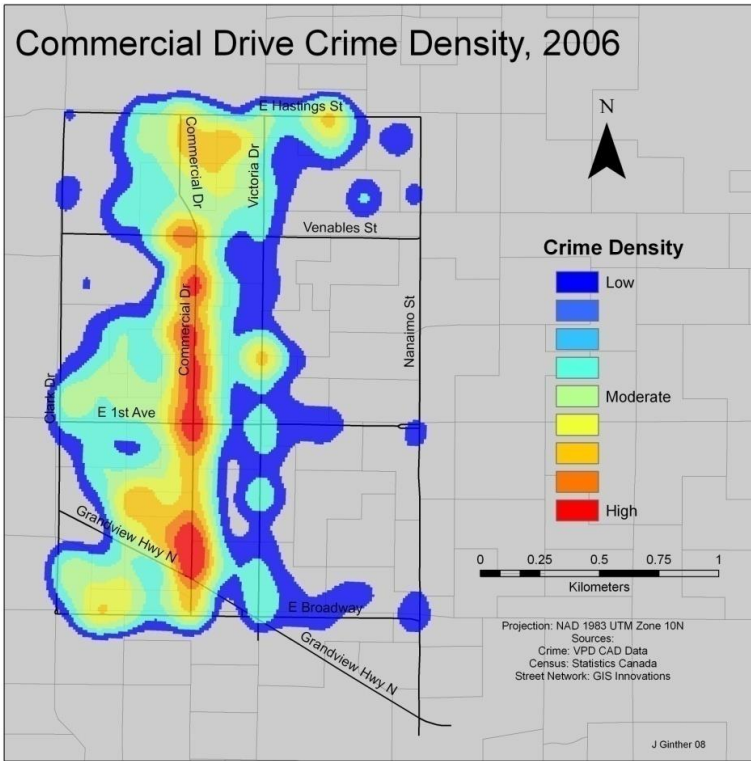

Figure 39 Neighbourhood Fear in 2007

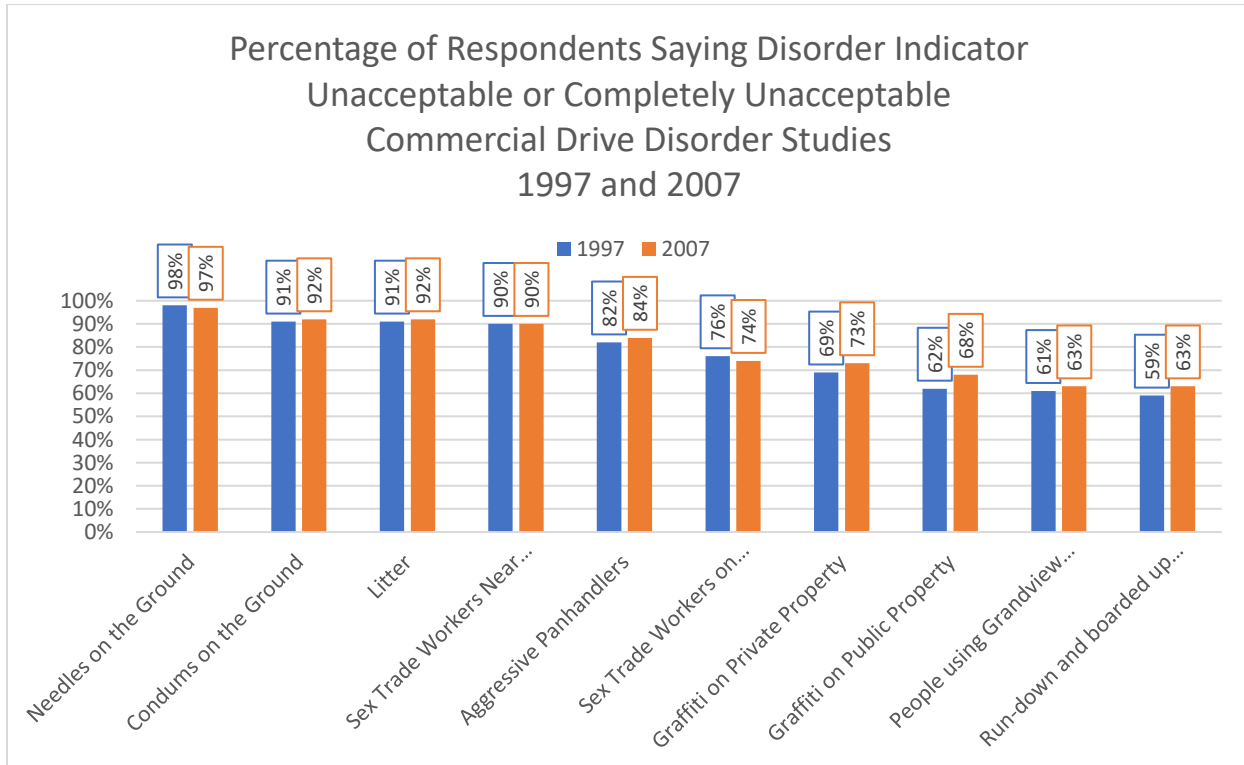*Figure 40 Neighbourhood Crime Density*

Figure 41 Socially Unacceptable Behaviour / Indicators of Disorder in the Neighbourhood

The Vehicle Theft Studies

In 1993, ICURS did a survey on motor vehicle theft in selected jurisdictions across British Columbia as part of a collaborative project with BC municipalities, the BC Association of Chiefs of Police, the Insurance Corporation of British Columbia (ICBC) and the BC Ministry of Justice. As part of the study, persons who reported a stolen vehicle were contacted to determine what advice had been given to them and what actions they had taken in response to that advice as well as to determine their satisfaction with police handling of the crime they had reported (Brantingham, et al., 1993; Fleming, et al., 1994). This survey was conducted by victim assistance personnel following training by ICURS. This approach minimized the cost of the survey while protecting the privacy of the victims. The survey showed that police had, in the opinion of respondents, acted fairly and rigorously in responding to their victimizations.

These types of surveys can be expanded to develop better assessments of the perceptions of equity in police services both of crime victims and vulnerable persons who have had contacts with the police. Surveys are heavily used in measuring performance in the health care system, particularly focused on those people who have had experiences with hospitals. Similar surveys in policing would greatly impact in measures of efficiency, effectiveness and, most importantly, of equity.

Spatial Distribution
Motor Vehicle Theft Rates and Police Officers
British Columbia 2005

BC Motor Vehicle Theft Rates   **Distribution of Police Officers**
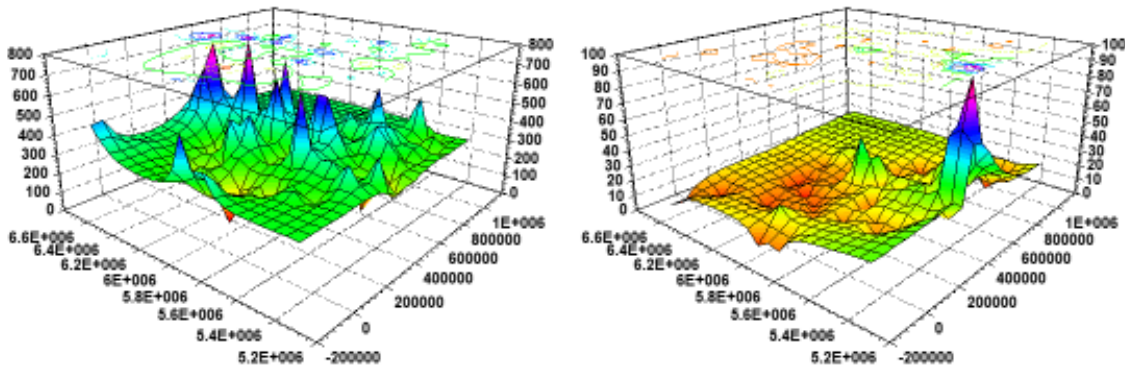

Figure 42 Spatial Patterns in Crime and Police Resources

Social Media as Sources of Information on Police Performance

Social media, particularly systems such as Facebook and Twitter, are rapidly becoming sources of information that police and other criminal justice managers can utilize to assess public and service user expectations of police and other parts of the criminal justice system and to assess how well the services delivered meet those public expectations. Community-based Facebook pages, for instance are developing in ways that allow them to function as very active supplements or alternative to Block Watch programs; but with much more active and continued participation and interaction by and among neighbourhood residents. Such Facebook pages provide direct access to community assessments of performance and particularly of the equitable handling of complaints. This information source can become a major tool in measurement of the effectiveness and equity of police services and can help police gauge fear of crime and concern with disorder in the community receiving services. Expansion of police use of social media as a source of information on police performance should be carefully researched.

Summary and Recommendations

Summary

Policing is complex. No easy measures exist for determining efficiency, effectiveness or equity in the overall economics of police service. Perhaps this is related to the fact that the debate on issues like core policing and tiered policing is both contentious and not well understood. For example, dealing with mental health issues in vulnerable communities may not be considered core policing in some discussions but it certainly remains an important element of and a key activity in contemporary policing. We are, nevertheless, making major advances in the 21st Century. Simple crime rate or response time measures have some meaning, but the multi-agency, multi-role character of policing calls for better measures that take into account the underlying public meaning of crime, the varying demands for police service in different jurisdictions, and the rapid increase in cyber crime. Such measures would address:

- System-wide impacts on crime;
- Baseline models of demand for police services from a community perspective;
- Crime diversity and Crime Gravity;
- Crime attractors, Crime corridors and Crime catchment areas;
- Repeat Offending and Repeat victimization;
- Mobility of Offenders;
- Evolution and change in the methods of criminals (such as the apparent change in stealing through break and entry to stealing through computer hacking);

Such measures would also address public and police perceptions to the quality of services delivered through conduct of surveys among populations that actually use or deliver police services. These would include:

- Surveys of equity and fairness in policing that elicit the perspectives of direct consumers of police services – victims of crime, witnesses, suspects, offenders and other categories of persons entered into RMS subject files as well as other criminal justice system actors.
- Surveys of sworn police officers and civilian employees to:
  - solicit suggestions for improvements in regulations, procedures and practices to enhance effectiveness, efficiency and equity in provision of police services; and,
  - assess Issues of morale.
- Surveys of other criminal justice and social service personnel including crown prosecutors, judges, correctional personnel, social workers, emergency paramedics, and hospital emergency room personnel

There are no simple measures of policing or police performance, but with research and management focus on the economics of policing and its complexity, there should be a way, over a span of two to three years, to develop and implement a process for assessing the efficiency, effectiveness and equity of policing at the community level and aggregating that up to show broader patterns at the jurisdictional, regional and provincial levels.

In such a process, police serving a particular jurisdiction would know estimates of demand for their services from:

- The size of the population at risk of offending or being victimized;

- The risks economically;
- The risks from presence or absence of other governmental services;
- The planned growth and projected change to their community;
- The public view of police services in their community, and especially the views of persons who have had contact with the police.

With this information, likely future crime trends can be estimated and likely success rates in various activities can be estimated. These estimates would provide a base line for identifying what police and do to improve services and where police can only improve services by working collaboratively with other parts of government and community organizations.

Recommendations

1. Focus on the equity, effectiveness and efficiency of police services in specific police jurisdictions.
2. Recognize that core policing services in Canada involve the provision of many different public services in addition to proactive and reactive investigation of crime.
3. In support of core policing, develop better tools for the analysis and visualization of core police activity for use by senior police managers at local, regional, provincial or territorial, and national levels.
4. Develop a new, standardized police service statistical survey that captures and weights all of the different types of calls for service received by police to supplement the current survey on crimes known to the police.
5. Develop a new measure of expenditures for police service   and situate that measure within the context of all other governmental expenditures.
6. Develop additional measures of crime to supplement the standard crime rate and the crime severity index. The crime gravity score and the location quotients of crime should be among those measures.

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