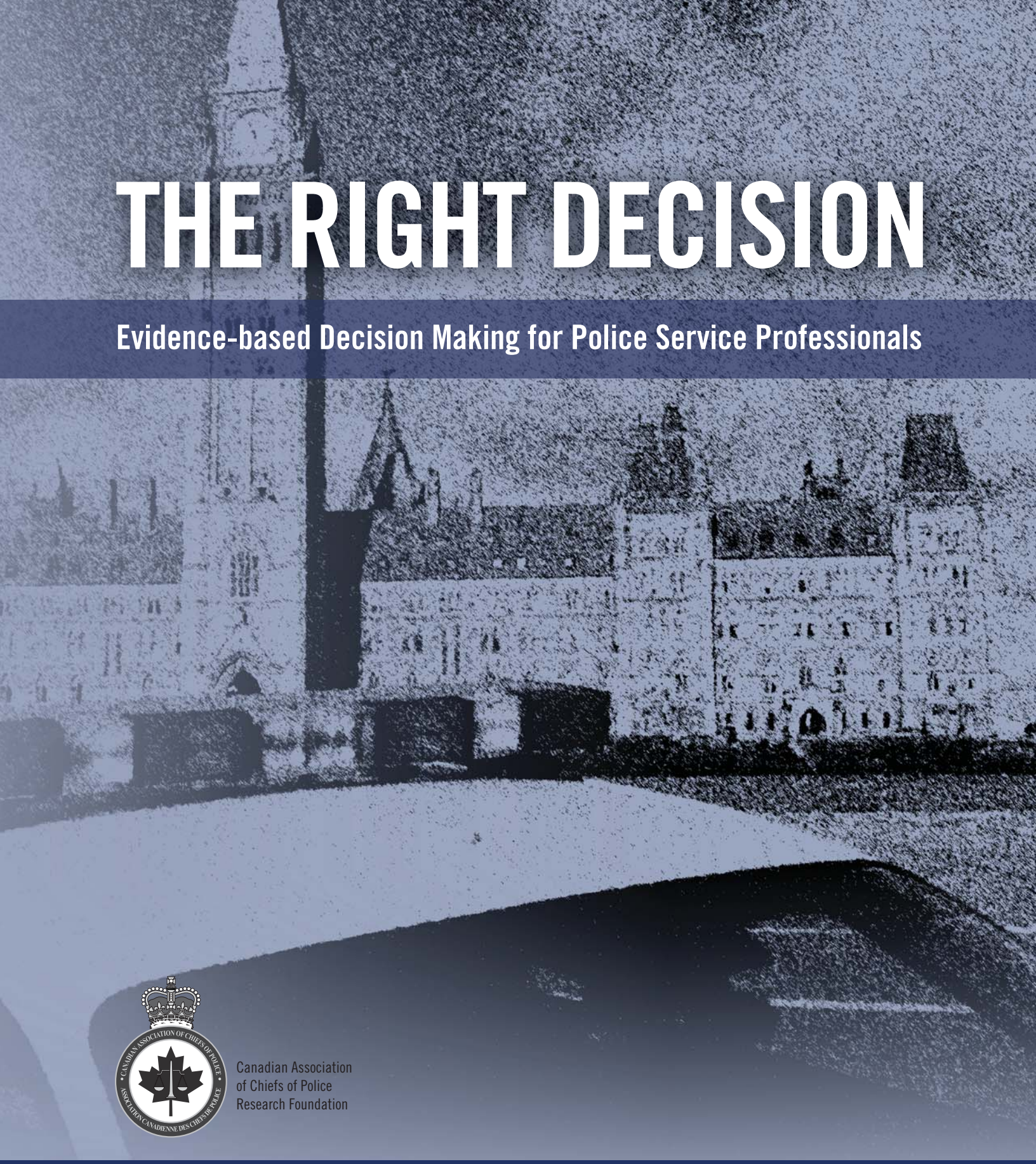
THE RIGHT DECISION

Evidence-based Decision Making for Police Service Professionals



Canadian Association
of Chiefs of Police
Research Foundation

Paul S. Maxim, Len Garis, Darryl Plecas and Mona Davies

THE RIGHT DECISION

Evidence-based Decision Making for Police Service Professionals

Paul S. Maxim, Len Garis, Darryl Plecas and Mona Davies

(Revised May, 2015)

About the Authors

Paul Maxim, Professor, Wilfrid Laurier University

Paul Maxim obtained his MA in criminology at the University of Ottawa and his PhD in sociology at the University of Pennsylvania where he specialized in criminology and research methods. He is currently a professor in the Department of Economics and the Balsillie School of International Affairs at Wilfrid Laurier University in Waterloo, Ontario. His primary areas of research interest are population and labour economics.

Len Garis, Adjunct Professor, University of the Fraser Valley

Fire Chief for the City of Surrey, British Columbia, Len Garis and is an Adjunct Professor in the School of Criminology and Criminal Justice at the University of the Fraser Valley, a member of the Affiliated Research Faculty at John Jay College of Criminal Justice in New York, and a faculty member of the Institute of Canadian Urban Research Studies at Simon Fraser University. His focus is on addressing public safety challenges through evidence-based decision making and innovation.

Darryl Plecas, Professor Emeritus, University of the Fraser Valley

Darryl Plecas is Professor Emeritus in the School of Criminology and Criminal Justice at the University of the Fraser Valley. Prior to his retirement, he held the RCMP Senior University Research Chair at UFV. He received the University's Teaching Excellence Award, and in 2003 received an Innovative Excellence in Teaching, Learning and Technology Award at the Fourteenth International Conference on College Teaching and Learning. He has published numerous articles relating to Canadian criminal justice. He also has extensive experience in applied policy and program evaluation, and effective decision making.

Mona Davies, Legal Analyst

Mona Davies has an LL.B. from the University of London and her Masters in Political Science from the University of Toronto. She also has a professional degree from the Institute of Chartered Secretaries and Administrators. She has worked both in the private and public sectors with over 10 year's experience in international law, specializing in investor state arbitration.

Table of Contents

2 Forward

3 Introduction

17 Defining the Problem

31 Thinking Critically

43 Collecting Evidence

55 Statistics

67 Experimental Designs

79 Costing Analysis

97 Making Decisions

For more information about this book or its authors, contact Dr. Irwin M. Cohen at the Centre for Public Safety and Criminal Justice Research in the School of Criminology and Criminal Justice at the University of the Fraser Valley, at irwin.cohen@ufv.ca or 604-854-4553. For additional public safety publications, please visit www.cjr.ufv.ca

Canadian Association of Chiefs of Police Research Foundation

This project was commissioned by the Canadian Association of Chiefs of Police Research Foundation, which seeks to create and develop the highest standards of effectiveness in law enforcement through research. Other partners include the City of Surrey, British Columbia and the University of the Fraser Valley, B.C.

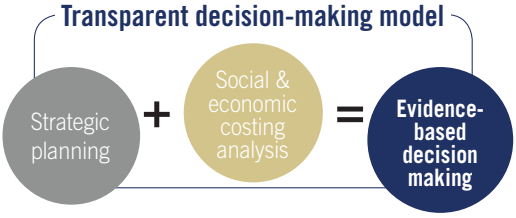
This manual was adapted from *The Right Decision: Evidence-based Decision Making for Fire Service Professionals*, developed through the support of the Canadian Safety and Security Program, led by Defence Research and Development Canada's Centre for Security Science, in partnership with Public Safety Canada.

Forward

Canadian police services are key to maintaining public order and security, but their capital and labour costs can pose significant financial challenges. Police service professionals make crucial decisions regarding the level of service they can provide their communities and the demands they are going to place on those communities. In an effort to stay current and improve their effectiveness, Canadian police services have begun to adopt innovative approaches to: (1) rethinking what services are of highest priority; (2) generating improved outcomes; and (3) better controlling service delivery costs.[1] Policing is one of the major budget items for most cities and municipalities.

While understanding the invaluable role of police services, both the public and municipal leaders are asking that significant decisions be based on hard evidence. Questions such as what are police forces' underlying strategic value and what are the associated costs and benefits are commonly raised.

This manual has been created to help decision makers address those concerns. Evidence-based decision making is one of the more effective tools you can use to rationalize why a particular approach or program option was chosen.



Evidence-based decision making is not new. Rather, it is a framework that brings together strategic planning with social and economic costing analysis within a transparent decision-making model.

This manual provides an overview of some of the more crucial components of evidence-based decision making. Some of the material may appear a little daunting at first. But we would ask that you read it in small chunks and go over it more than once. As with any volume of this type, the material often makes more sense when linked to a problem or issue in your own organization. Overall, we hope you find this manual useful in improving your decision making and justifying your choices.

For their assistance, we would like to thank: Saanich Police Chief Cst. Robert Downie, Ottawa Police Cst. Ian Matyas, Surrey Fire Service Strategic Planning Analyst Alex Tyakoff, and Dr. Charles Jennings, Director of the Regenhard Centre for Emergency Response Studies at the John Jay College of Criminal Justice in New York.

1. Research Brief No. 31. Police Performance Metrics http://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/plc-prfrmnc-mtrcs/plc-prfrmnc-mtrcs-eng.pdf

Introduction

Effective Decision Making in a Changing World

While the primary function of police departments has remained consistent over time—to ensure the safety and security of all persons and property—how departments deliver their services is becoming more complex. Crime rates have generally declined over the past two decades, but the public is increasingly asking police departments to respond to a broader range of calls. Those calls often require more sophisticated equipment and better or differentially trained personnel. Furthermore, many jurisdictions have been asking its police services to integrate their functions with other first responder agencies to include fire services and emergency medical services.

As a result, leaders and managers continually face this question: How can we provide quality service in light of more complex demands while being sensitive to resource and economic restraints? Choices and trade-offs need to be made, and consequences need to be considered. The pressure increases on decision makers when politicians, municipal staff, and ultimately, the public scrutinize these decisions. The days are gone—if, indeed, they ever existed—where government and taxpayers take a request for more equipment and more personnel at face value. Politicians, city managers and higher executives are increasingly forced to make choices within tight resource constraints.

The days are gone—if, indeed, they ever existed—where government and taxpayers take a request for more equipment and more personnel at face value.

More than ever, leaders in police departments need to make decisions in ways that are transparent and justifiable. Good decision making, we will argue, needs to be informed as much as possible by evidence, research, and sound information. We term this approach evidence-based decision making. We make and justify evidence-based decisions by referencing independently supported and verifiable facts. This approach helps ensure that the decisions we make are sound and defensible. Used effectively, evidence-based approaches can help you produce the results for which you are searching.

So why is evidence-based research important? Why does this approach to problem solving matter for police services? Among some key reasons are the following:

- Policies and programs that are not guided by sound evidence frequently cost too much, waste resources, or simply yield poor or unknown results;
- External decision-makers who approve departmental budgets may not view departmental requests as justified if they lack compelling evidence; and
- Policies and strategies that are evidence-based often produce better results, which can increase your credibility and support for the department as a whole.

This manual will help you understand how to find and use the information and research needed to make evidence-based decisions. It will also help you to put your decisions within a compelling framework to convince others of their merit.

Of course, not all decisions are or can be based on facts. Both professionally and in our personal lives, we refer to ethics, values, preferences and political choices. To believe or do otherwise would be to deny the complexities of social life.

This manual will help you:

1. Find and use information and research to make evidence-based decisions.
2. Put your decisions into a compelling framework to convince others of their merit.

Yet, even in those circumstances, evidence-based decision making can help you link the values, principles, and ideologies that guide your department to independent evidence and supportive research.

The evidence that we will learn to use comes from a variety of sources. Some is available as administrative data that government and other formal organizations routinely collect. Some is generated in the course of formal policy and program evaluations, and some will come from the work of government and academic scientists. Other sources of information will include your own organization and, often, your own unit or department.

Learning to Navigate the World of Evidence

This manual will help you to navigate the world of evidence without feeling intimidated by it. As we will discover, not all evidence or data is of equal value. Even good information needs to be placed in a context where we can evaluate its accuracy and meaning. In other words, this manual will help you figure out what you need to know about data generation without having to be a scientist or scholar.

Besides learning how to assess evidence, we will also discuss how to use evidence to formulate a persuasive argument. Data alone is not sufficient to inform and support your decisions. We need to frame public justifications for our policy or program decisions logically and coherently. Requests not grounded in a sound strategic or business plan will have very little chance of success. We will learn that many arguments or justifications that are put forward simply do not make sense. We will examine some major logical fallacies that are to be avoided at all costs.

This manual will also explain how to conduct an environmental scan and a SWOT analysis (an assessment of an organization's Strengths, Weaknesses, external Opportunities, and Threats). You will learn why those frequently form part of information collection before a new policy or program is developed, or before strategic priorities are determined. You will learn about cost-benefit analyses and costing studies, which are critical components of strategic planning when resources are tight.

Using examples from police services around the world, this manual will show you how to define a problem. It will help you to think critically and creatively about it, and find the evidence you need to inform your decision. Additionally, it will provide simple explanations of various forms of research so you will know how and when to use them to support your case.

Before we begin, though, it is helpful to think more deeply about the reasons for doing all of this. How and why has evidence-based decision making become so important? Why should you, or anyone else, care about the process?

Medicine and Health Care Professionals That Have Led the Way

We can trace the origins of evidence-based approaches back to the 1980s. Faced with significant financial challenges, the government of the United Kingdom started to emphasize the need for policies and best practices supported by compelling evidence and empirically-sound research. Decision makers had wasted too many resources, they believed, on choices that had no evidence to back them up. They too often decided on the basis of personal preference, traditional practices, and ideas that had little more to support them than they were popular at the time.

This had profound implications for the practice of how police intelligence was being delivered, thereby prompting a shift away from traditional practices to Intelligence-Led Policing (ILP) models which have been adopted internationally.

As anyone who has been in their field for any length of time knows, the world is full of scam artists selling the latest managerial elixir or practice. Within the UK, it was obvious to the government that investments were needed, but those investments needed to be effective and efficient.[1]

This approach influenced many other fields, most particularly health sciences, where researchers could directly link poor practices to increased levels of harm for patients. Evidence-based medicine evolved as a way to reduce the gap between academic research and clinical practice. Ideally, this would ensure the best possible outcomes and the most appropriate care for patients. Researchers and health care professionals scrutinized policies and procedures to see how they could run medical facilities in more efficient and effective ways.[2]

The need to change existing ways of doing things in the world of medicine was becoming increasingly apparent. For example, one major study suggested that it took approximately 15 years to incorporate the results of research into recommended policy. As a dramatic example, let us consider that the research basis underlying a cure for a particular form of cancer might already exist.

However, the lag between that discovery and even partially implementing it in a clinical setting takes about a decade and a half. Even after that extended period, only about 40 per cent of practitioners are using that information.[3]

Meanwhile, people who could benefit from the results of that research continue to suffer or die because information had not influenced the practices of the medical profession in a timely way. Worse still, implementing the answer might be intentionally delayed if other groups saw greater benefit and financial profit in "managing" the disease rather than in actually curing it.

An evidence-based approach tries to use the best available information generated through research, experiments, observation, and other factual sources to influence the creation of the best decisions and policies possible. Sometimes, this can directly conflict with other forces, values and interests, as the previous hypothetical example illustrates.

Case Study

Evidence-based policing is a method of making decisions about "what works" in policing: which practices and strategies accomplish police missions most cost-effectively. In contrast to basing decisions on theory, assumptions, tradition, or convention, an evidence-based approach continuously tests questions with empirical research findings.

While research on all aspects of policing grew substantially in the late twentieth century, the application of research to police practice intensified in the early twenty-first century. This is especially so for the three tasks that make up what Lawrence Sherman has defined as the "triple-T" strategy of policing: targeting, testing, and tracking. Evidence-based targeting requires systematic ranking and comparison of levels of harm associated with various places, times, people, and situations that policing can lawfully address. Evidence-based testing helps assure that police practices neither increase crime nor waste money. Tracking whether police are doing what police leaders decide should be done is likely to grow rapidly in the coming years. We are already seeing the use of GPS records of where police go and the implementation of body-worn video devices to record what happens during encounters with citizens.

Post World War II Developments

Policing changed substantially after World War II. Much of that change was based on evolving technologies and changes in management philosophy. A primary factor has been an evolution toward the use of "hard data" or evidence to assess the impact of police practices. Within the field, it is acknowledged that the push toward the use of evidence-based policing can be attributed Lawrence Sherman.[4] In a seminal review article, Sherman summarized many of those changes.

As he notes, initially "random patrols in police cars were promoted on the theory that police 'omnipresence' would deter crime. In the 1960s, the advent of three-digit emergency phone numbers such as 911, turned random patrol into an airport-style 'holding pattern' for rapid response, also based on a theory of deterrence." [5] This led to a differentiation between what we now refer to as reactive and proactive policing.

Reactive policing involves the police waiting for a call for assistance. That is, as Sherman noted, "what police did when they reacted to a citizen call was not subject to much police agency direction or analysis. The main organizational requirement was to arrive, do something, and leave as quickly as possible." [6]

By the mid-1970s, reactive policing established itself as the dominant form of organizational response. This approach is typically referred to as the three Rs of random patrol, rapid response, and reactive investigations.[7] In large parts of the world, much police practice is still based on the reactive model, where police respond to calls for service. Typically, crimes are reported by victims. Crimes detected either serendipitously or through anticipatory activities by police officers on active patrols are not as common. As Sherman notes, under the traditional three Rs model, "there was almost no targeting of patterns or predictions of crime or disorder.

By 1975, the "three Rs"—random patrol, rapid response, and reactive investigation—had become the standard model of urban policing. By 2012, this was evolving into "triple-T": targeting, testing and tracking.

Little testing was done of what worked best to prevent or solve crimes and problems. Few agencies were involved in tracking and managing what police were doing, where, when, and how, in relation to any specific objectives." [8]

To a large degree, the reactive model of policing made sense given the technological limitations facing most departments. Collecting and analysing crime data is an arduous and labour intensive task. Until the last decade of the Twentieth Century, computers were expensive and the direct and timely linkage of the location of criminal activities to central databases was difficult. This is not to say that crime analysis was not an active endeavour. Pin boards identifying crime "hot spots" were common in most larger departments and officers often shared intelligence information. The point to be made, however, is that much crime analysis was done manually, by individual officers or small and specialized teams often working on high profile cases: real time crime analysis was not a routine activity.

That started to change as computing hardware became commonplace, and software programs became both more sophisticated and easier to use by non specialists.

Sherman points out that "by 2012, the three Rs were changing into what I describe ... as the 'triple-T' of targeting, testing, and tracking. While the standard model is far from gone, its resources are increasingly guided by statistical evidence. In the emerging triple-T strategy, both patrol and detective managers had moved toward far greater proactive management of police resources." [9]

The triple-T, as Sherman notes, constitutes the basis of modern evidence-based policing, building on the basic framework he proposed in 1998.[10] What makes it possible is the fact that large amounts of data can be actively collected, stored and analysed in real time. Not only can departments focus on crime data alone, they now have the ability to link that data to the geographical and social characteristics of the locations where those crimes take place. It is also increasingly possible to develop enhanced victimologies by looking for commonalities among victim characteristics.

Modern criminalistics allows departments to test notions or suspected patterns of crime against hard data. In some instances, this has led to predictive policing where it is possible to focus or redistribute police resources to potential victims or targets. This is not to say that historical policing did not involve some elements of proactive policing.

The point to be made is that modern technology allows for this to become a much more routinized activity. Furthermore, officers can spend less time on the menial tasks of connecting physical records or case files and more time on testing ideas and trying to understand the underlying meanings behind crime patterns.

Targeting, Testing, and Tracking

As Sherman summarizes, evidence-based policing has come to focus on three principles:[11]

"1. Police should conduct and apply good research to target scarce resources on predictable concentrations of harm from crime and disorder.
2. Once police choose their high priority targets, they should review or conduct tests of police methods to help choose what works best to reduce harm.
3. Once police agencies use research to target their tested practices, they should generate and use internal evidence to track the daily delivery and effects of those practices, including public perceptions of police legitimacy."

Evidence-based policing not only has benefits for crime response and prevention. The same data and analytical processes can be used to evaluate the effectiveness and efficiency of equipment and general managerial practices. In an age when policing is coming under increasing public and economic scrutiny, evidence and "hard data" help the police to justify, and the public to understand, the choices and practices of law enforcement.

"To understand is to perceive patterns." – *Isaiah Berlin, theorist, philosopher*

Mapping Data, Informing Decisions

Applying geographic information systems or GIS to crime mapping and analysis is a major innovation of police organizations around the world. It enables crime analysts, uniformed officers, investigators, administrators and police executives to access and analyze data in maps so they can make better decisions. In its simplest form, tabular data can be imported into a GIS and expressed spatially in the form of maps. These maps can show the distribution of crime types across your community, or how traffic volume and the built environment can impact police response times. It can also be a way to redistrict police boundaries and inform the location of a community police station. Like most things in life, you are only limited by your creativity.

Geographic information systems were first introduced to modern day policing as a way for crime analysts and criminologists to better understand the geography of crime. In fact, a rudimentary form of mapping was used by the physician John Snow in 1854 to successfully counter a severe outbreak of cholera that occurred in London, England. By isolating the water-borne disease to a public water pump on Broad Street in the Soho district, he disabled the well pump by removing its handle. This very act had helped to stem the flow of the outbreak. The application of mapping to disease control was subsequently applied to policing; the prevailing wisdom was that criminal activity is much like the behavior of infectious disease.

Using mapping technologies, police can target resources on most crimes by identifying the small fraction of localized places in any city where crime happens repeatedly.[12]

These hot spot concentrations are most obvious at a micro level, such as a single address, a cluster of addresses, or a "block-face" street segment from one corner to the next on a single street. Hot spots can be mapped, ranked, classified by offense type, and analyzed in many ways relevant to police operations. In fact, mapping technologies are central to most CompStat-led police departments across North America.

Beyond descriptive or hot spot mapping lies the power of analytical mapping and predictive policing. Retrospectively, analysts have been able to spot the bad guy hiding in data by mapping the location of stolen vehicles relative to where they were dumped and recovered. Often, a stolen vehicle is abandoned within a short walking distance of the auto thief's residence, which helps to connect the dots in an investigation. Mapping has also been used along with linkage analysis to carry out telephone pattern analysis in major crime cases such as homicide and forcible confinement. By charting the location of cell towers relative to whom calls were made (and received) during "crime time," and where they pinged, investigators are able to triangulate data points and make inferences. Geographic profiling goes a bit further in theory and method, and in capable hands is able to predict - with amazing precision - when and where the serial offender will strike next. By leveraging GIS technologies to discover spatial and temporal patterns, you are better able to deploy your officers in a more efficient and cost-effective manner and to keep communities safe.

In the not-too-distant past, officers stuck push pins into wall maps to show locations of crime. More inventive types tied strings from pin-to-pin to indicate linkages between events or sequence of crimes. This is akin to writing officer's notes on paper napkins, a practice we wouldn't recommend.

Thankfully, with the arrival of affordable and powerful computers and GIS software, most police services can readily access and apply mapping technologies to examine, understand and solve problems, and to make informed decisions.

The good news is GIS technologies are relatively affordable and accessible to most police departments, including small to mid-sized operations with limited budgets, and there are plenty of excellent industry courses available. One only has to visit the geography department of a local university or polytechnic institute for ideas. For those who are not very familiar with the workings of GIS programs, we would suggest you start by dropping by your city planning and engineering departments for assistance. Most of these municipal departments have the necessary technical expertise and base maps to jump-start your journey into GIS. Speak with a crime analyst and IT technician on how to best deploy GIS across your department.

Effective Decision Making: The Task of Good Leaders and Managers

Decision making is possibly one of the most important roles of leaders and managers. Their decisions influence the direction of their units and affect the morale and well-being of personnel who work for them. Poorly made decisions increase conflict and diminish morale. Well-made decisions that lead to tangible, positive results can increase departmental success and improve morale.

Nevertheless, even when leaders and managers see the value in an evidence-based approach, several factors can get in the way. Some administrators feel pressured to make decisions quickly and with incomplete information while others might use outdated information. Policing is a fast-paced environment; there is a need for speed. However, this tendency should be governed by sober reflection and consideration of the latest data to inform decisions and better practices. Additionally, most people rely on personal experience, observation, or gut instinct when having to make a choice. As trained professionals, our personal experiences and judgments are often valid, but they comprise part of the picture only. Cognitive science indicates that we tend to see what we expect to see. The mind is poorly "wired" to deal effectively with both inherent uncertainty and the induced uncertainty of dealing with complex, multi-faceted issues in law enforcement.

Poorly made decisions increase conflict and diminish morale. Well-made decisions that lead to tangible, positive results can increase departmental success and improve morale.

Using evidence-based research helps to ground our experiences and opinions in a broader context of information that is ultimately more convincing. Besides, practices evolve. The police service of the early twentieth century is not that of the new millennium.

When developing a new strategy or policy it is best to assess what you know, what others around you know, and what the wider field of research tells you about it. It is also prudent to commit to evaluating that new policy or plan after you have started it so you can generate your own evidence to show its effectiveness. That helps to advance the field as a whole, and your department's research can then inform other departments on what works, what does not, and why. Often we are reluctant to assess a program or practice because we might find that it does not work. That is not a problem. Both as individuals and as a society, we typically learn more from our failures than from our successes.

The Nature of Empirical Research

What are we really talking about when we use the term *evidence*? Unlike the evidence that might come out of a police investigation of a crime scene, evidence in this context has a specific meaning. It refers to the results of empirical research coming from systematic data collection grounded in formal assessments, experiments, or other research models. It is a systematic approach to answering a research question that generates information or facts that are replicable, observable, credible, verifiable, and supportable.

When assessing the research available to you, some of it will be:

- *Quantitative*, generating numbers and statistics, or
- *Qualitative*, generating subjective information that is helpful in determining preferences, values, or perspectives of those responding to the questions.

Either of those approaches can generate valid data. The key is in knowing when and where to use what kind of evidence, and to be able to find out whether it is adequate for the purposes at hand.

While there are many good sources of supporting evidence, academic research has the added benefit of being peer-reviewed. This means that other independent scholars and researchers examined the research to see if it was credible and well designed. This does not mean to say that the work is either perfect or infallible. Nevertheless, it does increase your ability to trust in the results. Research must be peer-reviewed before it is published in most academic journals. Some academic journals can be highly technical and very intimidating to those outside the field. Fortunately, many sources summarize significant academic findings or translate the results into everyday language.

Common Research Methods

In the medical field, the gold standard for research has been the randomized controlled trial. Here researchers randomly assign individuals to receive various preventive, therapeutic or diagnostic interventions, and then follow up to see the effect of the intervention. One possible intervention might be no intervention at all. This enables researchers to compare the control group (which received no intervention) to the test groups, which received the various interventions in question. Drug testing is frequently done this way. In a later chapter we will examine different frameworks for collecting evidence and discuss why researchers hold the randomized controlled trial in such high esteem.

In the social sciences, having randomized tests involving a control group is also possible. For example, we could randomly assign people with security alarms in their homes as a test group for comparison with another random group without alarms, which would be the control group. This is one way of answering the research question, "Do people with security alarms have fewer break-in incidents than people without security alarms?" Researchers will set up such experiments to 'control' the factors that might skew (or distort) the results. This increases the validity of the research, so that you can have greater confidence or trust in the measurements and results. Researchers are also concerned about the reliability of their result—meaning, if we continued to replicate this study repeatedly, would we get the same results? Would we get the same results if we ran this test in a different community? Or, is it unique to this community only and, if so, why is that? Research needs to be both valid and reliable so you know the results are legitimate and trustworthy, and not a fluke or coincidence.

Making Better Decisions

By now, you probably can see that there are benefits in making decisions influenced by sound, credible research. Quite simply, if you have done your homework, it is likely you will have a better-informed decision. Defending your decision is also easier since the process is more transparent and is based on something other than your hunch, best guess, or personal opinion.

It is important to recognize, though, that evidence-based decision making is best suited for objective questions. As we noted at the outset of this chapter, other decisions are influenced primarily by our preferences, values, or beliefs, and are less likely linked to research.

However, the two merge when we want to find the most effective ways to address issues that ultimately correspond with our values. Improving our quality of life by providing quality police services and crime reduction is a social value that provides the motivation to do things differently. Evidence-based research helps us to know *what* to do and *how to do it.*

Notes

1. Tranfield, D., Denyer, D. and Smart, P. (2003) "Towards a methodology for developing evidence-informed management knowledge by means of systematic review," *British Journal of Management*, Vol. 14, No.3, pp. 207-222.
2. Vishwanath V. Baba, Farimah HakemZadeh, (2012) "Toward a theory of evidence based decision making," *Management Decision,* Vol. 50 Issue 5, pp. 832-867.
3. Antman, E.M., Lau, J., Kupelnick, B., Mosteller, F., Chalmers, T.C. (1992) "A comparison of results of meta-analyses of randomized control trials and recommendations of clinical experts. Treatments for myocardial infarction." *Journal of the American Medical Association*, Vol. 268, No. 2, pp. 240-248.
4. Sherman, Lawrence W. (1997). "Policing for crime prevention." In L. Sherman, D. Gottfredson, D. MacKenzie, J. Eck, P. Reuter, and S. Bushway (Eds.), *Preventing crime: What works, what doesn't, what's promising*. Washington, DC: National Institute of Justice, U.S. Department of Justice. Also see Sherman, L. (1998). *Evidence-based policing*. Ideas in American Policing Lecture Series. Washington, DC: Police Foundation.
5. Sherman, Lawrence W. (2013) "The Rise of Evidence-Based Policing: Targeting, Testing, and Tracking." *Crime and Justice* 42: 377-451.
6. Sherman (2013), p. 378.
7. Sherman (2013), p. 378.
8. Sherman (2013), p. 378.
9. Sherman (2013), p. 379.
10. Sherman, L. W. (1998), *Evidence-Based Policing.* Washington, DC: Police Foundation.
11. Sherman (2013), p. 382-83.
12. Sherman, Lawrence W., Patrick R. Gartin, and Michael E. Buerger. 1989. "Hot spots of predatory crime: Routine activities and the criminology of place." *Criminology* 27: 27-56
    Weisburd, David, Elizabeth R. Groff and Sue-Ming Yang (2012) *The Criminology of Place: Street Segments and our Understanding of the Crime Problem.* New York: Oxford University Press.

Defining the Problem

Not all Decisions are Alike

We make hundreds of decisions daily, ranging from what to have for breakfast, to deciding in which room to hold a meeting, to whether or not we should buy a new car. Many of those decisions are informal, relatively insignificant and have few consequences. Some decisions incur a degree of risk or uncertainty. Each of us takes risks every day. For most of us, reasonable risks don't prevent us from doing our daily tasks and routines. Working through a formal process to address those issues would cause our lives to grind to a halt.

On the other hand, there are significant decisions we face in our personal and our professional lives where the consequences are not small or we need others to be engaged in making the decision. Examining the issues in detail and working through a formal process is worth our time and effort. Generally, that formal process involves creating a clear definition of the problem, outlining the alternatives, and weighing the costs and benefits associated with selecting any of those alternatives.

Evidence-based decision making can help us in those circumstances where we need to make an economically, socially or politically significant decision.

Evidence-based decision making can help us in those circumstances where we need to make an economically, socially or politically significant decision.

An advantage of evidence-based decision making is that it allows us to use known results to estimate a measurable outcome. The good news is that anything can be measured. No matter how "fuzzy" the measurement is, it's still a measurement if it tells you more than you knew before.[1]

One can never know the actual consequences of a decision before the event. However, by drawing on experience and the available evidence, generating a reasonable and defensible expectation of a specific outcome is possible.

All of us will make decisions that lead to undesired outcomes at times. That is a reality of life. The fact that we made the wrong choice is different from making a bad decision. There is a difference between not making the correct decision and bad decision making.

As we will outline, bad decisions are avoidable. Bad outcomes from good decisions, however, are fortuitous events over which we might have little control. So what then, distinguishes a good decision from a bad decision? Simply, good decisions are ones that flow from where the problem is clearly articulated.

They are ones where we bring as much of the appropriate and available evidence to bear as possible. A good decision is one where you can look back and with a clear conscience assert that under the same circumstances, and with the same evidence, you would come to the same conclusion.

While getting a less than ideal outcome from a good decision is unfortunate, one other advantage of having made a good decision is that we can draw lessons from it. If the decision making process is transparent, it is possible to consider why it resulted in a negative outcome. Did we make some incorrect assumptions? Were we missing some important information?

In this chapter, we will consider the following

- What is the issue and how do we problematize it?
- How can we identify the options and alternatives?
- How can we think creatively to generate new ideas?
- How do we generate alternatives?

What is the Issue?

Typically, even rational, systematic decision makers will start by making a list of alternatives. Lists are good and they definitely have their place. Nevertheless, as John D. Rockefeller once said in a different context, "A list is not a plan."

Before we start to generate options, we need to ask: What is the purpose of the decision? What is our intended goal? Those questions are embedded in an analysis of the problem. The framework of that analysis is generally a strategic or a business plan. Making a decision without planning is common. As the old adage goes, "if we fail to plan, we plan to fail." Without an explicit plan, however, we generally do not know if an undesirable outcome is a result of a bad approach or the fact that we encountered new or different circumstances. An open and formally structured process allows us to accumulate knowledge so that we are less likely to make the same mistake in the future.

Often, unplanned decisions do not end well. Planning allows us to make decisions logically and systematically. Proper planning makes decision making simpler and it makes it transparent.

Proper planning makes decision making defensible even when the results are not as expected, and in an environment of increased police accountability, this is crucial.

That is, we can show critics that the choice we made was rational and reasonable under the circumstances. Proper planning makes decision making defensible even when the results are not as expected, and in an environment of increased police accountability, this is critical.

When we ask the question, "What is the issue?" we are essentially asking, "How does the decision we are facing fit into and advance the mandate of our organization?"

Before Doing Anything, Ask "Why?"

Too often, we find ourselves backed into a corner when confronted with the seemingly simple request about whether we should choose Option A over Option B. This is a popular strategic move by someone who wishes to force an issue. For example, an employee may ask for a meeting to discuss performance and salary. As an opening gambit, the employee might ask, "Are you going to give me the same raise as last year or will I also get the promotion I have coming in recognition of my service to the company?"

Clearly, the employee is attempting to force a false choice. In this instance, we call it a false dichotomy because the question assumes that only the two options A or B are possible. In fact, many options may exist. Before considering the many possibilities, assessing the employee's contributions to the organization is necessary. Ideally, there should be a performance assessment policy in place. Lacking that, however, you might ask some of the five Ws. Why should you be rewarded based on your performance? What have you contributed to enhancing the effectiveness of your unit? Where can we see evidence of your contributions? Who in your unit have you helped or supported this year? When can we expect to see the returns on your performance?

Perhaps these are not the most appropriate questions to ask in the circumstances, but you get the idea. The notion is to tie the request back to the goals of the unit or organization and to ensure that the choices that we are considering are consistent with those goals. Typically, we are trying to ensure the bases for the choices are not irrelevant. Decisions to reward employees simply because they are friendly, consistently show up for work on time, or always dress neatly are difficult to defend.

When all else fails, ask yourself, "Can I defend my decision to others in the organization, my boss, or the public?" As a former colleague once said, "I make every major decision assuming it will appear on the front page of tomorrow's newspaper. If I can accept that, then I have likely made a reasonable choice on reasonable grounds."

That mandate is normally part and parcel of our strategic plan. Sometimes it is embedded in our operational plan or standard operating procedures (SOPs).

As an example, let us assume that a police chief of a medium-sized police department has just returned from a conference on crowd control and policing large public events or demonstrations. The general consensus is that such recent events in Vancouver as the Stanley Cup riots and in Toronto during the G20 meetings have dictated the need for law enforcement to be prepared to confront high-risk situations. The issue has been reinforced in the press by widespread coverage of the events. Although the majority of public events the Chief's department oversees are planned peaceful gatherings with minimal public disruption, a small number are demonstrations that can lead to public disruption and arrests. While the department's personnel have gone through basic crowd control training for such a response, the Chief now thinks the frequency and level of training of his personnel may be inadequate.

The issue the Chief faces is whether he should create his own Emergency Response Team (ERT) or rely on the services of a larger neighbouring department. At face value, it is difficult to argue that one should not pursue extra preparation for such events. The reality is, however, that in developing its strategic plan, the department needed to balance different requirements of the local community.

> By embedding the decision within the framework of a pre-existing plan—such as a strategic plan—the choices made are defensible on strategically assessed grounds.

The goals outlined in the department's strategic plan say that its primary goal is to provide for a safe and engaged community and to strive for organizational and service excellence. Consequently, the real needs of the department might be renewing the patrol car fleet or an upgrade in the department's dispatch system. By referring to a planning framework, we can see that creating an Emergency Response Team (ERT), team is not a priority. Furthermore, in all likelihood, the incremental investment in that area would be wasted and provide little, if any, return on investment.

Investing in an ERT team, however, fits with the overall goal of the department to improve the safety of the community. The real issue, however, is whether the proposed investment fits with the real and immediate needs of the community. The issue is not one of improving the overall safety of the community; the issue is really how best to address the most likely threats the community faces.

Undoubtedly, the Chief could have listed the options available to the department for an ERT and the best alternative among those options could be selected. The point, however, is that decision was not the only one to be considered. The key was to refer to the department's operational focus or, ideally, its strategic plan.

Again, by embedding the decision within the framework of a pre-existing plan or operational framework, the choices made are defensible on strategically assessed grounds. In that case, a delay in implementing a new program to provide for an ERT is justifiable.

Generating Ideas

Often, choices appear obvious. Do we spend more on equipment or personnel? Is our communications equipment at the end of its working life expectancy or not? In other instances, the alternatives are not always self-evident. It is not an A or not-A choice. In later chapters, we will examine how to conduct environmental scans and SWOT analyses. These are relatively formal procedures that systematically review what others have done or might do in similar circumstances.

Before resorting to those approaches, however, several more modest ways exist to generate alternatives. You might want to consider the following options:

Talk to people outside your normal circles

Too often we limit our social and professional circles to those we already know or with whom we work.

Often, this generates a group-think mentality where we reinforce the belief in a limited number of options. Furthermore, colleagues and subordinates may be more concerned about reinforcing what you have said or telling you what they think you want to hear rather than offering unique suggestions. Outsiders, however, may face similar situations but approach the issue entirely differently.

Engage in a group brainstorming session

Possible group-think tendencies aside, sometimes the people around you are the best source of ideas. They know the organization and understand the problems. Furthermore, they are less expensive than consultants since they are already on payroll. Ask for individual suggestions. Sometime a group session where we ask people to come up with "crazy" alternatives is effective.

The semblance of a little competition can sometimes unleash new ideas. Remember, today's innovations were yesterday's impossibilities. Brainstorming can be either informal or structured, the intent is to generate as many ideas as possible and seek solutions to our most vexing and persistent problems.

Read more books and journals; surf the web

The more you read, especially outside your area of policing, the more novel ideas you are likely to come across. Business books are an obvious choice but sometimes great ideas come from works of fiction. Most of us like to stretch ourselves. Professional journals are a good way of keeping up with new trends. As always, the internet is anarchy and generally fits the adage that you get what you pay for. Still, gems are to be found and modern search engines are amazingly good at ferreting them out. As Stephen Covey stated, it's always wise to "sharpen the saw."[2]

Focus on the people you serve—both internally and externally

Look at the world from the perspective of the people you serve both internally and externally. How they see your organization is probably very different from how you and your immediate colleagues see it. Besides the people you serve, other great sources of ideas are from your partners such as professional associations, community partners, educational institutions and other areas of government.

Often these connections have something of value to offer. Understanding the outsider's view can pay huge dividends.

Hire a reputable consultant

Often, you are the local expert at your core business or activity. That is why you are in your position. On the other hand, not all of your decisions relate to your core business function. Most businesses engage outside design firms, marketing agencies, web designers or management consultants. The key is to identify the area of expertise that you require. Once done, ask your associates if they can recommend a consulting firm or individual. Usually, smaller firms are more creative and less costly, but creativity is a business.

Of course, you need to be willing to be open to new perspectives. Don't let your prejudices get in the way. Just because you have a low opinion of someone does not mean they have bad ideas. Also, do not feel intimidated because someone can generate better ideas than you. Especially if that person is a subordinate, you automatically get credit for being smart enough to having such a creative employee on your team.

Finally, be willing to accept that sometimes, the best options are the obvious ones. A consultant who gives you a report that tells you what you already know, may not simply be lazy or uncreative. It could be that what is obvious to you is indeed the best option. Consider it that your suspicions have been confirmed.

Get a Plan

Whatever its size or complexity, every organization can benefit from having a plan. Whether it is termed a strategic, organizational, or business plan, the point is the same: an organization needs to know why it is doing what it is doing, where it is going, and how it intends to get there.

Without a plan, people make decisions arbitrarily. At best, those decisions will lack consistency and, at worse, they will be contradictory. A plan does not guarantee organizational success or efficiency. Not having one, however, invariably dooms an organization to mediocrity or failure.

Much material outlining how to put together an organizational plan is available both in bookstores and on the internet. Topics range from project management practices and principles to the latest in major case management. Time spent reviewing some of that material would be a good investment.

Essentially, a plan consists of four elements:

1. A general statement of organizational values.
2. A statement of goals and objectives.
3. An outline of how the organization intends to carry out or achieve its goals.
4. An indication of how to measure success.

Four elements of a plan:

Plans vary in complexity but there are advantages to keeping it simple. Complex plans are often difficult to remember and can be highly constraining. As most battlefield generals know, once the action starts, little goes as expected. Often, the best one can hope for is that the troops know what they are fighting for, that they remember the overall goals and objectives, and that the line officers are sufficiently trained to react to unexpected tactical challenges and setbacks. Thus, there is a lot to be said for keeping things simple.

Keeping Things Simple

The idea of keeping things simple and staying true to the obvious is illustrated in this humorous exchange between Sherlock Holmes and Dr. Watson:

Sherlock Holmes and Dr. Watson went on a camping trip. After sharing a good meal and a bottle of wine, they retire to their tent for the night.

At about 3 am, Holmes nudges Watson and asks, *"Watson, look up into the sky and tell me what you see?"*

Watson said, *"I see millions of stars."*

Holmes asks, *"And, what does that tell you?"*

Watson replies, *"Astronomically, it tells me there are millions of galaxies and potentially billions of planets. Astrologically, it tells me that Saturn is in Leo. Theologically, it tells me that God is great and we are small and insignificant. Horologically, it tells me that it's about 3am. Meteorologically, it tells me that we will have a beautiful day tomorrow. What does it tell you, Holmes?"*

Holmes retorts, *"Watson you idiot—someone stole our tent."*

Statement of Organizational Values

It is currently in vogue among management gurus to spend a great deal of time identifying the fundamental values underlying our organization. Typically, we outline organizational values in one or more of: a mission statement, a vision statement, and a values statement.

Well-crafted statements can be inspiring, and make for eloquent poster boards that can be placed on office walls and in annual reports. Poorly crafted statements do little more than provide a source of levity. As always, the best practical advice is to keep things simple and straightforward. Simple, unambiguous statements are easy to remember and easy to follow.

Well-crafted mission, vision or value statements can be inspiring; poorly crafted statements do little more than provide a source of levity.

Essentially, a statement of value should outline the reason for the organization's existence. This is known as the mission statement. For many organizations, such as police departments, the mission may be obvious. Your raison d'être is to protect lives and property or, in a broader sense, to create a safer community. The mission statement is where you answer the great existential question, "What is your purpose?"

Value statements should also provide some expectation of where the organization plans to be in the next three to five years. What, in other words, is the midterm vision for the organization? Perhaps you see yourself as becoming the regional standard for performance.

Finally, a values statement suggests something about your core beliefs. These are meant to be foundational and inspirational. For Google, it was, "Do No Harm." In your case, it may be, "Serve the Community." While this might seem trite, it is useful to recall the core value when decision making starts to focus too much on what is in the best interest of the organization. In this instance, what you do is not about the organization; it is about serving your community.

Statement of Goals and Objectives

An organization's statement of goals and objectives contains the targets it sets for itself. Organizational goals are the broader targets for which one is aiming; objectives are the midterm step one sets to achieve those goals. Broad goals may be such things as setting targets reducing the number of property crime and violent crimes in the community, or increasing the unit's capacity to handle a broader range of service demands. To achieve the goal of reducing crime, it is often necessary to make a list of objectives that form a series of intermediate steps. For example, one objective might be to research, acquire and use the best technology and infrastructure to assist officers in the detection and investigation of crime.

Implementation Procedures

As we noted earlier, a list is not a plan. Simply outlining the organization's goals and objectives is a necessary part of, but not a complete planning process. A true plan involves a discussion of how we can carry out the goals. What is the mechanism or what are the procedures that are being put in place to meet the desired outcomes? For example, one objective may be to reduce on-the-job injuries. We may link this to the overall goal of increasing worker safety.

Napoleon's goals and objectives

Sometimes it is easy to confuse the concepts of goals and objectives. Too often, the two are used interchangeably. While related, the two are distinct notions. A good example is to consider Napoleon Bonaparte's intentions in 1799.

Goal	Objective
Rule all of Europe	Become head of state in France
	Conquer Italy
	Conquer Spain
	Defeat Prussian Army
	Defeat the Austro-Hungarian Army
	Incorporate Poland into the French Empire
	Conquer Russia

Ironically, Bonaparte achieved all of his objectives except for the last. Despite this impressive achievement, he ultimately failed to achieve his overarching goal. He failed to consider the impact of Russia's brutal and unforgiving winters.

The important issue under implementation is: How do we make this happen? Obviously, the mechanism we choose depends upon the circumstances. Perhaps more resources should go into training personnel to be better equipped to address mentally-ill persons in conflict with the law. On the other hand, people may have adequate training but they have not had sufficient opportunity to practice the procedures.

Another mechanism might be to enhance information-sharing and working relationships between the police department and external community partners.

This applies to all of the goals and objectives identified in the plan, whether they are "soft" objectives, such as increasing employee morale, or "hard" objectives, such as reducing work-related injuries or damage to police vehicles.

Implementation procedures are the actionable items in our plan. Too often, strategic and business plans identify what the organization intends to achieve but not the means by which it hopes to meet those intentions.

Put another way, if goals and objectives are the nouns in a sentence, implementation procedures are the action components or verbs.

Measuring Outcomes

Measuring outcomes is essentially keeping a scorecard. Before you can do this, however, it is necessary to indicate within your plan what specific performance indicators you are going to use. You should closely link those indicators to the specific objectives you have identified and, in a general sense, to the overall goals outlined in the plan. As the eminent management guru, Peter Drucker, once stated: "What gets measured gets managed."

Obviously, clear quantitative measures are easiest to use, such as changes in calls for service, response time, clearance rates, and so on. However, qualitative measures should not be overlooked. Indicators of community satisfaction or fear of crime, for example, may be hard to quantify but are crucial performance elements for any service provider.

Too often, strategic and business plans identify what the organization intends to achieve, but not the means by which it hopes to meet those intentions.

Typically, outcome measures will cover a spectrum of issues, ranging from internal performance metrics, to levels of service provision, to financial accountability. Many discussions on strategic plans suggest creating a table where we list operational objectives in one column and their corresponding measures of success in the next. These linkages are judgment calls, but complex objectives usually require more varied indicators than simple, one-dimensional objectives.

Because goals are longer term and higher level notions than objectives, it is often more difficult to identify specific measures. Furthermore, goals often require a more qualitative assessment than do intermediate objectives. One thing to keep in mind, however, is that while there ought to be a consistency between the outcome measures of objectives and goals, there need not be a perfect correspondence.

It is possible to meet most or all of one's objectives but not one's goals. Similarly, the failure to meet one or more objectives does not necessarily mean that the organization has missed its overall goals. Practical strategic or business plans sometimes contain other items or provide more detail on certain dimensions.

Details might also be put in place about what forms the organization's "value-added" for your community, or how it differs from similar organizations or service providers. Whether these items are relevant depends on the particular environment and circumstances in which the organization finds itself. Regardless, those components become part of the crucial list of elements to which we refer when we need to make a critical decision.

Often we pose questions or decisions vaguely. A good decision maker will define and clarify the issue and relate it to the organization's plan. Having done that, one can then ask subsidiary questions such as: Does the issue warrant action? If so, when should we carry it out? Is the matter urgent, important, both or neither?

Evidence-based Decision Making

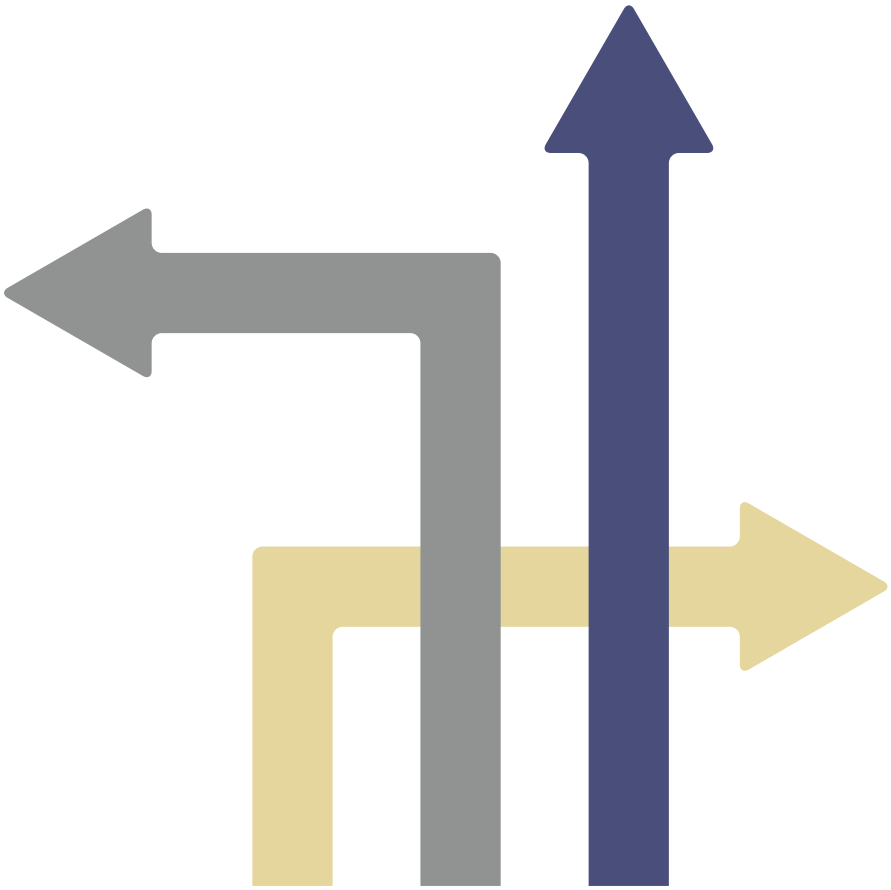
Good evidence-based decision making is tightly linked to an organization's plans. This does not mean that occasionally we must make important decisions that are beyond what we planned to do. Environments change and new issues arise, all the while we have to be able to maintain a focus on our core business functions. The world is not static. This is particularly true in the world of policing.

Effective managers, however, need to be sufficiently flexible to deal with those situations. Regardless, going through a planning exercise often provides a broad enough perspective or sufficient guideposts that "out of the blue" challenges can be placed within the general framework of our plans. The primary benefit of a good plan is that it allows decision makers to be able to justify how and why they are assessing the choices they are considering. Raising the criticism that certain options have been considered is easy. In fact, for many decisions there may be an almost infinite list of possible options. We can reduce that list substantially if we point out that the suggestions may have merit, but are outside the realm of the strategic plan.

A good plan, then, lets us know what questions or issues are relevant, what options are worthy of consideration, and consequently, what evidence we need to consider in weighing those options.

Notes

1. Douglas W. Hubbard (2014) *How to Measure Anything: Finding the Intangibles in Business.* New Jersey, NJ: John Wiley & Sons.
2. *Stephen R. Covey (1989). 7 Habits of Highly Effective People*, New Jersey: Simon & Schuster.



A good plan lets us know what issues are relevant, what options are worthy of consideration, and what evidence we need to consider in weighing those options.

Thinking Critically

Clarity of Thought

Evidence and data alone are not sufficient for making good and useful decisions. How we formulate an argument or explanation is just as important as the quality of the information we might bring to bear. When we consider evidence-based decision making, we need to keep two aspects in mind. First, as in making any type of case, the underlying arguments need to be based on sound logic. An argument that can lead to more than one conclusion is generally not very useful. Second, how most people think evidence or proof shores up an argument is typically not the most powerful way of making a case.

If there are two things that seem to characterize humanity, they are that people like to argue and, even when someone shows that their position is false or illogical, they generally won't change their world view. Humans are stubborn beasts with a tendency to defend any coveted untruth against the best of reason and evidence.

Evidence seems to abound that argumentation is one of humanity's most favoured social activities. Go to any sports bar on a Saturday night and you will see what seems to be inexhaustible evidence.

Humans are stubborn beasts with a tendency to defend any coveted untruth against the best of reason and evidence.

Then, there is the internet. Its rise has been the greatest venue for half-baked ideas, conspiracy theories and their supporters since the invention of walls and graffiti. Fundamentally, evidence and sound logic rarely sway people. When was the last time, for example, someone listened to you make a case and said, "Thank you for pointing out my logical fallacies. I see that I was wrong on this issue and I will from now on change my perspective on the matter." A positive outcome is typically one where they change the topic; a negative outcome is where they turn away muttering something about you and your kind having always been idiots.

The fact is, there are some discussions to which no solution exists, either logical or empirical. Arguments over the existence of God; who is the best looking actor or actress; or, whether Aunt Helen made the world's best muffins will never be resolved.

Generally speaking, matters of values are issues that are based on emotional preferences.

On the other hand, there are situations where evidence and rationality sway us (or, at least, some of us). Economic issues, for example, typically command our more rational sentiments. Matters of health, and life and death—immunizing your children against the measles, for instance—tend to elicit a rational response.

Although, it is admitted that charlatans abound and thrive in those domains as in all others.

The focus of this chapter is on those instances where, either individually or in groups, we are willing to consider rational and evidence-based input into our decision-making processes. Since those instances appear rarely in the affairs of humans, it is obligatory for us not to miss the opportunity for making a sound decision by using faulty logic.

Logical Fallacies

Logical statements are generally of the form, if A leads to B and B leads to C, then the occurrence of A will lead to C. Logical fallacies are ones where inherent gaps, contradictions or simple irrelevancies in arguments go unacknowledged or unchallenged. Some logicians and philosophers have made careers listing almost infinite varieties of fallacies (again, see the internet). For the most part, however, logical fallacies fall into a small group. Learn to identify these and you will be less likely to be led astray, whether intentionally or not.

Appeals to Authority

None of us has the capacity to generate all human knowledge from scratch.

As youngsters we are taught that what our parents, teachers and other "experts" say is generally true. It is an accumulation of knowledge passed from one generation to the next that distinguishes humans from other beings. This has allowed us to develop antibiotics, to build skyscrapers and to distribute spam to those little boxes we call cell phones. Without accepting knowledge passed on from authorities, civilization could not exist.

However, while we may be willing to accept the received wisdom from our resident Yodas, we should not be blind to the fact that Yoda may be wrong. There is nothing wrong with asking for further evidence to back up some authority's claim.

> Be suspicious of opening lines such as: "But, it has always been done that way," or "The experts agree that..."

While we do not have the time to question all authority, certain appeals should raise your suspicion.

Typical openings that should cause you to be suspicious are lines such as:

- "But, it has always been done that way."
- "Everyone knows that's the way it is."
- "What do you (we) know? So-and-so is an expert in these matters."
- "Science tells us that . . ."
- "The experts agree that . . ."

In such instances, there is nothing wrong with saying that, "If that is the case, then there should clearly be some hard evidence to back it up. Perhaps we should check it out in more detail." Or, "Gee, that's interesting because some (scientists, experts, etc.) say just the opposite. How are we to resolve this?"

Usually, appeals to authority are code for either, "I am too lazy to check this out," or, "I am blowing smoke."

Personal or Ad Hominem Arguments

Ad hominem is Latin for against the person. Essentially, ad hominem arguments are ones where someone attacks the person making the statement personally. Usually, the person's sanity, morals or parentage is called into question. An ad hominem argument is an attempt to "blow-off" the proponent by undermining their credibility. Among some more polite ad hominem attacks are such statements as:

- "What do you expect from a couple of fascists (socialist, liberals, academics, whatever)?"
- "That's a typical statement from someone who is clearly out of touch with today's realities."
- "That's a typical male (feminist) response."
- "Gee, you would think s/he is an expert in the matter the way s/he is going on."
- "So, how many years have you been in the field?"

The key here is to separate the argument or assertion from the speaker. Just because one has a low opinion of the other person, doesn't necessarily mean that what they have to say is wrong or irrelevant. It may be difficult at times, but trying to respect the idea is essential if not the person presenting it.

The "Red Herring"

Red herrings are irrelevant issues that someone brings up in a discussion. For example, it is asserted in a council meeting, and may be the case, that too much money is being spent on travel, toys for administrators or overtime. Someone then asserts that this would not have happened if we had invested in the appropriate technology a couple of years ago.

The problem here is that inappropriate spending that has gone unchecked is due to a lack of financial oversight. Effective financial oversight has existed before the time of the Romans and long before computers were available. Investing in the appropriate technology may help in the oversight process but does not ensure oversight in itself. Examples are bountiful of solutions that have merely added to the problem rather than solving it.

The key to addressing red herrings is to ask how the herring is related to the problem being considered. How will the technology be used to enhance oversight? Is the appropriate software available? Are the auditors properly trained in the equipment to be able to enhance their performance? Computers, after all, only do what we tell them to do.

Pink Herrings

True red herrings are items that are clearly unrelated to the issue at hand. Sometimes, however, someone may raise an issue that is sufficient to address the problem but is not necessarily a solution. We might refer those to as pink herrings. Perhaps the biggest pink herring is for administrators to argue the problems exist in their organization because of a lack of financial resources.

Certainly, money can purchase resources. All too often, however, more money just leads to more of the same. Money, itself, doesn't necessarily solve the problem. Proper oversight, a more effective use of existing physical and human resources, or a more creative approach to the issue may be more effective than simply throwing more money at the problem. What is necessary is that existing or future resources are directed toward developing or enhancing mechanisms related to the problem.

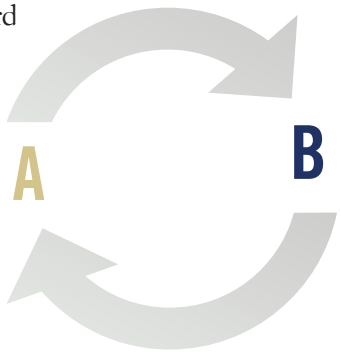
As with the red herring, we need to address the open-ended call for money questions by asking how the money will be used. The answer will likely be to purchase more equipment or hire more officers. The subsidiary question then becomes: In what way will that equipment or those officers enhance a process that is currently broken or ineffective?

Circular Arguments

Circular arguments are those of the form that A causes B because B is the result of A. Circular arguments abound, particularly in political debates. A favorite of teachers is students who come after an exam and assert that they can't get a C because they are A students. (So, explain how you earned the C if you are an A student?)

Another good example is sometimes found in salary negotiations. Bargaining units will sometimes insist that they need to get a larger increase than their colleagues because they have historically been the highest paid police unit in the group of comparable organizations. If you don't give the raise, how can they be the highest paid? Usually, most ratcheting effects that we see in labour negotiations are based on circular reasoning. Group A has it in their contract that they are to have a 10 per cent premium on the rest of the jurisdiction because of the high cost of living in their area. Group B argues that to remain competitive, they need to be within 10 per cent of Group A regardless of productivity or other factors. A change in the compensation of any one group automatically ratchets the pay of the other.

Sometimes we use the term begging the question to describe a circular argument. The form of the argument is essentially the same: "You know the reason that action is illegal is because it is against the law."



Similarly, an often heard comment in city councils is that a particular group will not support tax increases because they have made it part of their platform. When asked why that is part of the platform, the answer is that tax increases are not in the interest of the people.

To break the circularity, we need to know why a body passed the law in the first instance: what was its supposed purpose? Likewise, we need to know in what way not increasing taxes benefits the electorate. What is the exact economic mechanism supposed to be at play?

Other Fallacies

People call upon many other logical fallacies when rationality and evidence fail them. They range from the teenager's perennial appeal to popularity: "But everyone at school has one," to appeals to nature: "That is just not natural." Parallels, of course, abound in the professional sphere. Every municipality or department in the region has a Nouveau Widget so, obviously, we need one too. A current bureaucratic favorite is the rationale for why we keep a current practice or why things don't change. The *cliché du jour* is: "It is what it is," which has replaced the formerly abused, "Well, that is the nature of organizations." All of these are logically non-starters.

Just because two things appear associated, doesn't necessarily mean that one causes the other–or that, in fact, they are causally connected in any way.

Causal Linkages

One clinker of a fallacy we did not discuss previously goes by the formal name of post hoc, ergo propter hoc, which means "after this, therefore because of this." Those who might have studied statistics will recognize this as a variant of the "correlation does not prove causation" fallacy.

Just because two things appear associated, doesn't necessarily mean one causes the other—or that, in fact, they are causally connected in any way. The possible absurdity of assuming that because two things are correlated they are connected is presented in the police car fallacy. The story here is that a Martian comes to Earth and notices that wherever a crime has occurred, there is invariably a police car at the scene. The Martian, therefore, erroneously concludes that police cars cause crime.

Of course, this fallacy can also be applied to fire engines and fires as well as ambulances and injuries.

Obviously, association or correlation is somehow related to causation. The question is how can we identify or recognize a causal relationship when we see one? The issue is important because causal thinking and causal imagery have become entrenched in our everyday view of the world. Whenever we see something we do not quite understand, our first inclination is to ask, how did that come about? In other words, what was the cause?

From an historical perspective, formal causal thinking is a relatively recent idea. Most scholars use David Hume's writings as the starting point for explaining what is a cause and how we might identify one.

David Hume (26 April 1711 – 25 August 1776) was a Scottish philosopher, historian, economist, and essayist known especially for his philosophical empiricism and skepticism. He was one of the most important figures in the Scottish Enlightenment, and in the history of Western philosophy. He is the philosopher "widely regarded as the greatest who has ever written in the English language." Hume is often grouped with John Locke, George Berkeley, and a handful of others as a British Empiricist.

Hume was a Scottish philosopher who lived in the early to mid-1700s. Without belabouring the issue, Hume identified three necessary conditions for a causal relationship. The first condition is that the cause and the effect must be coincidental or "conjoined," as he said. This is the correlation part where two things generally appear together.

The second condition is that the cause must come before the effect. Therefore, if the Martian had been around a little longer, he would have noticed that the crime occurred first and that the police car generally turned up later. Thus, it was crime that caused the police to respond; crime was not a consequence of the existence of police cars.

The third element of causation is the most difficult issue and that is what we call the condition of non-spuriousness. Non-spuriousness means the cause is not just enough or sufficient to cause the effect, but that it necessarily produces the effect or outcome. This is sometimes easier to understand in the negative. What non-spuriousness means is that no third factor is resulting in the apparent cause and effect to be appearing together. An example here might be the strong correlation between crime, the number of police officers and the number of crimes across jurisdictions. Neither may be a cause of the other; both, however, are driven by an underlying increases or decreases in population density.

Hume's conditions for a causal relationship

1. The cause and effect must be coincidental.
2. The cause must come before the effect.
3. There is no underlying third factor resulting in the cause and effect to be appearing together.

Spuriousness means that a relationship between two or more factors is coincidental. The real cause is an underlying third factor. The problem here is that even if we take away the apparent cause, the effect will remain. Thus, with crimes and police cars, if a prank caller instigates a call that makes police cars appear, then they will appear whether a crime occurs or not. From an evaluator's or a scientist's perspective, non-spuriousness is generally the most difficult factor to control. Observing that two events generally coincide is not difficult, nor is it difficult to see that one event generally precedes the other.

The difficult issue is assessing whether some other underlying mechanism is driving both of those events. Essentially, we have devised two ways to deal with the spuriousness issue. The first is to try to develop explanatory theories to explain how or why something should cause something else. In formal terms, we need to find what we call a causal mechanism. Logically, why should X produce Y? As we say in the trade, "What's the story?"

The second way of dealing with the non-spuriousness issue is through the physical manipulation of conditions. That is, can we physically reproduce the effect ourselves? We call this manipulation an experiment.

Over time, we have developed a series of experimental designs or ways of manipulating situations so that we can isolate what we believe are the cause and effect factors from other possible or spurious influences. We will highlight those techniques in a later chapter.

In summary, then, it is sufficient at this point to consider that all three conditions must exist for us to be reasonably confident that something is truly the cause of something else. Those are the elements of coincidence or correlation; temporal sequencing where the cause precedes or comes before the effect; and, the condition of non-spuriousness where no other underlying mechanism is generating both the apparent cause and the effect.

Unfortunately, we conduct much research that does not consider all three of those issues. That is why, for example, we often hear of some medical survey where some factor (say, pomegranates) are supposed to reduce the risk of cancer. Typically, the study is correlational such that someone conducts a survey and it is found that people who eat pomegranates have a lower incidence of cancer. We can probably determine that the consumption of pomegranates preceded the onset or non-onset of cancer.

What those studies generally do not do is to control for spurious or confounding factors. For example, pomegranate eaters may be also less likely to smoke, get more exercise, eat a healthier diet and generally have a healthier lifestyle than non-pomegranate eaters. Those factors are likely the real causal agents. Including pomegranates in the diet or not is irrelevant.

Of course, once we start to believe that pomegranates are related to cancer, we can generate any number of possible causal explanations after the fact. For example, we might argue that high levels of vitamin C or antioxidants in pomegranates fight the onset of cancer.

Linking Evidence to Explanations

A common mistake people make is that by collecting sufficient evidence, one can "prove" that a hypothesis or theory is correct. In fact, the relationship between an explanation and what forms evidence is complex.

To prove a relationship we generally need to use data or evidence in two ways. First, when we consider an explanation, we must find one that is consistent with at least most of the evidence or facts that we have to date. If an explanation does not explain most of what we know, it is unlikely to be a good candidate for what we need.

Once we have narrowed our plausible explanations to ones that make sense logically, and ones that generally fit the existing evidence, we need to conduct secondary tests to see whether those explanations hold up under critical circumstances. Obviously, we have selected an explanation that fits the known facts, so simply collecting more data under the same circumstances likely won't give us more hard evidence.

For example, the fact that crime rates in inner-city neighbourhoods with graffiti tend to be higher than other neighbourhoods does not provide proof that graffiti causes crime. Going back to our Martian example, seeing ever more instances of crime and police cars appearing together does not provide more proof that one causes the other. On the other hand, a few instances where crime occurred with no police cars about soon disproves the hypothesis.

To prove a theory:

1. We must find an explanation that is consistent with at least most of the evidence we have to date.
2. We must then conduct secondary tests to see whether those explanations hold up.

That is perhaps the single most important point that Hume made in his discussion of causation. It is very difficult to prove something is true; it is much easier to show that it is not true.

One example Hume used was that just because the sun has risen in the east and set in the west since time immemorial, it does not "prove" that this will necessarily happen tomorrow. On the other hand, all we need is one instance where the sun doesn't rise in the east to disprove the pattern. As contrived as that example might be, it does make the point about the relative imbalance between evidence that appears to show a relationship and evidence that appears to dispel a relationship.

Working and Null Hyphotheses

Hypothesis testing is an approach routinely applied in science to help establish knowledge. It requires a true (or false) statement to be made that offers a plausible explanation about the problem. Testing the hypothesis results in our coming to some conclusions.[1] A working hypothesis might be something like: probation officers who have prior criminal justice experience (as a police officer or corrections officer, for example) are less supportive of rehabilitation than those who have no prior criminal justice experience. This is perhaps due to the fact that the probation officers have been on the front-lines and feel that they have a good understanding and pre-disposed prejudices as to why some people who commit crimes are not remediable. There really is no absolute proof to this. Instances could exist where such probation officers are in fact supportive.

To provide evidence of whether this is really so, we would test the hypothesis by looking at instances where the opposite could be the case. This leads us to what we call the null hypothesis: there is no statistically significant difference in the attitude toward rehabilitation between probation officers with prior criminal justice experience and those without this experience.

If we fail to reject or falsify the null hypothesis (so, in fact, there really is no difference in attitudes) then we must logically reject the working hypothesis that probation officers who have prior criminal justice experience are less supportive of rehabilitation than those who have no prior criminal justice experience.

It is that strategy that scientists use to test hypotheses and theories. We cannot prove the working hypothesis directly. Instead, we create a null hypothesis that is the opposite of the working hypothesis. If we find support for the null hypothesis (that is, we find that prior criminal justice experience has no influence whatsoever on the outcome) we toss out the working hypothesis. Or, at least, we need to seriously reconsider what it says. If we do not find support for the null hypothesis (we do not find an alternate support for the opinion) we have very strong reasons to believe that our working hypothesis is valid. As we find that fewer and fewer alternatives pan out, the greater credibility we have in the working hypothesis.

An Example of a Working Hypothesis and a Null Hypothesis[2]

Between November 2010 and February 2011, the district of Oldham in Greater Manchester, experienced an 18% increase in burglaries in residential properties compared with the previous 4-month period. This was an increase of 91 burglaries. One of the hypotheses put forward was that the increase in burglary is attributable to an increase in burglary offenders in the area, mainly as a direct result of an increase in prison releases.

Some crime prevention officers claim however that there is no direct correlation between the two. Ex-offenders receive intensive supervision immediately after their release from prison, with the aim to minimize re-offending and maximize their rehabilitation. Perhaps it is a failure in the system, or the breakdown of social support services that causes recidivism and not the fact that they have been released from prison.

As a result of this, Oldham's Neighbourhood Policing Teams, a police Superintendent, Crime Prevention Officers and analysts from the Oldham Community Safety Partnership sought to analyze the correlation of the two facts. At the beginning of the study, the analysts needed to state the working hypothesis and the null hypothesis. In this case, we might state them as follows:

Working hypothesis:

The increase in burglary is attributable to an increase in burglary offenders, mainly as a direct result of an increase in prison releases.

Null hypothesis:

It is unlikely that an increase in individuals released from prison was the main explanation for the increase in burglaries in Oldham.

The researchers test the null hypothesis. If the evidence is consistent with it, they conditionally assume that it is true and essentially reject the working hypothesis. If they find the evidence is not consistent with the null hypothesis, they reject the null hypothesis and have strong reason to assume the working hypothesis is true.

Notes

1. Chainey, S. "Improving the Explanatory Content of Analysis Products using Hypothesis Testing", *Policing Advance Access*. March 14, 2012. http://policing.oxfordjournals.org/content/early/2012/03/14/police.pas007.full.pdf
2. Chainey, S. (2012)

Collecting Evidence

Environmental Scans

Evidence-based decision making is influenced by the plans we create to help us set priorities, and by concerns that affect our organization's ability to fulfill its mandate. When issues arise and decisions have to be made, we need evidence to help us decide the likely impact or effectiveness of our decisions. Police departments can use the approach for example, to improve performance and seek and establish an advantage in relation to criminals and criminal activity.[1]

A common strategy for gathering this information is through an environmental scan. Simply put, an environmental scan gives us an informed, comprehensive picture of the current circumstances in which our organization exists. It makes us aware of internal and external realities, important issues, and trends affecting the organization. Information of this kind helps confirm or refute our perceptions. It can guide us with future programming, strategic priorities, and budgeting. An environmental scan can also be useful in determining future strategies and in developing appropriate, well-informed responses.

What benefits do organizations receive from conducting an environmental scan?

An environmental scan makes us aware of internal and external realities, important issues, and trends that affect our organization.

Why should we spend the time and energy to conduct one? Among the most prominent are the following. Environmental scans can provide:

- A fresh, objective look at issues within the organization's goals and mandate, with an eye toward how to rank them most effectively;
- An opportunity to access information, research, statistics, and other data that someone else took the time to collect;
- An opportunity to involve community stakeholders, organizations, individuals, and groups in decisions that affect them, by giving them an opportunity to provide input, perspective, and advice;
- An opportunity to discover the strengths and assets in the larger community to address the issue;
- A framework or point of comparison to understand the assets and strengths of own organization; and

- An opportunity to learn how your organization's programs and practices are affecting other organizations, agencies, individuals, or groups, and to what degree your programs and practices are effective in fulfilling your organization's mandate.

Conducting an environmental scan is a sequential process that involves gathering information from secondary sources, including existing research reports, statistics, or other information. This is supplemented by first-hand or primary sources of information, from individuals or groups that you will contact yourself. Analysis of this information leads to establishing where your organization fits within the broader social ecology.

Unlike many other management procedures, there are few formal guidelines for conducting environmental scans. What we will do, however, is to provide you with an overview of the procedure and some suggested tools for moving forward.

Types of Environmental Scans

There are essentially two types of environmental scans. The first approach is a less formal type of scanning that you conduct yourself, based on your own knowledge and what you or an assistant can gather sitting at your desk. The first step is to write out what you know about how others are dealing with similar situations. In other words, you are looking to see how others in your social environment do things. Generally, people who are more connected with their colleagues, who read the trade literature, and who regularly attend conventions and workshops tend to find this process easier.

A second part might involve a more formal review. Depending on the issue, you might seek out journal or news articles that have been written on the topic. A good place to start is to check the internet. Search engines such as Google, Bing and Webcrawler can retrieve a tremendous amount of information very quickly. One of the big challenges in using general search engines is that it is sometimes difficult to identify the exact search terms you need. Consequently, the search generates more chaff than wheat.

Using Internet Search Engines

There are some tricks to using search engines. If you are fortunate enough to have access to a municipal librarian or a local college or university library, there are usually experienced people who can provide some assistance. Some tips for narrowing Google searches are provided on the next page.

Either online or by visiting a library, it is also possible to search the professional literature. Trade magazines and journals often provide coverage of general issues.

Speaking with a librarian well-versed in criminology or police sciences at a local university or college, or knowledgeable staff at a justice library, is a good place to start.

For more detailed sources of information, it might be necessary to enter the formal research or academic literature. This latter step can be a little daunting at times since there is a lot of variation in how technical articles are written. Some are very accessible while others require extensive prior knowledge of the topic. The key is not to become discouraged.

Sometimes it is worthwhile looking further afield. In this case, official websites such as those of the US National Criminal Justice Reference Service (NCJRS) or the United Nations Office on Drugs and Crime (UNODC) can offer a wealth of information. The box on the next page gives a brief listing of some of the major policing and criminal justice journals. A few key web links are also provided. Many local universities have academic partnerships with police services and are a great source of information and potential joint projects.

If you require information on characteristics of your community or other statistics, a great deal of information is available on the Statistics Canada website.

Effective Searches on Google

1. **Be specific.**
   Find pages within sites using *site:[website URL]* and your search phrase, find authors using *author:[name]*, and type *intitle:[word]* to find a page with that word in the title.

2. **Format.**
   Use *filetype:[pdf or other extension]* to find images and all sorts of files (such as docs and jpgs).

3. **Broaden your search.**
   Use an asterisk (*) as a wildcard search operator to fill in the blanks. For example, "*polic**" will return information on police, policing and so on.

4. **Limit your search by excluding unwanted terms.**
   Put a minus sign in front of terms you wish to exclude. For example, *alarms -burglar* will exclude the term "burglar" from your search. To limit a search numerically, use the range (two dot) indicator. For example "*used armoured vans 2010 .. 2014*" will limit results to those years.

5. **Use specific search engines.**
   Google scholar, for example, is an excellent way to find both academic and other articles on selected topics. Webcrawler looks across a series of search engines. Also check out the website for Amazines (www.amazines.com) for a database of free articles.

Sources of information

A Sample of Professional Journals

Aggression and Violent Behavior
Alcoholism Treatment Quarterly
American Criminal Law Review
American Journal of Criminal Justice
British Journal of Criminology
Campus Law Enforcement Journal
Canadian Journal of Criminology and Criminal Justice
Canadian Society of Forensic Science
Child Abuse and Neglect
Child Abuse Review
Child and Youth Services
Correctional Compendium
Corrections Today
Crime and Delinquency
Crime Prevention and Community Safety
Criminal Behavior and Mental Health
Criminal Justice and Behavior
Criminal Justice Policy Review
Criminal Justice Review
Criminology and Public Policy
Drug and Alcohol Review
European Journal on Criminal Policy and Research
Federal Probation
Global Crime
International Criminal Justice Review
International Journal of Comparative and Applied Criminal Justice
International Journal of Offender Therapy and Comparative Criminology
International Journal of Police Science and Management
Journal of Alcohol and Drug Education
Journal of Child and Adolescent Substance Abuse
Journal of Child Sexual Abuse
Journal of Contemporary Criminal Justice
Journal of Crime and Justice
Journal of Criminal Law and Criminology
Journal of Drug Issues
Journal of Elder Abuse and Neglect
Journal of Ethnicity in Substance Abuse
Journal of Experimental Criminology
Journal of Family Violence
Journal of Forensic Identification
Journal of Forensic Psychology Practice
Journal of Forensic Sciences
Journal of Gang Research
Journal of Interpersonal Violence
Journal of Offender Rehabilitation
Journal of Police Crisis and Negotiations
Journal of Quantitative Criminology
Journal of Research in Crime and Delinquency
Justice Quarterly
Juvenile and Family Court Journal
Law and Order
Law and Policy
Law Enforcement Technology
Legal and Criminological Psychology

Continued on next page

Sources of information

A Sample of Professional Journals (cont.)

Police Practice and Research: An International Journal
Residential Treatment for Children and Youth
Security Journal
Studies in Conflict and Terrorism
Substance Use and Misuse
Trauma, Violence, and Abuse
Violence Against Women
Western Criminology
Women and Criminal Justice

Online Sources

National Institute of Justice. http://www.crimesolutions.gov/

RAND Center on Quality Policing. http://www.rand.org/jie/centers/quality-policing.html

Statistics Canada: www.statcan.gc.ca

US Department of Justice Community Oriented Policing Services: http://www.cops.usdoj.gov/

A significant amount of information on policing and the criminal justice system can is available through Statistics Canada.[2]

To do a scan most effectively, make sure you have collected information in more than one way. By doing this you can check and cross-reference to see if the same issues and concerns are surfacing through your various sources of information.

Occasionally, it is worthwhile conducting a formal process where others in the organization are involved.

In this instance, you might consider bringing in an outside facilitator and conducting a formal scan. The process of doing a formal scan is outlined in the second part of the chapter on SWOT analyses. The primary difference between an environmental scan and a SWOT analysis is that the focus or range of issues considered by an environmental scan is generally much broader. SWOT analyses are typically limited to issues relating to challenges and opportunities confronting the organization.

Framing Your Environmental Scan

The information that you will be gathering is influenced by the question you are trying to answer. To frame the environmental scan, we can start by asking some focused questions, such as the following:

- What is the key issue?
- What do we need to know about the issue?
- What are the trends and drivers affecting these factors?

Once the question has been carefully framed, and the research has been gathered from primary and secondary sources, then the analysis begins.
First, we need to consider what themes, concepts, issues, or concerns surfaced in the secondary research. In other words, how have other groups, organizations, communities or police departments elsewhere been affected by this issue? How have they ranked those concerns?

Compare the results of your surveys with the qualitative data that is emerging from your focus groups. Consider what people have been saying in the one-to-one interviews. What common themes are emerging? How are the results showing consistency and repetition?

Try to determine how these people have ranked the concerns that also showed up in your secondary research. Do they see it the same way? Or have they raised different thoughts, ideas, or concerns that have not shown up in the secondary research?

Once you or your team have agreed on the ranking of the issues, beginning with the most serious and urgent, then you can begin to consider the strategies, program activities, and practice that will help you address them. You will also need to consider the budget implications involved in meeting these strategic priorities.

As we noted, environmental scans are often accompanied by a SWOT analysis, which determines the internal and external strengths, weaknesses, opportunities and threats that are affecting the organization's ability to fulfill its organizational mandate. The SWOT analysis is explained more fully in the second part of this chapter.

Example: Police Sector Council Environmental Scan[3]

In 2009, the Police Sector Council (PSC) commissioned a report to understand better the changing Canadian landscape. The report sought to offer a snapshot of Canadian society and global issues that are relevant to the policing community. It was motivated by a perceived increase in the complexity of current social trends, along with increased interrelations among various demographic, social and economic factors. A key element was the recognition that Canadian police forces had to work together with one another against this backdrop of social change. The report sought to provide feedback about implications for policing in an effort to pull together a more connected and cohesive view of the policing world in Canada.

Police sector stakeholders were asked what they would like to see in an environmental scan produced by the PSC. Based on their suggestions, the document highlighted demographics and public safety & security, and introduced social and human resource management sections to the list of topics.

The environmental scan was the result of a literature review and survey of environmental scans among police forces in Canada, conducted in 2008. Over 300 organizations, from small regional police forces to colleges with policing courses, and all levels between provided their feedback.

Assume you are the police chief of a mid-size police department in a community with its own set of policing challenges. Someone in your organization has suggested that it would be interesting to examine what challenges departments in other communities are facing. You could do an environmental scan of your own and scan the various community, regional police websites, but you are having a hard time finding information as most departments use data for internal planning purposes. Or you could use the PSC report as it already contains the information from over 300 organizations. This not only saves you a lot of time, but it also will provide you with a comprehensive view of what other organizations are facing.

Continued on next page

Summary of Key Trends Explored in PSC Report

The world population, like Canada's, is growing. Canada relies more and more on international migration to increase its population and renew its workforce. Canadians are aging, and with one in three Canadians considered a baby boomer, the country faces the reality of mass retirement. There will be new challenges for the Canadian policing community, as workers retire while today's youth show only moderate interest in policing as a career.

While, on the world scale, Canada is economically advantaged, poverty remains an issue for several sub-populations. The current economic uncertainty is also causing greater levels of insecurity for some. Homeless and poor populations, as well as Aboriginal populations, continue to be overrepresented in the justice system as both victims and perpetrators. The policing world will have to adapt to new realities in the near future, in particular if, as some argue, socio-economic disadvantage is linked to greater crime rates.

The proportion of Canadians with a post-secondary education is increasing, along with the level of computer and technology literacy. Technology represents a double-edged sword for police. On the one hand it can be used to solve and prevent crimes along with gathering and storing information, but on the other, it is increasingly used to support a range of white collar crimes including fraud, identity theft and related predatory actions.

Malls, gated communities and other new forms of property blur the distinction between public and private places, requiring police to collaborate further with private security forces. Blurred boundaries and jurisdictional issues over crimes in cyberspace are other challenging dimensions that will require further international coordination by police.

Diversity in culture, lifestyle, and moral codes is posing greater challenges to politicians and the policing world alike, as Canadian society struggles to find a middle ground encompassing the acceptance of diversity and a fair interpretation of the law.

Based on this and other information, you might decide to refocus the service components of your own department. Clearly, several options are available. Depending on your department's location (a major metropolitan area as opposed to a small, rural community), you might wish to broaden your range of activities.

Another option would be to identify the four or five key areas in which all other departments engage and focus on those as your core functions.

Again, what you get out of an environmental scan is determined by the initial question you are trying to resolve.

SWOT Analyses

A SWOT analysis is an assessment of an organization's Strengths, Weaknesses, Opportunities, and Threats. Keep in mind that, typically, the strengths and weaknesses are internal to the organization, while the opportunities and threats are characteristics of the external environment.

SWOT is easy to use. It can be a useful complement to the environmental scan. A SWOT can generate crucial information with relatively little effort, and it brings that information together in a framework that provides a good base for further analysis. It is an excellent decision support tool, and aids us in making an important decision – especially the right decision.

As we discussed earlier in the chapter, the environmental scan will provide you with primary and secondary information to determine pressing issues and concerns related to your research questions.

When that information is combined with the results of the SWOT, you will be better equipped to identify your strategic priorities and future directions.

The SWOT adds to the results of the environmental scan by engaging various members of your organization in a discussion of the strengths and weaknesses that exist within your department. Looking outside the department allows you to consider opportunities that could be seized to advance the interests of the organization. The SWOT also explores threats: those external factors, realities, or trends that can make the ongoing functioning of the department more challenging.

A SWOT analysis is sometimes conducted as a group session with a facilitator. This might be preceded by a survey that each member of the group completes in advance, so they have a chance to consider their own assessment before group discussion begins.

Even simpler, one can give each group member a blank SWOT template that they can use to jot down their thoughts in advance, and then have them bring it to the meeting.

Conducting a SWOT Analysis

While it is possible to conduct a SWOT analysis by yourself, the real benefit of the exercise is usually seen when several members of the organization are involved.

One of the paradoxes managers face is that on the one hand, employees and others expect leaders to lead but, at the same time, they expect to be part of the decision-making process.

As with any activity, consultation has a price. While employees are being consulted they are not doing their normal activities. Furthermore, group dynamics can generate unexpected results. Group politics come into play and red herrings can occupy a significant amount of time. For those reasons, it is often beneficial to have an outside facilitator lead the exercise. The advantages of consultation, however, are numerous.

First of all, groups tend to generate crucial ideas that a single manager or even a management group might overlook. Second, people from different segments of the organization interact with different audiences, suppliers, community groups, clients or customers, regulators and, other service providers.

Example: Completed SWOT Analysis

Strengths

- Community and "problem solving" philosophies
- Services to community
- Fiscal responsibility
- Innovation

Weaknesses

- Aging staff and pending retirements
- Recruitment challenges
- Lack of diversity

Opportunities

- Collaboration with neighbouring community concerning disaster management planning.
- Access to senior government funds to expand disaster response strategies.

Threats

- Increased reliance on technology
- Population aging / decline
- Increasing budget costs
- Need for additional civilian support staff

This gives them different perspectives on the organization, particularly with regard to outside influences. Third, even participants who do not see their input reflected in the final product generally feel they have had some say in the process. This typically has a positive effect on morale and often creates more "buy in" when choices have to be made and different options are implemented.

In a group situation, one of the first questions when conducting an analysis is: Who will participate? It is helpful to have a diverse cross-section of individuals to ensure the most comprehensive assessment. While no guarantee, this helps to increase the likelihood that no crucial aspect is overlooked. As a general rule, the SWOT analysis should be done by no less than mid-level management, and preferably even a higher level of leadership. In addition, the analysis should include representative employees from throughout the organization. Front-line supervisors should be included. Again, while not always the case, leaders in the organization often have greater insight into those external and internal issues that need to be considered. This comes from their experience as well as their relationships with a wide variety of people inside and outside the organization.

Before starting the analysis, and filling in the matrix, it is often worthwhile providing the team with the environmental scan results to read in advance of the SWOT analysis meeting. Ensure you include the guiding research question that is behind the environmental scan and SWOT process, as that will create the framework for the discussion. Create helpful ground rules for the discussion.

SWOT Discussion Ground Rules

- Focus on one quadrant at a time.
- Listen to understand, and acknowledge what you are hearing others say. Avoid interrupting or criticizing the contributions of others.
- Establish reasonable time limits to keep the discussion moving forward. Respect each other—it's acceptable to have differing points of view and perspectives
- Agree on how distractions such as cell phones and interruptions from support staff will be managed. It is suggested that cell phones be turned off and administrative staff interrupt only for emergencies.
- Confidentiality: What can be shared outside the room? Where will the information go in the end? How will anonymity be protected?
- All team members should participate.

As the group considers the issues and concerns that have resulted from the environmental scan, ask them to consider each quadrant in turn as a means of assessing how those issues and concerns could be more fully addressed or understood.

As you proceed through your SWOT analysis, keep these factors in mind:

- SWOT analysis is a subjective process, not a science. However, the quantitative and qualitative data that emerged from the environmental scan will help the participants trust that the results are well-founded.
- Keep it simple by focusing on a few issues only. If other matters emerge, they can be addressed later through a subsequent process. Without these limitations, the process may bog down with too much data and information to be dealt with at one time.
- Be realistic about the strengths and weaknesses of the organization. Create safety and transparency so participants will be honest.

In summary, the SWOT analysis combines with the environmental scan to create strategic plans that are realistic, researched, and supported by internal personnel and external stakeholders. Evidence-based decision-making benefits from using tools such as these, leading to plans and decisions that will be solidly grounded in facts and research, and guided by a wide array of perspectives and input.

Notes

1. "Strategic Planning in Policing, Part II." http://mennozacharias.com/tag/environmental-scanning/
2. http://www5.statcan.gc.ca/subject-sujet/theme-theme.action?pid=2693&lang=eng&more=0&MM
3. "Environmental Scanning Labour Market Information Project 2009." Environmental Scan prepared for the Police Sector Council. http://www.policecouncil.ca/wp-content/uploads/2013/03/PSC-Environmental-Scan-2009.pdf

Statistics

A Tool for Decision Making

Statistics is probably one of the most misunderstood of disciplines. Most university students dread having to study it, and most professors who teach it often do so with great reluctance. Furthermore, the topic is often reviled as a tool of charlatans. As Mark Twain once claimed, "There are lies, damned lies and statistics." Yet, used appropriately, statistics can be one of the most useful and powerful tools in the decision maker's toolbox.

Our suspicion is that statistics' bad name stems from two sources. First, many people see it as an outcropping of math—with which most of us had a less than excellent experience in high school. Second, most people who teach statistics are not themselves statisticians and, while they may come to master the technical details, they rarely grasp the underlying logic. Statistics does entail some math, but most of that math is no more complicated than being able to balance one's chequebook. The key to understanding statistics is to see it as a way of organizing and making sense of a world dominated by uncertainty. In fact, one definition of statistics is that it is the science of decision making under conditions of uncertainty.

The key to understanding statistics is to see it as a way of organizing and making sense of a world dominated by uncertainty.

It should not be used as a last resort to rationalize or support a hastily made prior decision based on intuition.

What is key for most decision makers is not to get tangled in the details of statistical analysis, but, instead, to understand the fundamental principles or logic behind the activity. Those fundamental principles are few and, generally, quite simple. Once understood, however, the principles of statistics can be used to great advantage, even if one doesn't have a detailed knowledge of the underlying math or technical aspects.

Statistics consists of two basic activities. The first is the collection of data in an attempt to describe something. The second is the use of data to help make decisions or inferences. The first activity we call descriptive statistics; the second, we call inferential statistics.

A Discussion of Measurement

We often refer to the process of observing and recording data as a measurement. What distinguishes the way statisticians view measurement from most other people is that statisticians assume all measurement contains an element of error. In other words, in the world of statistics, having something measured with one hundred per cent accuracy is more good luck than good management. From a statistical perspective, error in measurement has two basic sources: inherent error or instability, and operational error.

When we speak of inherent error or instability, we are referring to the property of the thing we are measuring. For example, if you were to ask someone to tell you on a 100-point scale how satisfied they were with their job (assuming 0 is total dissatisfaction and 100 represents total satisfaction), they might respond 71. If you asked the person the same question on several different occasions, they would likely give you a range of answers somewhere close to 71.

The reality is, most people have a general idea of their level of job satisfaction but have a hard time giving a precise number. Furthermore, while they may be mostly satisfied with their job, their exact level of satisfaction would vary according to numerous factors ranging from the time of day, to whether they just had an altercation with their superior, to the weather.

Inherent error relates to what we are measuring—e.g. a breathalyzer test, which may be affected by whether there is alcohol in your mouth.

Operational error relates to how we are conducting the measurement—e.g., a problem with the measuring device or how we read it.

While relatively stable in a range, most people's actual level of job satisfaction is inherently unstable.

The same applies to breathalyzer tests. Breath analysis is by far the most commonly used method of testing for blood alcohol (BAC) in impaired driving cases. Assume a police officer takes two separate readings from a driver he has just pulled over. He will likely get different BAC levels between the first and the second reading depending on whether the driver had just burped or vomited; if there was electrical interference from a cell phone and police radio; or if there was tobacco smoke, dirt, or moisture in the environment.

Consequently, from a statistical perspective the BAC level is inherently variable.

To the notion of inherent variability, we can also add operational error. Perhaps the police officer forgot to perform a manual calibration check on the device. The battery was not fully charged. The device was improperly used. The breathalyzer forms were not completed correctly. There was an error in copying down the results, 0.8 instead of 0.08., or between testing the BAC and recording it the officer forgot the actual number.

The point is that, try as we might, it is generally difficult, if not impossible, to have totally accurate measurement. Believing we can do so is simply fooling ourselves. Furthermore, for most situations, "close" is good enough. What does it matter if the BAC is 0.08 or 0.085? One thing that makes statistics powerful is that statistics assumes some error will appear in our measurement.

What is also great about statistics is that, when used appropriately, we can estimate how much error exists in the measurement process.

From the statistician's perspective, people who believe that total accuracy in measurement is possible are like ostriches with their heads in the sand.

It is far better to admit that error in measurement is everywhere, so why not admit it and try to get an estimate of the size of that error? How can we do that? The answer is that we need to either take several measurements of the same item, or to measure several items assumed to be the same.

From the statistician's perspective, people who believe that total accuracy of measurement is possible are like ostriches with their heads in the sand.

Descriptive Statistics

Remembering the characteristics of a single item is relatively easy, whether that item is a person, an event like the eclipse of the moon, or the colour of one's motor vehicle. Similarly, most of us can easily recall the characteristics of several items. The larger the number of items becomes, however, the more difficult it is for us to remember the individual items that make up the group. For example, we may recall the ages of all of our colleagues in a police station. Recalling the age of all police personnel in a region is virtually impossible. If we want to be able to say something about the ages of police officers in a region, we need to somehow aggregate or summarize the data. This is where descriptive statistics come into play.

What descriptive statistics do is summarize the characteristics of a group so that we can make sense of a mass of information. Even if we could remember them, listing the ages of 600 police men and women is not a very useful exercise. Descriptive statistics allows us to identify certain useful characteristics of the list. Often, the first two things we want to know about a list or bunch of observations are what is typical and how much variability is there?

The most common measure of typicality is the arithmetic average or mean.

> Descriptive statistics summarize the characteristics of a group so we can make sense of a mass of information.
>
> We may measure *typicality* by determining the average or median age in the group.
>
> We may measure *variability* by determining the youngest and oldest ages in the group, the spread of ages within the group, or how much the results deviate from the average.

We might find, for example, that the average police officer in our region is 38 years of age. Other measures of typicality include the median and the mode. The median is that point in the age distribution below and above which half of the ages fall. The median age might be 35. In other words, half the police officers in our region are above age 35 and half are younger. The mode is another term for the most common age. The mean, the median and the mode are the most commonly used measures of typicality. We can also think of those measures as a central anchor point for the list or distribution of ages.

Measures of variability give us an idea of how widely a bunch of measures range or vary. It is one thing to know that the average age of a police officer in our region is 35; it is something else to know that most are between the ages of 30 and 40 as opposed to 25 and 50. The most common measures of variability are what we term range statistics and variance statistics.

Range statistics are simple measures of the distance between two points. For example, among our police officers, the youngest may be 24 and the oldest 58. The range would simply be 58-24, or 34 years. This range measurement is based on the difference between the minimum value in the distribution and the maximum value. Min-max ranges are interesting but can sometimes be misleading. For example, the oldest person in a region might be 65 while most of the other "elderly" employees are less than 55. Here, we sometimes call the 65-year-old an outlier.

To deal with distributions that have the odd extreme case, we sometimes use a statistic known as the interquartile range. To get the interquartile range, we need to figure out the age of the person who is at the 25th percentile point of the distribution, and the age of the person who is at the 75th percentile. The interquartile range is simply the difference between those two numbers. Again, like the min-max range, the interquartile range gives us an idea of the spread of the ages.

Besides ranges, we often use statistics known as variability statistics to give us some notion of how the data are spread or disbursed about the measure of central tendency. The two most commonly used variability statistics are the variance and something called the standard deviation. At first sight, these statistics may appear a little daunting but conceptually, they are quite simple. The key in understanding them is not to focus on the math but to consider the underlying ideas.

See the following pages for examples of typicality and variability.

An Example of Typicality

Even simple descriptive statistics can be useful in decision making. Let's examine the number of robberies in two neighbouring town over a week (7 days). The reported offences for each day are shown in the accompanying table.

	Day	Town A	Town B
	Mon	10	9
	Tues	11	16
	Wed	8	7
Median Point	Thurs	9	7
	Fri	9	8
	Sat	9	7
	Sun	5	7
Sum		61	61
Mean		9	9
Median		9	7
Mode		9	7

For measures of typicality, we can calculate the average or arithmetic mean, the median and the mode. The average or arithmetic mean is simply the sum of the robberies divided by the number of days. The median is that point below and above which 50 per cent of the numbers fall. The mode is the most commonly recorded response time.

The data in the boxes represent the actual numbers of robberies. Even from this limited amount of information, there are several points of interest. First, both stations have a total of 61 robberies in a week. This resulted in an average robbery rate of 9 robberies a day. Examining the numbers, however, it appears that Town B had one day when there were 16 robberies. In statistical language, we call exceptional values such as this outliers. The arithmetic mean is very sensitive to outliers. This is easy to visualize if we replace the 16 with a value of 30. All the other values stay the same but the mean would shoot up to 10.7 robberies.

A measure that is much less sensitive to outliers is the median (or midpoint, as it is sometime called). As we have noted, the median is the value that breaks the distribution into the upper and lower 50th percentile. In the table, the median or midpoint is 9 which coincidentally fall on Thursday, the middle day of the week. For Town A, the median or midpoint of the distribution is 9 and for Town B, the median is 7.

That Town B has a lower median than mean is a consequence of the fact that, except for the outlier value of 16 robberies, Town B generally has lower numbers of robberies than Town A. Because we are only dealing with a few values, this is easy to see. It would be less obvious with a large data set. Regardless, the principles hold.

An Example of Variability

In this example, we will use the robbery data from the previous box. We have seen that the typical or average robbery occurrences are about the same for both stations. However, looking at the raw data suggests that there might be more variability in the occurrences in Town B times as opposed to Town A. The fact that the mean and the median were slightly different provides numerical support for this view.

	Town A		
	Robberies	Deviation from Mean	Deviation Squared
Mon	10	1	1
Tues	11	2	2
Wed	8	-1	1
Thurs	9	0	0
Fri	9	0	0
Sat	9	0	0
Sun	5	-4	16
Mean	9	0	2.7
	Town B		
Mon	9	0	0
Tues	16	7	49
Wed	7	-2	4
Thurs	7	-2	4
Fri	8	-1	1
Sat	7	-2	4
Sun	7	-2	4
Mean	9	0	9.4

One measure of variability is the range. Town A's robbery rates go from a minimum of 5 to 11, providing a range of 6. Town B's robbery rates go from a minimum of 7 to a maximum of 16, providing a range of 9.

Another two commonly used measures of variation are the variance and the standard deviation. While seemingly complex, these measures are conceptually simple. In the second column of numbers, we have subtracted the mean from each individual response time. For example, in Town A, the first deviation is 10-9=1. We do that for each individual robbery.

In column three, we simply square the deviations from the means (that is, multiply the value by itself). When we do this for all of the observations, we discover two things. First, the average of the deviations from the mean is zero. This will always be the case because the mean is in the "middle" of the distribution and the positive deviations will cancel out the negative ones. That is why we calculated the third column: the squared deviations.

The mean or average of the squared deviations is known as the variance. The variance for Town A is 2.7 and for Town B it is 9.4. This suggests that there is much more variation in the robbery rates of Town B than for Town A. The variance is a statistic that is used a great deal. In slightly more advanced statistics, our goal is to try to explain why there is more variance or variation in one set of numbers than another. Perhaps, across the two towns, the level of economic prosperity is substantially different. The difference might also be due to variations in the effectiveness of policing. Those are notions or hypotheses we might want to test.

Since squared values generate big numbers, we often compare the square root of the variances. This brings the values back to the size of the original measurement (raw numbers as opposed to squared ones). The square root of the variance is known as the standard deviation. The standard deviation for Town A is 1.6 and for Town B it is 3.1. This suggests that the variation in the robbery rates in Town B is nearly twice that of Town A.

An Aside

We can also use variance statistics as an estimate of how much error in measurement exists. For example, two people may take 25 minutes on average to complete an activity. The variance for one person might be eight minutes and for the second person three minutes. Based on the average both people appear equal in performance, but the variance measures suggest that the second person is much more consistent and, in that sense, better. From a management perspective, the interesting question is why one person is more consistent in their performance than the other.

Subsequent investigation may show that the first person has to perform the action under a variety of conditions while the second faces fewer environmental challenges. It may also be that the first person lets things "slide" for a while and then turns on the juice to get the numbers back up to an acceptable average.

Regardless, knowing differences in variances can sometime tell us more than simply knowing differences in averages or central tendency.

Inferential Statistics

The second leg on which the discipline of statistics stands is what we term inferential statistics. Inferential statistics help us to draw conclusions and make decisions. Unlike for most descriptive statistics, the math behind inferential statistics can get complicated. Consequently, we will restrict our focus to the logic underlying inferential statistics and examine how they can be used to help us make decisions. Learning inferential statistics by oneself from a book is typically not easy.

For readers who have no background in the area, it might be worthwhile investing is a one-semester course in a local college. Otherwise, understanding the concepts is sufficient; just leave the details to an expert.

Inferential statistics are used for many purposes. However, the two primary ones are to be able to estimate or infer the characteristics of a population from a sample, and to estimate whether significant differences exist between two or more populations or samples.

Population Estimates

Let's start with the issue of making inferences from samples of populations. If we wanted to know the proportion of the population of a city that uses burglar alarms, we could contact each household and pose the question. Collecting information from everyone in a jurisdiction is known as conducting a census. In a city of 300,000 households, that could be an expensive and time-consuming proposition. That is why censuses are done only rarely and under limited circumstances. Fortunately, early in the twentieth century, statisticians figured out how to estimate the characteristics of the whole (a population) from a sub group or sample.

The key to being able to do this, however, is in the way in which the sample is drawn or collected from the population. Essentially, "any old sample" doesn't cut it. The sample has to be taken from the population in a particular way. There are some variations on the theme, but let us keep this simple and consider the basic case. What we want is something statisticians call a simple random sample. A simple random sample is one where each household in the population has an equal chance of being selected, and that chance of being selected is independent of the other selections. Let us break that down into the constituent parts: random selection, equal chance, and independence.

Random selection

This implies the households in the sample are chosen using a chance mechanism – things like coin tosses and computer random number generators. In other words, someone cannot choose the households based on availability or door colour. Random selection implies that a listing of households (say a city directory) exists where the households are listed or numbered from 1 to 300,000. For a sample of 1,200 households, we would use a random number generator to give a listing of 1,200 numbers between 1 and 300,000. Once we have those numbers, we would then identify the households that hold those positions or numbers on the list.

Equal chance

This implies that each household has the same chance or likelihood of selection. Lists with duplicate addresses or lists that omit certain a type of household (say, all apartments or all households in a particular neighbourhood) mean some households either have a greater likelihood of selection, or no chance of selection.

Independence

This implies that the selection of one household does not determine or affect the selection of another. For example, the person selecting the sample might notice two houses on the same block or two houses next to each other appear on the list. Thinking they might be too much alike, the researcher drops one household in favour of another selection. That is not acceptable. The selections that appear must be included despite anything else.

If we follow these rules, then estimating the characteristics of the entire population from the sample is possible. Some other things need to be considered, such as the size of the sample, but those are details that are best discussed with a professional. If we follow the basic rules outlined above, we can estimate what proportion of the population of households that have burglar alarms within a given likely range.

In other words, the sample estimate will be close to what actually exists in the population but will probably not be the exact figure. What differentiates statistical sampling from other procedures, however, is that it is possible to estimate the range within which the population figure will likely fall. Thus, we could conclude that the likely proportion of homes with burglar alarms we would see is X percent within plus or minus Y percentage points in, say, 19 surveys out of 20.

The uninitiated often disparage statistical estimates for not being able to provide exact values. But, as we discussed earlier, the fundamental assumption in the world of statistics is that all measurement entails error, so the best we can do is come up with a point estimate and a reasonable notion of its level of accuracy. This is something no other procedure can do. With a statistical estimate, you get an idea of whether an estimate is precise enough to be useful or too variable for practical purposes.

Many different ways of generating estimates are available, but you have no way of knowing if they are close to the actual value in the population or somewhere out near the planet Mars.

Significant Differences

Another primary use of inferential statistics is to be able to estimate whether two samples are similar or different. For example, over a year, a Police Chief might wish to know whether differences in response times exist across police stations. Typically, data such as response times are collected though an automated dispatch system. At the end of a period, calculating the mean or average response time is possible. As discussed earlier, the mean value will be an estimate based on error-prone data and there will be a distribution of values around that estimate. Thus, the question is, if the response time of one department is eight minutes and another one is nine, does that one minute difference reflect a real difference or is it simply within the realm of possible measurement error?

Some differences are big and substantively meaningful and do not require statistics to help us make a decision. For example, if the difference in response time were 10 minutes, then we know a real and important difference exists. However, when we get to one minute, it is not clear that the difference is real or just within the realm of normal variability.

What statistics can do is let us know whether that difference is within or outside that range of normal variability. If it is outside, then we say that the difference is *statistically significantly different.*

We should note, however, that just because something is statistically significantly different, it does not necessarily mean that it is substantively different. On the other hand, if something is not statistically significantly different, then we should assess the difference as being within the normal range of variation and, consequently, not substantively significant either.

Inferential statistics are of even more use when we have multiple comparisons to make. Typically, a large city may have 10 or more police stations. Are the differences across all 10 significantly different? More advanced techniques can help us to figure out what factors might be related to those differences. That brings us to our final topic in this chapter and that is the role of statistical modelling.

Statistical Modelling

For most decision makers, the real power of statistics lies in the ability to model social, natural and mechanical processes. Statistical models allow us to examine complex issues where multiple factors might affect a particular outcome. For example, statistical models have been used to model response times to incidents allowing for traffic and weather patterns. Based on the result of those models, an optimal placing of police vehicles and patrol routes can be determined. Models can also be used to find whether changes in the number of personnel dispatched or whether certain patrol patterns are more effective than others.

Similarly, the physical and socio-demographic characteristics of neighbourhoods can be used to model which neighbourhoods or what types of dwellings are most likely to experience burglaries or break-ins. Currently, one of the more active and dynamic areas of modelling is in predictive policing. Predictive policing is the application of analytical techniques, particularly quantitative techniques, to identify promising targets for police intervention and prevent or solving crime. Predictive policing can offer several advantages to law enforcement agencies.[1] It does not replace traditional policing. Instead, it enhances existing approaches such as problem-oriented policing, community policing, intelligence-led policing and hot spot policing.[2]

In statistical modelling, most of our focus is on trying to explain variation. Thus, we go back to one of our basic statistical concepts—that of the variance. So, for example, we might ask: What are the factors that likely affect the different variations in response times for the same call types between Detachment No. 1 and Detachment No. 2? Based on the outcomes of those and other modelling exercises, it is possible to identify what form of intervention works and what doesn't work. Improving the allocation and efficiencies of their resources is also possible for decision makers. Whatever the complexity of the model or underlying process, statistical analyses help us to figure out many useful results with an estimable level of accuracy.

Among the key questions we can address with statistical modelling are the following:

- Does the overall model accurately reflect the process we are trying to describe or emulate? In other words, is it statistically significant?
- How much of the variation in the outcome factor is explained by the model?
- Which elements in the model are statistically significant and which are not?
- What is the relative impact or rank ordering of various components of the model on the outcome factor?
- Are those impacts large enough to be meaningful from a substantive or policy perspective?
- How do the various sub components in the model interact with one another as to their impact on the outcome?

As we indicated, statistics is not the magic bullet for all decision making. Used appropriately, however, statistical techniques can provide a great deal of insight into the questions we are examining.

Decision making is a complex process, and the best processes are those where we use the many tools at our disposal to help come up with an answer. Often, trade-offs have to be made. Something may be statistically significant but not substantively significant. Similarly, just because one choice is more effective than another does not mean that it can be justified socially or economically. Regardless, knowing whether something has a "real" impact or not is a good starting point.

Notes

1. "Predictive Policing: Forecasting Crime and Law Enforcement." Research Brief RAND Corporation. http://www.rand.org/content/dam/rand/pubs/research_briefs/RB9700/RB9735/RAND_RB9735.pdf
2. "Predictive Policing, National Justice Institute" http://www.nij.gov/topics/law-enforcement/strategies/predictive-policing/Pages/welcome.aspx

Experimental Designs

How Do We Know What it Means?

A basic notion underlying this book is that making decisions based on evidence has advantages over other forms of decision making. By evidence, we are referring to observable and measurable "facts" or data. While we argue that it is generally a good thing to have facts, a single fact or bit of data or piece of information is fairly meaningless in itself. The reason for this is that *nothing has meaning except in comparison with something else*.

For example, assume you are on a trip to India and you see a pair of shoes on sale for 2,859 rupees. If you are not familiar with prices in India, you might ask yourself whether this is a good value or not. The "fact" that the shoes are 2,859 rupees is irrelevant to you unless you have something with which to compare it. That comparison might be with another product or with the average hourly wage in India or with the equivalence in another currency. Currently, 2900 rupees is approximately equivalent to $50 Canadian. It is only by making a comparison that the relative value of the shoes takes on meaning.

To understand the meaning of a fact, we need an appropriate point of comparison.

Similarly, your department might have an overall crime clearance rate of 40%, with a rate of 70% for violent offences. At a city council meeting, the question is raised as to whether these are acceptable performance rates. The average citizen might have expectations that at least 90% of all crimes result in charges being laid or being otherwise cleared. By referring to national data reported to Statistics Canada, it can be shown that the overall clearance rate in Canada is about 60% for violent crimes and about 40% for crime overall. By making this comparison, it is clear that your department is performing on par with the rest of the country for overall crime, and somewhat better when addressing violent crime.

The point being made is that to understand the meaning of a fact, we need an appropriate point of comparison.

Within the framework of evidence-based decision making, a key question we have to ask ourselves is: What is the most appropriate point of comparison? A complementary question might also be: What is the best way in which to make that comparison? The answer is to use a standard framework that program evaluators and applied scientists call experimental designs. Experimental designs are simply different approaches to helping us make an appropriate comparison.

The remainder of this chapter will focus on some basic experimental designs that we use to assess the value of information or data related to a question about which we need to make a decision. In applied research, designs can become very complex. No matter the complexities of the design, however, there are a few fundamental principles that underlie the value or the merits of the design.

The "Counterfactual"

When we do or observe something, the question is: What would have happened if the event had not occurred? What if the Axis powers had won World War II? What if the party in power had not won the last election? What would have happened if insurance companies provided police services instead of municipalities? The comparison is with some theoretical model. It cannot give us proof of something, but as a mental exercise, it forces us to identify the important elements of a policy or program. What are the relevant or active components that are making the difference or that we expect to have an impact? These ideas, which are counter to the existing outcomes or facts, are called "counterfactuals."

Einstein referred to this mulling of counterfactuals as *thought experiments*. Thought experiments consist of conducting an analysis in our heads to think through the potential impacts and consequences of a particular event or outcome. What differentiated Einstein's thought experiment from simple fantasizing or theorizing is that he also focused on how we might test the thought experiment using real situations and observable data.

As an example of a thought experiment, we might consider the issue that police performance is affected by the level of stress caused by the nature the job content; for example, the perceived risk, long hours, shift work and level of responsibility and accountability.

We recognize that these elements can be stressors, but do they in fact affect one's level of performance? In our thought experiment we might consider other factors such as organizational stressors.

Experience tells us that other factors can affect job stress levels. Perhaps it may not be the nature of police work that generates the greatest amount of stress for police officers. Instead, it is the characteristics of the organization and behaviors of the people in them that may produce stress. Maybe it is the lack of rewards or recognition for a job well done that is affecting the job performance. We should also consider other job-context stressors that are likely to create stress in the police *milieu*—organizational structure and various aspects of organizational life (such as coworker relations, training, resources, leadership and supervision, and internal affairs).[1] Through this thought experiment we conclude that job content is not the sole causal link to job stress levels, but that other stressors such as job context are strong contributors.

What Makes Up Good Evidence?

When we engage in evidence-based decision making, the fundamental question is: What makes up appropriate evidence? If we think of science as a mechanism for finding the "real" explanation of something, then thinking of it within the context of a court case makes sense. In the courts, as in science, there are varying amounts of evidence provided.

> What makes sense logically does not always work out in the observable world. What we need is hard evidence based on repeatable observations.

Even if it is fundamentally true, we perceive some evidence as more valid, more reliable and more relevant than others. So it is in science. Good evidence stands up to the rigours of a good cross examination. Still, what makes up good evidence?

One characteristic of good evidence is how rigorously people have tested it. Within the framework of science, the basic mechanism for testing an idea is the experimental design. Experimental designs are physical applications of logic, so let us examine the logic underlying experimental designs.

Assume for a moment that we wish to assess the impact of burglar alarms on home break-in rates. One approach would be to take a community and install burglar alarms in all residential homes. We could then see if a difference existed between the break-in rates before and after the introduction of the alarms. Unfortunately, any difference might be the result of other factors (recall our previous discussion of spuriousness).

For example, by coincidence, home break-in rates might have dropped due to a decrease in the number of young people in a neighbourhood, or a more positive job market, changes in police patrolling, or perhaps due to a more active neighbourhood watch program. We know all of those factors are related highly to home break-in incidences.

Ideally, we would like to be able to observe the same community with and without burglar alarms simultaneously. In other words, we would assess the effect of a burglar alarm program based on the difference in outcomes for the same community with and without participation in the program. Nevertheless, we know that this is impossible. Something cannot be in two states at the same time. At any moment the community either participated in the program or did not participate. The inability to observe the same entity in two different situations simultaneously is known in science as "the counterfactual problem." That is, how do we measure what would have happened if the other situation had existed?

If we cannot assess what would have happened if the opposite or counterfactual situation occurred, then how can we decide if burglar alarms have an impact and not something else? The approach scientists and program evaluators take is to find a comparison group that is as close to the treatment group as possible.

The inability to observe the same entity in two different situations simultaneously is known as "the counterfactual problem." That is, how do we measure what would have happened if the other situation had existed?

How close that comparison group is to the treatment or experimental group determines how much credibility we can have in our results.

There are many ways of finding or creating comparison groups, some of which are better than others. The adequacy of a comparison group is something that evaluators spend much time and energy considering.

For example, we might find a "sister" community not far from the target community and use that as a comparison. On the other hand, we might decide to hand out burglar alarms to every second residence, or to residences on the south side of the community but not on the north side. We might even consider comparing our target community with all of the other communities in the province or region. All of those approaches can provide a point of comparison against which we can judge the potential impact of burglar alarms in the target community.

The problem, however, is that all of those options have possible limitations. Some conditions or circumstances make the target and the comparison group inherently different. Sometimes we can see those differences. For example, in selecting a "sister" community, it may be that the residences in that town are older and tend to have a poorer overall security design. That might be an obvious difference, even to a casual observer. Often, however, the differences are not obvious.

The remainder of this chapter will focus on the different ways we might identify valid comparison groups to accurately reproduce or mimic the counterfactual. Identifying such comparison groups is the crux of any impact evaluation, no matter what type of program we are evaluating. Simply put, without a valid estimate of the counterfactual, we cannot establish the impact of a program with any degree of certainty.

Comparisons With Targets (The One-shot Test)

One of the simplest designs we have is to compare our population of interest with a particular goal or standard. Often, policy guidelines are based on legislated standards or targets set from studies of best practices. Targets can vary according to the context. For example, a community might target a 20 per cent reduction in traffic accident incidents over a five-year period. A parts manufacturer may implement a six-sigma regime, where one expects that fewer than 3.4 defective parts per million will be manufactured. Human resource policy may also dictate that organizations should strive to hire a certain percentage of individuals belonging to minority groups.

The key, then, is to compare our population of interest with a target that is theoretically doable or achievable. Once we implement an action, the question becomes whether we have met the target or goal. If we achieve the target, we have reason to believe that the action (which is generally a policy or program implementation) has been successful. Of course, we will use a statistical procedure to help us determine whether we are close enough to the target to be equal to the target.

The methodological literature sometimes calls this approach the one-shot test. That is, an action, policy or program is carried out, compared with a standard and, if it meets the standard, we generally assume the action was successful. The evidence might seem reasonably convincing. Unfortunately, one-shot tests have their limitations. We can see one major limitation in the following example.

The one-shot test does not account for alternate explanations for a result.

Example: One-shot Test

Suppose a community has an overall reported crime rate of 3,000 per 100,000 population and wishes to reduce the rate by 20 per cent over a three year period. The Police chief decides to initiate a Neighbourhood Watch program as it is seen as a cost-effective strategy that centers on citizen involvement in fighting crime. Three years later the crime rate has dropped to about 2,400 per 100,000 which is equivalent to the desired 20 per cent decrease. Can we infer that the watch program is behind the reduction in crime? It would seem so and the evidence seems compelling.

In fact, an alternate explanation might exist. The campaign generated substantial publicity in the local press. Police and volunteers went door-to-door distributing pamphlets. Online campaigns were launched advising home and business owners how to safeguard their residences and buildings with simple, cost-effective measures. The rise in the use of cell-phone technology and social-media made the citizens feel more secure as they are able to contact the police more quickly when they see a crime occurring or when they witness something suspicious. Because of the publicity, people in the community became more aware of the need to be more vigilant and made changes in their residences and dwellings. Some installed closed-circuit televisions, reinforce locks and security mechanisms on their doors, windows and other access points.

In other words, by heightening awareness of crime in the community, members took actions that would have reduced the likelihood of crime regardless of whether they had participated in the program or not. The point here is not to argue that the Neighbourhood Watch program does not work in reducing crime. The point is that there may be alternate or coincidental explanations as to why the target was met. How much credibility those alternate explanations have depends on different factors. First, does it make sense logically that the alternate explanations might hold? If previous publicity campaigns resulted in no noticeable impact then we might wish to stick with the Neighbourhood Watch program as an effective mechanism. On the other hand, if publicity campaigns in other communities had resulted in substantial drops in crime rates, we might be more supportive of the alternative explanation. A further explanation might be that crime rates were declining overall for a variety of reasons, such as a change in demographics, or an increase in community support centres, overall heightened awareness, decreases in drug addiction rates, and so on. Consequently, the crime rate would have declined regardless.

Before-and-after Designs

A variation on the one-shot or target design is the before-and-after design. Again, we have a group or community of interest where we are looking to make an impact. We measure the situation beforehand, apply some intervention and then look at the outcome later. The assumption here is that any difference between the after and before results is due to the impact of the intervention. Unlike the one-shot design where the comparison is a policy goal or target, the implicit comparison in this design is the after results with the before baseline.

The before-and-after design shares most of the strengths and weaknesses of the one-shot design. Specifically, we can never be sure if it is the intervention that had an impact or simply some coincidental effect. For example, a jurisdiction might want to reduce the automobile accident rate among young drivers. The way they decide to do this is by dropping the legal Blood Alcohol Concentration limit from .08 to .05 for drivers under the age of 25. Examining the data from the three years before the introduction of the legislation with the data from three years after, an evaluator notices that accident rates have indeed dropped for younger drivers.

Again, we might consider the change in legislation to be the precipitating factor. On the other hand, it is possible that rates of drinking and BAC levels among young drivers have not changed. The difference is simply due to the increased vigilance of the police, who are targeting younger drivers in an attempt to enforce the new legislation. It is likely similar police vigilance without the change in legislation would have produced similar results. That is, the important factor is not the legislation, but simply enhanced surveillance by the police that serves to act as a general deterrent to young drivers.

Looking Past the Limitations

The limitations of these designs do not mean the evidence collected is irrelevant. We would have good reason to believe the results if we impose these interventions in many communities and under different circumstances with similar outcomes. Also, carrying out an intervention and then revoking it can tell us a lot. If the intervention results in the desired outcome and the revocation results in a return to the original baseline, then we have a more powerful argument that the intervention is the causal factor. What we need to remember is that evidence is rarely absolute. It has varying degrees of reliability or credibility associated with it. Just as in the courts, some forms of evidence are more credible than others.

Given the inherent weaknesses of these designs, we might ask what approaches we can take to address the problem. So far, the gold standard among evaluators and scientists is what we term the *classical experimental design.*

The Classical Design

A rule of thumb in science is that nothing is perfect and certainty is an elusive goal. On the other hand, a lack of certainty in one's death is rarely a reason for playing Russian roulette. Similarly, a one per cent risk that one will lose all of one's assets in the stock market generally results in a different form of investment behaviour than if the risk is above 80 per cent. So, if we do not have perfection, what is the current ideal or gold standard for experimental designs?

To date, evaluators and scientists have relied on the two-group, before-and-after design to provide the most valid and the most reliable evidence. We start with the before-and-after design mentioned above. We then complement it with a comparison or control group that serves as the counterfactual. In other words, we have one group exposed to a treatment and one group that is not. If the group exposed to the treatment exhibits a significant change and the comparison group does not, then we have very strong reasons for believing the intervention had an impact.

The key to the strength of classical design experiments is to ensure the comparison (control) group is equivalent to the experimental group.

The key to the strength of this design is to ensure the comparison group is equivalent to the experimental or treatment group from the outset. This harkens back to our earlier discussion of the counterfactual where, ideally, we would like to see the same elements exposed to the treatment and not exposed simultaneously. This situation is physically impossible. However, we can ensure that both the treatment and comparison groups are initially as alike as possible. How do we do this?

One way is to take pairs of identical people (or communities or what have you), and divide them into two groups. However, unless the pairs are exact clones, we can never be certain that they are identical on all relevant characteristics. Fortunately, while we can rarely work with clones or identical matches, we can divide subjects into two statistically equivalent groups. As we have noted previously, statistically equivalent does not mean truly identical, but it does mean that, on average, no statistically significant difference exists between the two groups. In other words, for all practical purposes, they are close enough to being identical.

The method for ensuring statistical equivalence is to take an initial group and randomly assign the members to the treatment and the comparison groups.

By random assignment, we mean using something like a coin flip (with a fair coin) or a random number generator to make the assignment. With a large enough initial group, the resulting two sub groups will be statistically equivalent. That is to say, any significant differences among individuals across the groups will cancel themselves out. To a point, the larger the initial group, the more equivalent the two sub groups will appear.

Any systematic factors that might affect the outcome (beyond the intervention) will be distributed across the two groups. Thus the two sub groups will be the same on all relevant characteristics, except that one is exposed to the intervention or treatment and the other is not.

Avoiding Sample Selection Bias

The key to having a strong classical design is for the researcher to conduct the random assignment to the experimental and comparison or control groups. Situations where we have not randomly assigned subjects to treatment and comparison groups have the potential for what we call sample selection bias. What this means is that the treatment and comparison groups might differ on a relevant factor. For example, we might conduct a study of residences that have burglar alarms with those that do not.

If crime rates are lower in residences where the residents have installed burglar alarms, it may not be that most or all of the difference in the lower crime rates is due to the burglar alarms. It is quite possible that people who install burglar alarms are more conscientious then people who chose not to do so. In other words, those who installed alarms are also the same people who have taken care to install high quality locks or window bars, and are active volunteers in the Neighbourhood Watch.

Usually, any situation where people or subjects volunteer or select into the treatment group should be considered suspect. Subjects often volunteer for a program because they are more motivated or see the treatment as potentially more beneficial. Sample selection bias can only be addressed if the evaluator or researcher has done a random assignment to the conditions. Having said this, it is imperative that the researcher engages in true random assignment. It is not unknown for some researchers to select those they think will be the most cooperative or most likely to succeed to be in the treatment as opposed to the comparison group.

Less Than Ideal Variations

Sometimes we cannot randomly assign members of a group to policy or program intervention and others to the control. A situation where this often arises is when governments decide to legislate policy. By their nature, social policies are implemented throughout a jurisdiction and not randomly assigned within particular areas. What happens, for example, if the province of British Columbia wishes to introduce a new set of response standards? Obviously, we can apply the before-and-after model, but we know that has limitations. Are there ways of using the framework of the classical design to overcome those limitations?

Matched Comparison Designs

The answer is, some approaches are less ideal than the classical model but perhaps more convincing than simply using the before-after approach. Since we have no ability to randomly assign jurisdictions to different response standards, one approach is to find potential clones. That is, jurisdictions with different standards that we know (or, more likely assume) to be similar in all or most relevant aspects. For British Columbia, we might consider choosing Washington and Oregon States, and the Province of Alberta as comparators.

The assumption here, of course, is that these jurisdictions have different response standards but have similar geographical and socio-demographic characteristics to British Columbia.

We call this approach the matched comparisons procedure. We attempt to find matching jurisdictions that are as similar as possible to the experimental one(s) to provide a relevant control group. Again, the issue of sample selection bias might arise, since there is likely something different about jurisdictions that decide to implement a policy over those that do not. Just as with the simple before-and-¬after approach, we need to regard these results with greater suspicion than those obtained from the gold standard of the classical design.

Regardless, matched comparison designs have produced convincing evidence that certain practices are effective. Perhaps one of the best examples is the early research into the use of daytime running lights on automobiles for reducing traffic accidents. On the flip side, matched comparison studies have also suggested that some policies do not have the intended impact. A good example here is the research into the relationship between capital punishment and homicide rates.

The preponderance of the cross-jurisdictional evidence suggests that while capital punishment may assuage our feelings for revenge, it does little to reduce actual amount of homicide.

We need to make a decision and the stronger the evidence, the more likely the decision is the correct one. We could be wrong, but even wrong decisions help us know what does not work. Doing the same thing over and over makes no sense if the results do not change. When it becomes obvious that our current practices do not have the desired impact, logic suggests we should try something different. Eventually, we are likely to find something that does work. An important factor is that we must be willing to change our view when faced with contrary evidence.

Too often, we rituatlistically engage in the same behaviour even when the evidence shows it doesn't generate the outcome we wish.

Too often, we ritualistically engage in the same behaviour even when the evidence shows it doesn't generate the outcome we wish. For centuries, physicians engaged in bloodletting because, despite the evidence, it seemed to make "common sense" at the time. The fact that many patients were unnecessarily weakened by the practice and subsequently died, was not a consideration.

The Essentials

The important point behind this discussion is that how evidence is collected—the framework or design used to generate the data—is an important element in helping us determine how credible the evidence might be. Among the key factors is our prior notion that nothing has any meaning unless it is in comparison with something else.

In other words, everything needs a comparator for us to be able to make sense of it. An intervention or an action only makes sense in comparison with another action or a non-action (doing nothing). That comparator is known as the counterfactual.

Since something cannot be in two different situations at once, we must look for the most appropriate comparison. As we have seen, clones are hard to come by, so the best approach we have devised to date is the randomized experiment where subjects or objects of interest are randomly assigned to a treatment group and an appropriate comparison or control group. The randomization process helps ensure that there will be no systematic sample selection bias.

In some cases, random allocation to treatment and comparison group is not possible, so we try to create situations that come as close to that ideal as possible.

Evidence generated by these approaches should always be considered suspect but, if the approach appears sound and there are few logical alternative explanations for the effect, then we are generally willing to give the evidence reasonable weight until we find something superior.

Even with the best designed experiments, however, the results are not always equally credible. The design is one element we consider; the magnitude of the impact or size of the effect being produced is another factor. Obviously, interventions that produce large effects provide better reasons for using the evidence for a decision than small or marginal effects. But that leads us to other considerations such as cost-benefit or cost-effectiveness analyses—topics of our next chapter.

❖

Notes

1. Shane, J.M. "Organizational stressors and police performance" *Journal of Criminal Justice* (2010) p. 2. doi:10.1016/j.jcrimjus.2010.05.008

Costing Analysis

Basic Concepts

Costing analysis comes in one of two variations. The first instance deals with the costs associated with doing something. For example, the decision to purchase a vehicle involves not only the capital cost of that vehicle, but also maintenance such as the cost of repairs, consumables such as gasoline, and support costs such as insurance. Depending on the circumstances, additional support costs may arise, such as those associated with having to build a new garage or rent a parking space. If we are looking at the true cost of ownership, we should also factor the depreciation of the vehicles (hopefully, we will recuperate some capital cost when we sell it in a few years) plus the interest of the funds used to purchase the vehicle.

The other form of costing analysis is what we term a *cost-benefit* or *cost-effectiveness analysis*. In this instance, we weigh the costs associated with the decision with the value of the expected benefits. For example, a department might choose to invest in further training. The question then arises: What is the return on that investment? If the training relates to how to fight online crime in a community where the internet does not exist, the return on investment might be considered zero.

Costing studies allow us to identify the total cost of a decision and the associated benefits.

In fact, it is a straightforward cost situation. On the other hand, if the training relates to officers' health and safety matters, the returns may appear in lower accident and injury rates, fewer sick days, lower insurance rates, more efficient or productive employees and higher employee morale. We can weigh the relative value of those benefits against the cost associated with the training sessions to estimate the relative return on investment.

A fundamental idea of economics is the notion of *opportunity cost*. Assuming you have a limited budget, deciding to do one thing necessarily precludes another. For example, given a department's capital budget, the decision is made to purchase a pick-up truck. By making that choice, the alternatives—an SUV, a sedan, a motorcycle, and so on—are foregone. That is to say, the opportunity to select an alternative is no longer available. Not only is the physical choice of the next best alternative not available, we give up the benefits associated with that choice.

Costing studies help us to identify the total cost of a decision and what the returns or benefits associated with that decision might be. Furthermore, we can also examine what we consider the expected cost and returns associated with the second or third best choices, and compare those to our preferred decision. Sometimes this exercise results in our seeing a "lesser" alternative as superior to our initial preference.

Monetary costs are not, nor should they be, the only factors that we consider when we make a choice. Political and other social considerations influence how we make choices. However, monetary costs are important and are typically easy to quantify. Most products and services have a monetary or market cost associated with them. Also, social and political costs are often closely linked to economic decisions. As with formally assessing monetary costs, using the general costing framework to assess the impacts of non monetary decisions is also possible. The only difference is that in those situations, the costs and returns are often more difficult to quantify. Regardless, decision makers can and do use qualitative data to weigh the impact of those types of decisions.

No matter whether we do a straight costing analysis, cost-effectiveness or cost-benefit analysis, there are five overall steps to consider.

Steps to Consider

1. Identifying the component in the department's operating or strategic plan to which the question or analysis relates.
2. Setting out the objectives that we intend the decision to achieve.
3. Identifying the options or choices that are available.
4. Conducting a financial (cost-benefit or cost-effectiveness) analysis of the option selected or the options under consideration.
5. Preparing an accounting statement summarizing the results.

These steps may appear to be a restatement of what we have mentioned previously. This is the case. However, we need to see effective evidence-based decision making as part of a broad framework that starts with a consideration of what we are doing and why, what are the alternatives, and what evidence can we bring to bear to help us make a decision. Unless we know what we are doing and why, it is almost impossible to identify the appropriate information. Without knowing that, we may collect much data but we likely won't be collecting much evidence.

Cost Analysis

Straight costing studies involve estimating the total life cycle cost of a particular piece of equipment or service. By life cycle, we are referring to the period during which we use the product or service. For example, a motor vehicle might have an actual average life expectancy of about 12 years before it is ready for the scrapyard. A person or an organization might decide to buy a vehicle, keep it for five years and then sell it. In that instance, for the owner, the vehicle's life cycle is five years.

The key to conducting accurate cost analyses is to ensure that we include all of the appropriate costs. Generally, for equipment or capital goods, these fall into the following categories:

- depreciation,
- interest on capital,
- maintenance fees (consumables and repairs),
- licensing or regulatory costs, and
- operator costs.

While analysts will often exclude operator costs from the analysis, those need to be considered, even if the final decision is to exclude them. If the equipment is meant as a replacement component, then the operator costs would carry over from the previous piece of equipment. However, suppose a police department has decided to purchase new fleet of police cars or to include a tactical vehicle in its inventory.

The key to conducting accurate cost analyses is to ensure that we include all of the appropriate costs.

That additional vehicle may require extra personnel, the cost of whom we need to factor into the analysis.

Some of you may wonder why we have just included depreciation in our list of items instead of the initial capital cost. Here the assumption is that the piece of equipment will be sold at the end of the life cycle. Consequently, the capital cost component here is the difference between the purchase price and the selling price. This is what we call depreciation.

Different pieces of equipment depreciate at different rates, but it is common for that to be about 20-30 per cent per year. We calculate depreciation on the outstanding value, so a $10,000 piece of equipment that depreciates at a rate of 20 per cent would be worth $8,000 after the first year. The second year's depreciation would be $8,000 x .2, or $1,600. Thus, the total depreciation after two years would be $2,000 + $1,600, or $3,600, and the residual value of the equipment would be $10,000-$3,600, or $6,400.

One item often forgotten in costing studies is the interest on the purchase. Interest rates are sometimes called discount rates in the literature. The need to consider interest is generally obvious when one borrows the money to make the purchase, since the bank or financing company will include that charge. However, even where the equipment is purchased outright, we should include the "rental" value of the capital. The reason for this is that if we had not made the purchase, we could have invested the money for a given return or used it for some other purpose. This, in effect, is another form of opportunity cost.

Obtaining Reliable Cost Estimates

Whether it is the total cost of hiring someone or purchasing a piece of equipment, the key to good costing studies is to ensure we include all items, and obtain the most accurate and reliable cost estimates of those items. Because all organizations work in different environments, typically we gain the best information from experience. Looking back over your organization's financial records can be revealing. Because they reflect actual experiences, it is easy to see where unexpected costs (and savings) arose. Do not write those off as unique or one-time occurrences; put those in as line items in your analysis.

Where drawing on institutional experience is not possible, one can often obtain information from other sources.

Often, suppliers will give cost comparisons with competitors' products. Beware, however, that those analyses often selectively include or exclude "inconvenient" line items. Make sure that you are comparing the proverbial apples with apples. Where you find missing items, make sure to ask for supplemental information.

Many independent agencies also conduct costing analyses of various items. Look especially to professional or trade associations. Similarly, governments and public organizations will often make their budgets and costing studies available. Much of that can be found online or in a local library. Sometimes a simple phone call can result in a gold mine of data.

An example of a straight costing study is presented in the box on the next page. Here, we are looking at the cost of owning and operating a typical, full-size pick-up truck over a five-year period. The cost of the operator is not included in this example.

Straight costing studies are done to estimate life cycle costs to decide the affordability of a purchase. They are also useful in comparing different products. For example, one brand of pick-up might have a higher capital cost but lower maintenance costs than another. The question then becomes: Which is the better choice?

The Cost of Purchasing a New Pickup Truck for Personal Use

Three-year cost of purchasing and operating a pickup truck:

Item	Cost ($)
Purchase price	23,500
Selling price	9,500
Depreciation	18,577
Financing	3,387
Fuel	10,079
Insurance	3,471
Taxes and licensing fees	3,650
Maintenance	2,069
Repairs	821
Total cost	42,054
Cost per kilometre	0.47

Assumptions:

- 20,000 km driven per year
- 2.7 per cent APR financing cost with $2,750.30 down payment
- gas $1.25/l.
- mileage at 10.46 l/100 km.

Similar analyses can be used to decide whether it is less costly overall to purchase a used vehicle as opposed to new, or to lease as opposed to purchasing outright. Obviously, for these different scenarios, we must make different assumptions regarding expected life cycle, operating costs and depreciation. It might also be worth repeating that the values used in costing studies are generally estimates. As we discuss in the chapter on statistics, all values are estimates. The key, with a little research and experience, is to minimize the error. However, many expected items, such as the selling price of the vehicle and the actual cost of operation, are based on assumptions that are out of one's control.

We have considered the cost of capital goods but we can conduct similar analyses for personnel. The same general principles apply. Typically, we focus on a person's salary when deciding to hire someone, but ancillary costs can be substantial. When pensions, taxes, insurance, benefits and other compensation-related issues are considered, it is common for those to add an additional 15-30 per cent to the total salary cost. This is above the cost of training and maintaining the person. Maintenance costs include the person's working space and any equipment and supplies they may need to do their job. In the previous example, we noted that equipment typically needs an operator. So, too, do people often need equipment to do their jobs.

A Note on Cost-effectiveness

In the previous analysis, our attention was on the total cost of owning and operating a vehicle over its life cycle. Knowing the total cost of something is an important consideration in decision making. Often, however, knowing the total cost does not tell us the whole story. Most equipment or other items generate some form of output or product. For a car, the output is transportation. In that instance, knowing the cost per kilometre is often a more valuable piece of information than the total cost.

In the example provided in accompanying box, the expected cost of the car per kilometer is about $0.47. We term the price or cost of something per unit of output as its cost-effectiveness. While cost-effectiveness is clearly related to total cost, we should treat it as an independent issue for decision making. Often, differences in total costs might be irrelevant. It is the per-unit cost that is important. One reason unit costs differ from total costs is the fact that total costs consist of two components: fixed or sunk costs, and variable costs. Fixed costs are associated with the one-time cost of purchase. Variable costs generally relate to operating and maintenance costs. A piece of equipment may have a higher fixed cost but, if it is more efficient than a lower priced piece, it will generally have lower unit costs.

A key element in cost-effectiveness analyses is being able to identify the appropriate output measures and being able to measure them appropriately.

The same applies to personnel costs. Higher salaries to people who are more productive, who are less likely to miss work and who provide a better quality of service can outweigh "savings" accrued by outsourcing to lower-cost jurisdictions. What is important is how many items are produced, how many people are served, and the quality of that output or service.

A key element in cost-effectiveness analyses, however, is being able to identify the appropriate output measures and being able to measure them appropriately. Again, this is where examining the organization's operating or strategic plans becomes important. It is in those documents that the organization's objectives and operational purpose should be outlined. Either directly or indirectly, an organization's effectiveness is related to the product or service it is meant to deliver.

Cost-benefit Analysis

Cost-benefit analyses are generally extensions of simple cost-effectiveness studies. A primary difference is that cost-benefit analyses look at a broader range of returns on the investment. Most cost-benefit analyses include effects (benefits) that are not easily quantifiable or outcomes that have a broader social impact.

Cost-benefit analysis is grounded in welfare economics. It differs from most branches of economics since the focus in not just on decisions of consumers and firms, but on public decisions that affect the economic interests of a broader community. Consequently, cost-benefit analyses often focus on issues such as quality of life or quality of the environment. A fundamental challenge for those doing cost-benefit analyses is how to measure the benefits so they are comparable across issues. Among commodities, apples are not electrical transformers. However, a market for both exists and it is possible to place a monetary value on both. Currency is a common exchange unit that allows the producers of apples to purchase transformers even when the producers of transformers have no interest in exchanging their product for apples.

The difficulty with many public goods and services is that there is no open marketplace in which the monetary value of those items is established.

Moreover, for ideological reasons, many people refuse to assume a monetary value on public goods. A common refrain, for example, is that "You can't put a price on the environment" or "You can't put a price on a human life." The fact is, we do both. The problem is that no independent or indifferent market exists to set those prices. Regardless, this is an essential weakness of cost-benefit as opposed to straight costing analyses.

Revealed and Stated Preferences

While the philosophical issue of whether you can truly value a human life may not be answerable, welfare economists have two broad tools at their disposal. They term one approach the revealed preference method. Revealed preferences relate to how people actually behave when confronted by a qualitative phenomenon. For example, comparing a particular piece of real estate with similar ones could reveal the "eyesore value" of having a fire hydrant on a front lawn. How much parents value education for their children might be suggested by what proportion of their income they are willing to spend on a child's tuition.

The second tool in the economist's repertoire is what we call stated preferences. Stated preferences are just that: what someone is willing to tell you they would pay for something.

We may judge people's value of environmental elements, for example, by how much of a tax increase they are willing to support for clean air or nature conservatory initiatives. Typically, stated preferences are determined through surveys and similar procedures.

While both stated and revealed preferences have their merits, both have their limitations. Using how much life insurance a person has to assess how much they value their lives might appear like an excellent revealed preference. However, how much they can buy is limited by how much insurance they can afford. Furthermore, a person may value their life highly but not be willing to see relatives "benefit" from their death since life insurance goes to the beneficiary and not the insured. Stated preferences on various aspects have been studied extensively by sociologists for the past century. Their overwhelming conclusion is that what people say and what they do varies considerably.

Still, cost-benefit analysis is one of the few techniques we have to assess the broader impact of various policies and programs. It helps us to clarify the issues, identify the constituent components, and bring some evidence to bear on the issue. It has gained general acceptance in the public sector and is mandatory in many government shops. For example, the Treasury Board of Canada has mandated that any regulatory framework put in place by the federal government must be based on a cost-benefit analysis.

We can use cost-benefit analysis to:

- decide whether a proposed project should be undertaken
- decide whether an existing project should be continued
- choose between alternative projects

The purpose is for "departments and agencies [to] assess regulatory and non-regulatory options to maximize net benefits to society as a whole. Hence, all regulatory departments and agencies are expected to show that the recommended option maximizes the net economic, environmental, and social benefits to Canadians, business, and government over time more than any other type of regulatory or non regulatory action."[1]

In summary, we can use cost-benefit analysis in various ways. For example, to:

- decide whether a proposed project or program should be undertaken;
- decide whether an existing project or program should be continued; or,
- choose between alternative projects or programs.

Components of a Cost-benefit Analysis

In setting up and executing a cost-benefit analysis, several steps need to be followed. These include:

1. Define the problem.

Again, this is a statement of the issue with a link back to your operational or strategic plan.

2. Identify any constraints or limiting factors.

This is a discussion of what administrative requirements and other challenges you might face. These include a listing of financial limitations, managerial or personnel challenges, environmental and other regulations, and any other factors or "hurdles" you might need to address.

3. List the alternatives.

Every initiative has alternatives, including doing nothing or staying the course. For example, if the issue is whether to close a particular police station or not, it may be informative to looking at amalgamating with another unit, sharing space with other services such as fire services or ambulance services, or expanding the operation to incorporate other stations.

4. List the benefits.

For the alternatives outlined, what is the return on investment? Is there a monetary return or an increase in productivity or effectiveness? Perhaps, the matter is not one of generating further revenues, but one of reducing or avoiding costs. Are there health, safety or environmental benefits to be gained? The issue might be related to overall quality of life. Are there savings to be had in equipment, time or personnel?

5. How are the costs and benefits to be quantified?

Clearly, market or monetary values of goods and services are the easiest with which to work. We have already outlined the challenge of providing market values. Still, finding a shadow or proxy price for a given cost or benefit may be possible. Social scientists have developed ways to estimate the value of a human life. The cost associated with noise levels or high traffic volume in a community, for example, can be estimated by differences in housing values between noisy and quiet communities or between those with high and low traffic volumes.

Often, we can find ways of assessing the value of tough-to-monetize issues by searching the appropriate literature. We have already discussed techniques for conducting more focused online searches. Using the expertise of economists and other social scientists in local colleges and universities might also be possible.

Once we have conducted these steps, we can put a report together summarizing these elements and presenting the relative costs and benefits.

Net Present Value

As the saying goes, "A bird in the hand is worth two in the bush." So it is with money. One reason we charge interest on borrowed money is that by giving capital to a borrower, the lender faces an opportunity cost. That money cannot be used for anything else. To compensate the lender for the opportunity cost, borrowers must pay interest. For example, when you buy a locked-in savings certificate with a five-year redemption, you get back more than you invested. A $1,000 certificate invested at 3 per cent would be worth $1,000 x 1.03 x 1.03 x 1.03 x 1.03 x 1.03 = $1,000 x 1.03^5 = $1,159.

We can also consider the opposite. What would an endowment of $2,000 that you are to receive in five years be worth to you today? In other words, what would you be willing to pay for the benefit of having the cash right now?

This is the principle behind reverse mortgages. A bank or financial institution will give you a fraction of your home's value today if you allow them to sell it at market value and keep the proceeds several years hence. This is the opposite of the previous problem. In these instances, we call the interest rate the discount rate. At a three per cent discount rate, that future $2,000 endowment would be worth $2,000 x 1/1.035 = $2000 x .863 = $1,725 today.

We term this current value on a future amount its net present value or NPV. The NPV is the opposite of the future value. Since programs and capital goods have an expected life cycle, it is common to standardize costs to today's value, that is, the NPV. Another way of thinking about NPVs is to consider them as equivalent to constant as opposed to real dollars when we are trying to control prices for inflation.

In these examples, we have discussed what economists call the private time preference rate, since the focus is on an individual. Within the public sphere, the choice to invest public funds in a particular program often precludes investments in other programs of benefit to the public. Within the public or welfare sphere, economists generally call the deferred value the social opportunity cost. While the terminology differs, the underlying principles are similar.

Benefit-Cost Ratios

For programs extended over time, we need to amortize both cost and benefits. Occasionally, the duration of the costs may be different from the duration or life expectancy of the benefits. Consequently, to make things comparable, analysts will calculate the NPV of both costs and benefits.

We term the ratio of the benefits to costs as the benefit-cost ratio or BCR. Assuming the NPV of the benefits of a program is $13.5 million and the net present value of the costs is $10 million, the BCR would be:

$$\textbf{BCR} = \frac{\text{(NPV Benefits)}}{\text{(NPV Costs)}} = \frac{13.5}{10.0} = \textbf{1.35}$$

Ideally, the BCR should be greater than one. Anything less assumes that the costs outweigh the benefits and, all other things being equal, the option should not be chosen. If we chose to evaluate several alternatives, the one with the highest BCR would normally be our choice. If a program with a lesser benefit-cost ratio is selected, then it is likely that we should have included the reason for that selection on the benefit side of the ledger.

Example: Evaluation of the Effectiveness of a Police Helicopter[2]

Whether communities should have police helicopters continues to be a controversial issue in a number of North American cities. The debate ranges over a wide array of topics on which many people hold strong views. Firm opinions are held over whether helicopters cost too much, make too much noise, invade privacy or are simply unnecessary. Is the money better spent on more police officers, more police cars or more police on bicycles? Is there some rate of crime that warrants a "copper chopper" or is there some geographic size, size of population, or density of population that warrants, or not, the use of police helicopters? Is the prime purpose of a police helicopter to deter crime? Is its purpose to increase operational effectiveness? Should police helicopters be on regular patrol or should they be on stand-by, to be used only in certain situations or emergencies? Does a police helicopter save injuries and lives with respect to pursuits? Some believe that it does; others say that it does not matter because police helicopters should not exist and there should be no pursuits.

In 1999 the London Police commissioned *The London Police Service Helicopter Research Study* to evaluate whether: 1) helicopter patrols have a suppression effect on the incidence of various types of crime and occurrences (residential break and enter, commercial break and enter, auto theft, theft from auto, robbery, property damage, trespass by night, suspicious person and suspicious vehicle); and 2) to evaluate whether a helicopter would increase the operational *effectiveness* and/or *efficiency* of the police service. The London Police acquired and evaluated the use of a helicopter over a one-year period.

London Police Helicopter Cost Analysis Considerations

Breakdown of Costs

Item	Cost
Helicopter Lease: • Helicopter • Insurance • Pilot • Scheduled Maintenance • Unscheduled Maintenance • Component Reserve • Administration	$256,328.55
Spotlight Lease:	$6,026.56
Additional Equipment: • Avionics • Radio interface equipment • Siren/hailer • LCD mount • Mounts for technical equipment	$11,155.67
Cost of Installation of the Equipment:	$16,775.00
Extra Maintenance Costs Incurred: • Shop supplies • Expendables	$7,922.99
Cost of Fuel: • Total Number of Litres Used = 43,168.92	$32,820.81
Cost of Operation	**$331,009.58 or $331/hour**

Notes:

1. The purchase price of the same helicopter was $268,000 (U.S.) or approximately $400,000 (Cdn.) in 1999.
2. Because the cost of fuel can vary so much across time and space the amount of fuel is provided to make it easier to make future comparisons.
3. Based on 1,000 hours of flight time, but excludes the salaries of the Flight Officers (who are police constables) and the value of in kind and other contributions

Assumptions: Costs are based on the actual leasing and operational expenditures for the use of the helicopter for 1,000 hours over a one-year period. The benefits are measured in terms of efficiency and effectiveness. Efficiency is the monetised value of policing time that is saved by other police officers being cancelled from having to attend and by the amount of police downtime saved when the helicopter is involved. Effectiveness is measured by monetising the value of higher rates of apprehension when the helicopter is involved by taking into consideration the value of greater detective time to effect the balance of these apprehensions.

Assuming that the average cost of a constable is $50.84/hour and the average cost of a detective is $55.17/hour, the table below outlines the cost of efficiency and effectiveness based on the total number of hours.

The table below shows that the apparent level of efficiency over the 672 occurrences amounts to a savings of 15,321 minutes or 255 hours.

Table: Apparent Time Saved When Helicopter is Involved in Various Types of Occurrences

	Helicopter patrols		Service as a whole			
Type of Occurrence	Total Number of Occurrences	Average Officer Downtime (min.)	Total number of occurrences	Average Officer Downtime (min.)	Number of Officers Involved (helicopter)	Apparent Helicopter Efficiency (min.)*
Assault	14	76.00	958	89.2	32	422
Weapons	37	69.11	367	104.5	198	7,007
Domestic IP	16	50.11	2,862	69.00	74	1,398
Missing Person IP	25	67.96	1,723	79.00	88	980
Noise IP	21	24.76	4,686	32.00	66	478
Disturbance	77	47.33	2,194	46.00	359	-477
Trouble with Person	85	44.82	8,5889	55.26	299	254
Drunk IP	12	41.37	1,800	41.00	35	-13
Check Welfare	16	72.08	4,422	61.00	58	-643
Assist Other Agency	19	54.12	1,337	80.00	37	958
Assist Fire Department	18	51.48	747	77.78	74	1,946
Break and Enter (Residential)	35	52.20	540	59.22	207	1,453
Theft	16	64.24	704	78.72	58	840
Property Damage	16	51.08	665	67.85	52	872
Prowler	26	32.17	1,028	42.01	75	738
Traffic Motor Vehicle Hit and Run	22	64.03	2,208	64.65	67	42
Impaired Drivers	9	74.43	655	88.31	31	461
Suspicious Person	124	43.60	3,249	42.00	426	-682
Suspicious Vehicle	29	50.68	789	42.00	105	-911
Alarm IP	55	24.88	2,805	26.00	177	198
Total	**672**				**2,518**	**15,321 =255 hrs**

* Average officer downtown (total police service) minus average officer downtime (helicopter) times number of police officers at the occurrences at which the helicopter attended. These are slight underestimates of efficiency because the helicopter occurrences are also counted in the total police service occurrences.

Table: Operational Value: Efficiency Value Plus Effectiveness Value Expressed in Hours and Dollars

	Efficiency		Effectiveness		Operational Value
Type of Occurrence ("just occurred" or "in progress")	Hours	C$	Hours	C$	C$
Assault	7.03	357	80	4,414	4,771
Weapons	116.78	5,932	480	26,482	32,414
Domestic IP	23.30	1,184			1,184
Missing Person IP	16.33	830	280	15,448	16,278
Noise IP	8.50	432			432
Disturbance	1.25	64			64
Trouble with Person	14.38	731			731
Drunk IP	1.83	93			93
Check Welfare	-10.72	-545			-545
Assist Other Agency	17.20	874			874
Assist Fire Department	36.38	1,848			1,848
Break and Enter (Residential)	24.22	1,230	320	17,654	18,884
Theft	16.93	860	160	8,827	9,687
Property Damage	22.30	1,133			1,133
Prowler	24.97	1,268			1,268
Traffic	4.73	250			240
Impaired Drivers	7.68	390			390
Suspicious Persons	-2.97	-151			-151
Suspicious Vehicles	-11.68	-593			-593
Alarm IP	9.80	498			498
Other*	10.12	514			514
Total	**338.36**	**17,189**	**1,320**	**72,823**	**90,014**

* Occurrences for which officers were cancelled that are in addition to the 20 identified in this table.

The 338.36 hours of police constable efficiency have a value of $17,189 and the 1,320 hours of effectiveness have a detective value of $72,825. These combine to produce an approximate value worth an estimated $90,014. The average police officer downtime for each type of occurrence amounts to 543 hours over the 672 occurrences on which the calculations are based. The value of the remaining 457 hours (1,000 - 543) is $23,334, which must be added to the cost of operation. The total cost, therefore, for the year of operation is $354,344 ($331,010 + $23,334). The benefit as measured above is $90,014 or 25.4 per cent of the cost.

Therefore, the benefits of the tangible features reported here amount to 25 per cent of these costs. It has further been speculated that greater levels of efficiency and effectiveness are possible, to an extent that the monetised benefits could approximate $138,463, or 42 per cent of the cost. These monetised benefits need to be considered in conjunction with the special and unique features of having a helicopter as part of a policing team. These include its speed, aerial perspective, ease and safety in conducting certain types of searches (e.g., roofs, railroad tracks and river banks) and the ability to 'turn night into day' by illuminating an area and contributing to visibility as well as citizen and officer safety.

Example: Evaluation of Assigned Vehicles Versus Pool Vehicles[3]

A request was made regarding the cost benefit of having assigned vehicles versus utilizing pool vehicles. The data provided is from the Manatee County Sheriff's Office. The study provides a reasonable approximation of the cost of an assigned vehicle program versus a pooled vehicle concept.

The table on the following page outlines the cost comparison between the two options. Besides the vehicle purchase cost, fuel, and maintenance, there are other inherent costs, the most notable is that of a deputy's lost time at the beginning and end of each shift for equipment change-out, vehicle inspections, and equipment checks. The average amount of time loss per shift is approximately 40 minutes per deputy. This equates to approximately 11 days per year in lost patrol time. The analysis includes both, with and without this cost.

Assigned Vehicle Program		Pooled Car Costs	
Vehicle Life	5 Years	Vehicle Life	1.8 Years
Life Cycle Mileage	90,000	Life Cycle Mileage	90,000
Life Cycle Costs		**Life Cycle Costs**	
Vehicle Cost	$22,488	Vehicle Cost	$22,488
Salvage	$3,750	Salvage	$6,063
Maintenance (Including Loaner Unit)	$12,285	Maintenance (Including Loaner Unit)	$21,297
Fuel Costs	$19,731	Fuel Costs	$19,688
		Annual Lost Deputy Time*	$7,899
Total Costs	**$50,754**	**Total Costs**	**$65,309**
Cost Per Mile	**$0.56**	**Cost Per Mile**	**$0.73**
		Without Deputy Lost Time	***$0.64***
Fuel and Maintenance Cost Per Mile	**$0.36**	**Fuel and Maintenance Cost Per Mile**	**$0.46**

* Based on average shift change time to load vehicle (25 min.) and unload vehicle (15 min.) and check/sign off on vehicle.

The costs tables show that a take-home vehicle is the most cost effective solution in regard to the fleet. This is substantiated by the $0.56 per mile cost compared to a pool vehicle of $0.64 per mile, a 14 per cent savings. Including the real cost of loss productivity and the savings grow to 30 per cent. The initial implementation cost of additional vehicles is the biggest obstacle for most agencies that have not implemented a take home or assigned vehicle policy.

Additional advantages to take-home police units were also identified. Specifically:

- Take-home programs result in more police cars being seen on the streets as officers go to and from work, or other approved activity. Citizens see a more visible police presence. So will potential offenders, offering a deterrent effect.
- They create a rapid response to emergency callouts. The officer doesn't have to go to the district to get a vehicle prior to responding. When there is a major event, rather than officers driving their personal cars to districts, where they would gather equipment, and be briefed, they leave directly from home to handle an incident. Criminal Investigators would have to come to the department to pick up a unit and crime scene equipment before responding to major crime scenes, losing potentially valuable time.

- Take-home cars allow for patrol officers, criminal investigators, and command staff to respond where needed, when needed. In situations such as a major disaster, the department could activate all sworn officers in a relatively short time, and send officers directly to the assignment upon notification.
- Take-home vehicles increase the level of enforcement. Officers driving take-home cars off duty that observe serious violations and criminal activity are obligated to take enforcement action.
- Take-home vehicles increase the back-up potential for officers on duty. In critical situations, while the nearest on-duty unit may be in another zone, an off-duty officer may be just around the corner from an emergency call for service, or another officer needing assistance.
- Officers take ownership and treat vehicles as their own, keeping them clean.
- Officer morale is considerably higher with assigned vehicles.

Summary

While costing studies are but one way of generating data for evidence-based decision making, they are often one of the more commonly used tools. Essentially, costing studies do three things for us. First, when done properly, they link the outcomes we wish to measure with the goals and objectives of our operational and strategic plans. They essentially help us focus on the question about whether the activity is within the organization's mandate.

Second, costing studies help us to focus on the many line items that make up actual costs. Often, "back of the envelope" or convention-based costs omit many ancillary costs associated with our activities. For example, it is common for costing studies to omit interest payments or costs associated with the need for extra personnel. By focusing on a detailed analysis, we are more likely to ensure that we include those items. Furthermore, exhibiting the results of a costing analysis to colleagues and others provides the opportunity for independent observers to identify potentially missed items.

Third, costing studies provide a transparent and fairly mechanical way of helping us decide on options.

The assessments are relatively objective and focused. The assumptions underlying the costs can be scrutinized, as can the values associated with individual items. The transparency of the process provides for a more defensible decision: one that is replicable by an independent observer. Furthermore, unlike purely value-based decisions, decisions based on evidence force critics to generate alternate values or analyses to validly criticize the analysis presented.

Even if someone can put forward alternate evidence, a net benefit still exists since that evidence will contribute to a more accurate assessment of the situation. In the end, a better basis for a decision is put forward.

Notes

1. Treasury Board of Canada (2007) *Canadian Cost-Benefit Analysis Guide: Regulatory Proposals.* Ottawa: Government of Canada. Catalogue No. BT58-5/2007. http://www.tbs-sct.gc.ca/rtrap-parfa/analys/analys-eng.pdf
2. Taken from: Whitehead, Paul C., "Operational Value of Police Helicopters: A Cost-Benefit Analysis," *International Journal of Police Science and Management.* (2002) Vol 4, p. 233
3. Taken from: Manatee County Sheriff's Office Memorandum, "re: Assigned Vehicle Costs", November 30, 2007

Making Decisions

Using Evidence

We make decisions all the time in our private and in professional lives. Mostly, those decisions are based on what we learned in our training, on conventional wisdom, or on traditional practices. Often, questioning common practice only leads to rediscovering the wheel. Yet, there are many circumstances where traditional practice and common knowledge does not work. We may not achieve the results we want, or our practices lead to less-than¬-efficient outcomes. For some reason, however, humans are reluctant to change. We are a conservative species. We become comfortable doing the same thing repeatedly, even when we are not happy with the outcome. As the Alcoholics Anonymous Handbook states, however, "Insanity is doing the same thing, over and over again, but expecting different results."

Evidence-based decision making makes the process transparent—it is no longer a closed, magical process, but one where observers can follow the logic and follow the evidence.

Historically, we can forgive decision makers for pursuing timeworn rituals. After all, as rainmakers knew, if you danced often enough, it would eventually rain. Modern weather forecasting has become sufficiently accurate; however, that rainmaking is no longer a viable profession.

The reason for that is meteorology has accumulated sufficient systematic knowledge that it is possible to predict local temperatures, precipitation and other phenomena with a high degree of certainty. Meteorologists have accomplished this by turning to scientific research and other forms of systematic study.

The reliance on systematic study and data collection, which is what underlies science, has made inconsistent inroads in most other disciplines.

This is unfortunate since, today, there is a large amount of empirical evidence to help us make better decisions. Furthermore, where existing analyses do not exist, conducting a local analysis to improve our own decision making is often not that difficult. This doesn't mean that one needs to become a scientist—far from it. All we need to do is to use empirical results to be able to build a reliable body of evidence.

Decision making based on evidence will generally allow you to make better decisions. Evidence-based decision making has the advantage of making the process transparent. Outsiders can become privy to the foundations of the decision. It is no longer a closed, magical process but one where observers can follow the logic and follow the evidence.

Evidence-based decision making is using the best available research and information on the outcomes of police work to carry out guidelines and evaluate agencies, units, and personnel.

We are not suggesting that you can always find an optimal solution to your problem. However, evidence-based decision making helps us to identify options and practices that do not work. In those instances, you are likely no worse off trying something new. Most often, however, a review of the existing evidence or the collection of your own data will help provide a more fruitful direction.

Everyone draws inferences from evidence. Inferential reasoning is a basic human skill. Thinking analytically is a skill like drawing and painting or operating a vehicle. It can be taught, it can be learned, and it can improve with practice. However, like many other skills such as karate, it needs to be hands-on and applied. This manual, companion workbook and related case studies will afford you that opportunity.

In summary, how can we put the lessons of this book together to formulate a good evidence-based strategy for decision making? Essentially, there are four main steps.

Without the right question, no amount of data will help provide an answer.

Identify and Frame the Question

The first three chapters of this book are focused on identifying appropriate questions. Without the right question, no amount of data will help provide an answer. We have stressed repeatedly that good questions need to be put into an appropriate framework. Ideally, you should draw these from your organizational plan or your strategic plan. This helps to focus the issue on the key purpose and objective of your unit. One main reason many organizations fail is that they lose sight of their mandate. They try to be all things to all people. This is simply not achievable.

If you lack an organizational or strategic plan, the next best thing is to drill into the issue. Ask several fundamental questions:

- Why are we proposing to do this?
- What are the likely outcomes?
- How does this action relate to the organization's mission?
- What benefits will this action bring to my unit or the people we serve?
- Are there more cost-effective or cost-efficient alternatives?
- Does this action have long-term or short-term consequences?
- What other resources am I likely to need if we pursue this action?

If what you are proposing to do is new or outside the traditional scope of your organization's mandate, consider putting together a focused business plan to support or justify the activity.

Once you have identified and justified the appropriate question, outline the options. Commonly, two or three viable alternatives are available. In other situations, the range of options and their relative merits is not necessarily obvious. In those situations, consider performing an environmental scan or SWOT analysis. If the issue is crucial, consulting an outside facilitator may be worthwhile.

Gather the Evidence

Often the best source of evidence is your own organization. You keep records of calls for service and your financial accounts. Those and other resources can give you valuable insights. Usually, internal data will provide a good base line or a measure of the status quo.

Outside your organization, other sources of information are available. Professional and trade organizations are a good place to start. Suppliers will also give you information on comparative options and estimates of lifetime service costs. Do an online search. Despite all of the trash on the internet, there are also nuggets to be had. Learn how to use your favourite search engine to eliminate as much of the irrelevant material as possible. Do not be afraid to check organizations in outside jurisdictions. In the UK, the Office for National Statistics is responsible for keeping information on crime incidents. It also produces many annual reports and studies. Similarly, the US Federal Bureau of Investigation is a gold mine of information, as is the Bureau of Justice Statistics.

Other excellent sources of information are libraries and your local college or university. Libraries have access to online databases that can search academic articles and other specialized material. Some of this can be intimidating to us if we are not used to using the facilities. Remember, a librarian can be your best friend. Contact your municipal librarian or visit a local college to seek expert advice.

> Remember, a librarian can be your best friend.

Librarians can also help you navigate a wealth of statistical databases. Most provinces and provincial agencies collect and make available regional data. While most data are available to the public, some is limited to authorized agencies. If you work for a public service agency, it is likely that yours is one of those authorized agencies. The Statistics Canada website is also a valuable source of information.

Some colleges and universities have laboratories and research groups or institutes that focus on crime-related matters. Again, these can often be found through an internet search or by asking a local librarian for help.

Do keep in mind, however, that not all evidence is of equal value. Do not be afraid to be critical, or contarian, especially if claims are at odds with your department's or your colleagues' experience. While not always the case, if something is too good to be true, it generally is. Ask yourself if the source is trustworthy. Is the agency presenting the data operating impartially or at arms-length, or does it have a self-serving agenda? Has the research or the publication gone through an external review process?

Organize the Evidence

Once you gather it, put your evidence together in an organized manner. Costing studies are easily presented in a spreadsheet. Other material can be presented in a table. Be sure to record the source of your information and keep track of where you found it. That way, if someone questions its veracity, you can refer them to the source.

A key element in presenting data is putting it in context. Remember, nothing means anything unless it is relationship to something else. Ask yourself, "compared to what?"

Is a ten-minute average response time adequate for an urban police department? Can we drill down to priority calls to extract more precision? You can be assured that Mayor and Council, the Police Board and others in the local community will ask.

A key element in presenting data is putting it into context.

Is a million dollars an appropriate price for a police tactical vehicle? Is it a cheap insurance policy or a colossal waste of funds if rarely, or ever, used? Is our level of training adequate? Will training requirements change in the near future. If so, how?

These questions can only be answered by making reference to a comparable benchmark. What is the price range for goods and services in the marketplace? What are industry norms or standards for performance? Are there best practices against which you can compare your unit or department?

The more you engage in evidence-based decision making, the easier it will become. Knowledge is cumulative.

Review the Decision-making Process

Once you have done your analysis, it is good practice to review the entire decision-making process. What have you learned? How could the process be streamlined or made more efficient? The more you engage in evidence-based decision making, the easier it will become. Knowledge is cumulative. You will soon determine the best sources of information. You will discover how to make the process more efficient and how to minimize the likelihood of getting sidetracked.

While evidence-based decision making generally takes longer than other approaches, it has its benefits. Decisions based on hard evidence are more resilient in the face of scrutiny. We owe it to ourselves and the communities we serve to be more evidence based in our thinking and application.

Taking a request to city council with strong external evidence is more likely to result in a positive decision. Presentations that show prior examples of success or that have reliable estimates of returns on investment are powerful. Finally, if someone challenges you, it is fair play to say that you have provided evidence to support your request. If they disagree, then ask them to show you their numbers.

What Others are Saying about *The Right Decision*

From Chief Constable Bob Downie, MA, OOM, Saanich Police Department, British Columbia

The Right Decision has been endorsed, and funded, by the Canadian Association of Chiefs of Police Research Foundation. We are proud to have worked with Len Garis and his team to make this manual, its companion workbook, and related case studies available to police organizations throughout Canada. We acknowledge the fine work that was done to produce the original version of this manual for Fire Professionals, and we are grateful for the offer to reproduce the manual in a police context.

The need for research has never been as important to policing as it is today. With increased demands on finite resources, and increased accountability for our decisions, our programs, and the services we provide, we must be able to explain why we are doing what we are doing the way we are doing it, and also to understand that what we are doing is the right decision. To do this we need to be able to find or produce reliable evidence on which to make our decisions. The days of relying on intuition alone to make decisions have passed.

The Right Decision takes the mystery out of evidence-based decision making and shows us both how important it is that we find and rely on evidence to make our decisions, and that there is nothing to fear in opening our organizations' doors to research efforts. There was a time when police were sometimes distrustful of research approaches, as we considered our environment too unique to be quantified and understood by others. Those days are also behind us. With *The Right Decision* you will be able to understand the questions you should ask when seeking evidence, the processes that should be engaged in, and the resources available to assist you in getting the evidence you can trust and rely on.

This manual can be used by anyone in your organization. It sets a framework for helping people to build a business case you can rely on to make informed decisions. It ties in the importance of linking initiatives with your strategic or business plans and associated goals and objectives. This approach can be used at any level of your organization and can help prepare staff for taking a broader approach to their thinking.

The CACP Research Foundation has done a great deal of work identifying research priorities in Canadian Policing. There is an opportunity arising from the significant amount of work being done across this country by police organizations, academics, and government at all levels in providing evidence-based research to assist us in making the right decisions. This manual will help us to exploit this opportunity to its maximum advantage, and in turn allow us to provide the highest quality of policing to the people we serve.

From Chief Constable Bob Rich, LLB, OOM, Abbotsford Police Department, British Columbia

What does it take to be a police leader? One important component is the ability to make a good decision. I realized at some point as promotions came along, that the more you moved up, the less defined the job gets. On the street you stop an offender and you figure out if you have grounds to arrest him. When and how you can do it that is all laid out for you. By the time you are helping to run the organization, even what kind of decisions to make can be pretty unclear.

This is a manual that sets out the steps to make a rigorous and defendable decision. Read this manual and you will know or be reminded how to go through a step-by-step decision making process that increases your chance of success both by being "more right" and increase buy-in from those around you. Seems like taking some time to read *The Right Decision* is the best decision you could make next!

From Theron L. Bowman, Ph.D., Deputy City Manager and former Police Chief, City of Arlington, Texas

The Right Decision takes the reader on an organized, methodical yet simple and measured approach to understanding decision-making processes. Professor Paul Maxim, Fire Chief and Professor Len Garis, Professor Emeritus Darryl Plecas and legal analyst Mona Davies guide the reader through simple yet essential discourses in what questions to ask and where and how to obtain data. The book touches on creating both basic and strategic plans. It moves to a higher-level discussion of research methods, statistical analysis and experimental design. The realistic police-related examples that are provided within each topic discussion simplify the learning for even the nonacademic consumer. Important terms are clearly defined.

The readers who use this information as a foundation for understanding and applying evidence-based decision-making should quickly evolve a strong skill set that will help them perfect performing a myriad of police processes and achieve objective outcomes. These processes include conducting initial and specialized criminal and administrative investigations, eyewitness identification, interviews and interrogations and crime scene search. This book is versatile enough to appeal to the novice student of policing yet provide value to seasoned officers, investigators and analysts looking to meet the high evidence-based standards of today's polity. The mild dosage of economics including cost-benefit analysis and opportunity costs motivates the city manager in me to make sure my police chief and other department heads have their own personal copies of this book.

The Right Decision alone is a great entrée into the evidence-based decision-making arena. When coupled with its companion workbook, it should be universally adopted as at least a minimum knowledge standard for all purveyors of justice.

Making the Right Decision

As a professional in the police service or other public service, you make crucial decisions every day that balance need with available resources. How should you approach these decisions, and how can you justify the decisions you make?

In this manual, Professor Paul Maxim, Fire Chief and Professor Len Garis, Professor Emeritus Darryl Plecas and legal analyst Mona Davies explore the what, why and how of evidence-based decision making.

What Others Are Saying About *The Right Decision*

Please see the inside back cover for full versions.

I recommend *The Right Decision* as a good reference tool for anyone who is in the business of making decisions. The material is put together in an easy-to-follow format and can serve as an aide memoire for a number of different aspects of the decision-making process.
– Deputy Commissioner Craig J. Callens, OOM, Commanding Officer, RCMP "E" Division

The Right Decision takes the mystery out of evidence-based decision making and shows us both how important it is that we find and rely on evidence to make our decisions, and that there is nothing to fear in opening our organizations' doors to research efforts.
– Chief Constable Bob Downie, MA, OOM, Saanich Police Department, British Columbia

Read this manual and you will know or be reminded how to go through a step-by-step decision-making process that increases your chance of success both by being "more right" and increase buy-in from those around you. Seems like taking some time to read *The Right Decision* is the best decision you could make next!
– Chief Constable Bob Rich, LLB, OOM, Abbotsford Police Department, British Columbia

The readers who use this information as a foundation for understanding and applying evidence-based decision-making should quickly evolve a strong skill set that will help them perfect performing a myriad of police processes and achieve objective outcomes... This book is versatile enough to appeal to the novice student of policing yet provide value to seasoned officers, investigators and analysts looking to meet the high evidence-based standards of today's polity.
– Theron L. Bowman, Ph.D., Deputy City Manager and former Police Chief, City of Arlington, Texas

This monograph is a very useful tool for policing the future, written for today's police who think about tomorrow. Anyone who reads it is likely to conclude that the era of "opinion-based" policing is waning; evidence-based practice will be the new, transparent basis for policing democracies.
– Professor Lawrence Sherman, author, Evidence-Based Policing (1998)
http://www.policefoundation.org/content/evidence-based-policing