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The Eye in the Sky:
Evaluation of Police Helicopter Patrols

The London Police Service Helicopter Research Project

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TECHNICAL REPORT
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EXECUTIVE SUMMARY

The prime objectives of the London Police Helicopter Research Project were:

1) to evaluate whether 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) evaluate whether a helicopter increases the operational effectiveness and/or efficiency of the police service.

The suppression (deterrent) impact of helicopter patrols on rates of crime was primarily examined using a pre-test-post-test design with matched comparison areas, where, within each pair, the experimental and comparison areas were chosen randomly.

Efficiency and effectiveness were evaluated by comparing a variety of indices of outcome for occurrences where the helicopter was included with occurrences for the police service as a whole.

The results and conclusions of the project were:

1) A critical review of the literature concluded that there is no data to substantiate claims that helicopter use suppresses rates of crime.
2) The quasi-experimental tests conducted in the present study led to the following conclusions:
   a) there is no suppression effect on rates of crime;
   b) there is no diversion of crime to non-patrolled areas; and
   c) there is no spillover effect of helicopter patrols to non-patrolled areas.
3) Analyses of occurrence reports and police logs led to the following conclusions:
   a) there is evidence of increased efficiency (i.e. time per call is less when a helicopter is involved; the helicopter is frequently first on the scene);
   b) there is evidence of increased effectiveness (i.e. apprehensions are more likely) when the helicopter is involved;
   c) some types of searches lend themselves exceptionally well to the unique advantages of the helicopter.
4) Surveys indicated the following:
   a) members of the public are somewhat supportive of police helicopter use;
   b) police officers are highly positive about its contribution to policing.
5) Other topics addressed included the following: the conduct of urban searches; noise and other bothersome features of police helicopters; traffic; and pursuits.

The London Police Helicopter Research Project was funded by the Ontario Ministry of the Solicitor General and Correctional Services and the National Search and Rescue Secretariat, as well as the private sector. Flights began on 1 July, 1999 and were completed on 30 June, 2000. The study was designed and conducted by an independent evaluator.

SOMMAIRE

Le principal objectif du Projet de recherche sur les hélicoptères de la Police de London étaient les suivants

1) évaluer si les patrouilles en hélicoptère avaient un effet dissuasif sur les différents crimes et incidents (introductions par effraction résidentielles et commerciales, vols d'automobiles, vols qualifiés, dommages à la propriété, intrusions nocturnes, personnes et véhicules suspects)
2) évaluer si un hélicoptère permet d'accroître l'efficacité opérationnelle ou l'efficience d'un service de police.

L'effet dissuasif des patrouilles en hélicoptère sur les taux de criminalité a été évalué à l'aide d'une méthode pré-test-post-test et des zones de comparaison appariées où, dans chaque paire, les zones expérimentales et de comparaison ont été choisies au hasard.

L'efficience et l'efficacité ont été évaluées en comparant divers indicateurs de résultat dans les cas où un hélicoptère est intervenu avec les cas auxquels a participé tout le service de police.

Les conclusions et les résultats du projet sont les suivants :

1) Un examen critique des documents prouve qu'il n'existe aucune donnée justifiant les affirmations selon lesquelles l'utilisation d'un hélicoptère permet de réduire le taux de criminalité.
2) Les tests quasi expérimentaux effectués pour la présente étude mènent aux conclusions suivantes :
   a) Il n'y a pas d'effet de répression du crime;
   b) Il n'y a aucun effet de répression du crime dans les zones non patrouillées;
   c) Il n'y a pas d'effet de déversement des patrouilles en hélicoptère dans les zones non patrouillées.
3) Les analyses des rapports d'incidents et des registres des services de police permettent de tirer les conclusions suivantes :
   a) Les données prouvent que l'efficience est accrue (i.e. le temps par appel est réduit lorsqu'un hélicoptère est présent; l'hélicoptère est souvent le premier arrivé sur les lieux).
   b) Les données prouvent que l'efficacité est accrue (i.e. les probabilités d'arrestations sont plus grandes) lorsqu'un hélicoptère est sur les lieux.
   c) L'utilisation d'un hélicoptère se prête particulièrement bien à certains types de recherches.
4) Les sondages ont donné les résultats suivants :
   a) les membres du public appuient dans une certaine mesure l'utilisation d'un hélicoptère par les services de police;
   b) les policiers sont très favorables à l'utilisation d'un hélicoptère.
5) Le projet examinait aussi les sujets suivants : les recherches en milieu urbain; le bruit et les autres désavantages des hélicoptères; la circulation et les poursuites.

Le Projet de recherche sur les hélicoptères de la Police de London a été financé par le ministère du Solliciteur général de l'Ontario, le Service correctionnel, le Secrétariat national Recherche et sauvetage et le secteur privé. Les vols ont débuté le 1er juillet 1999 et ont pris fin le 30 juin 2000. L'étude a été conçue et effectuée par un évaluateur indépendant.

Schweizer 300C Piston Helicopter

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This project was seen from the beginning as a research project in order to determine the value of the helicopter in policing – *it was not seen as a way of proving that a police helicopter is effective.*

I started agnostic; that is I did not know whether a police helicopter was effective or not. I wanted to find out. So did the London Police Services Board and its previous Chief of Police, Julian Fantino, and its current Chief of Police, A. J. Gramolini.

While I am the only person to be held accountable for this report, there are many persons who contributed to it directly and even more who contributed indirectly. Starting to name them inevitably runs the risk of failing to acknowledge important contributions. Not even attempting to do it correctly, would be a greater error.

The Pilot, Serge Côté, and the three Flight Officers, Constables R. John Carson, Paul Dow and Paul Ladouceur, were fully dedicated to this project and understood the requirements and limitations of the research aspects of the work. Then Inspector, now Superintendent Rick Gillespie was operationally in charge. His dedication to the research was exemplary.

Andy Whitford, crime analyst, generated the occurrence statistics that were needed in the format that was most useful. He did so regularly and in a timely fashion.

Valerie Beyer, a planner and analyst in the Corporate Services Division, was an important link between me and the various departments from which I requested information. Her cooperation with this study was of enormous value.

The single person who is most responsible for the initiation, execution and completion of the London Police Service Helicopter Research Project is Sergeant Bruce Nelson (now retired). He sought the sponsorships, created the partnerships and maintained the momentum to see this project through to completion. The test for selective deterrence in Chapter four and the analyses that are presented in Chapter five would not have been possible had it not been for the many days spent by Sgt. Nelson in assembling the information. The system from which it was generated is based on occurrences and does not lend itself to analysis. It is only because Sgt. Nelson painstakingly went through many thousands of occurrences one-by-one and categorized them that any analysis is possible. He is also responsible for the surveys of citizens and Police Officers. There are many features of this evaluation that would not be present and could not have been made available had it not been for the forethought, insight and perseverence of Sgt. Bruce Nelson.

I was retained as an independent, outside, evaluator to conduct the research. I designed the study, negotiated its implementation, requested information needed for the evaluation, interviewed participants and am solely responsible for the contents of this report, its dissemination and limitations.

There is not a single request for information or anything else needed for this evaluation that I did not receive and receive promptly. I am indebted to each and every person to who contributed to, what is best seen as, a team effort.

London
P.C.W.
November, 1999

EXECUTIVE SUMMARY

The London Police Service Helicopter Research Project was funded by a variety of government sources, including the Ministry of the Solicitor General and Correctional Services and the National Search and Rescue Secretariate, as well as by a number of private sector donations. It began its flights on 1 July, 1999 and completed patrols on 30 June, 2000. The study was designed and conducted by an independent evaluator who received complete cooperation from the London Police Service.

OBJECTIVES

The prime objectives of the project are the following: 1) to evaluate whether 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 increases the operational effectiveness and/or efficiency of the police service.

METHODS

A variety of methods are used to address the two main questions as well as a wide range of subsidiary issues. The suppression (deterrent) impact of helicopter patrols on rates of crime is primarily examined using a pre-test-post-test design with matched comparison areas, where, within each pair, the experimental and comparison areas were chosen randomly. During the year of the study, patrols were flown in five experimental areas and no patrols took place in their comparison areas. One area of the city, which included the downtown, is the only area that received the patrols over the whole year. Year-over-year comparisons of occurrences are conducted.

Efficiency and effectiveness are evaluated by comparing a variety of indices of outcome (e.g., police officer minutes per call, apprehensions, and first on the scene) for occurrences where the helicopter was included with occurrences for the London Police Service as a whole. Further documentation is presented by citing from the logs the contributions made by the police helicopter to various types of occurrences (e.g., searches for suspects and other persons, of roofs, railroad tracks and open areas, crowds and pursuits). Surveys were also conducted of citizens and of Police Officers involved on the ground with incidents in which the police helicopter also participated.

RESULTS AND CONCLUSION

1) A critical review of the literature concludes that suppression effects on rates of crime, which are often claimed and more often cited, are not warranted. The research designs used as well as the execution of the patrols leave too much room for alternative explanations of the findings, including that there is no effect.

2) The quasi-experimental tests conducted in the present study lead to the following conclusions:
   a) There is no suppression effect on rates of crime;
   b) There is no displacement of crime to non-patrolled areas; and
   c) There is no spillover effect of helicopter patrols to non-patrolled areas.
3) Analyses of occurrence reports and police logs lead to the following conclusions:
   a) There is evidence of increased efficiency (time per call is less when the helicopter is involved; the helicopter is frequently first on the scene);
   b) there evidence of increased effectiveness (apprehensions are more likely to occur when the helicopter is involved than in similar circumstances when the helicopter is not involved.
   c) Some types of searches lend themselves exceptionally well to the unique advantages of the helicopter (i.e., aerial perspective, ability to illuminate an area and speed), such as searches of roofs, railroad tracks, river banks and open areas.
4) Surveys indicate the following:
   a) Members of the general public are somewhat receptive of the police helicopter;
   b) Police Officers, who have been involved with it operationally, are highly positive about its contribution to policing in London.
5) Other topics addressed include the following: the conduct of urban searches; noise and other bothersome features of police helicopters; traffic; pursuits; and ways in which police helicopters can be used that reduce some of the concerns about noise while maintaining efficiency and effectiveness.

CHAPTER 1

THE LONDON STUDY

BACKGROUND

Fixed wing aircraft were first used in policing in 1929 in New York City. It was also the first community to use a police helicopter in 1948. Los Angeles County obtained its first helicopter in 1955 and by 1965 it had five. The RCMP established an air unit in 1937 and now has nine helicopters. According to Durham (2000:6) worldwide there are over 500 police agencies operating more than 2000 helicopters. It was not, however, until the late 1960s that numerous North American communities began using police helicopters and a number of reports have been prepared on the utility of helicopters in policing.

Whether communities should have police helicopters continues to be a controversial issue in a number of North American cities. The debate is not over a single issue. Rather, debate ranges over a wide array of topics on which many people hold strong views and some are little interested in more information on the topic. 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? There is not even agreement about the purposes to which a police helicopter should be put. Is the prime purpose of a police helicopter to deter crime? Is its purpose to increase operational effectiveness? If yes, on effectiveness, with respect to which types of occurrences? Should police helicopters be on regular patrol (however defined) 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.

Previous studies have attempted to address some of these questions, but none has done so conclusively. The possible role of helicopter patrols in reducing crime in patrolled areas has received the most systematic attention. There are numerous commentaries on the manner in which operational effectiveness is enhanced, but, by-and-large, they take the form of anecdotal information that focusses on the "good news stories" about the use of the police helicopter. We have no studies that compare classes of events where the helicopter is used with similar events where the police helicopter was not used. Comparisons on indices of effectiveness would be helpful.

The London Police Service Helicopter Research Study was conceived, funded and conducted as a project designed to answer some -*and only some*- of these questions. In one way or another, a variety of issues is addressed in this study, but the purpose of the study is to address two large questions: 1) Do helicopter patrols have a deterrent effect on the rate of crime in the patrolled areas?; and 2) Does having a police helicopter increase the operational effectiveness of the police? In the process of answering these questions a number of subsidiary questions are also addressed.

SPONSORSHIPS

The London study was funded by a combination of Federal, Provincial and private sector contributions:

Government Sponsors

- Ministry of the Solicitor General and Correctional Services (Grant)
- National Search and Rescue Secretariat (Grant)
- National Research Council/Canadian Police Research Centre (Peer review of the design and publishing of the report).

Corporate Sponsors

- Schweizer Aircraft Corporation: Cash donation and logistic support
- FLIR Systems: Supplied the infra red equipment at no charge
- Warren [Michigan] Police Department: Training for the Police Officers
- Canada Trust: Cash donation
- Esam Construction: Cash donation
- Eurocopter: Cash donation
- Brinks Canada Limited: Cash Donation
- Tecumseh Products: Cash Donation
- Modak Aviation: Provided administration support, and office and hangar facilities
- Shell Aviation: Corporate consideration on fuel price
- Northern Airborne Technologies (NAT): Corporate consideration on radio, interface equipment, siren, and loud hailer
- Paravion Technology Inc.: Corporate consideration on mounts for infra red equipment and provided LCD screen
- Helicraft: Corporate consideration on spotlight lease
- Ontario Police Supplies/Securitrim: Provided the striping and lettering for the helicopter
- Kitchener Aero: Corporate consideration on installation of NAT equipment
- Artcal Graphic Imaging: Corporate consideration on the price of roof lettering for police vehicles

BREAK DOWN OF COSTS

(All cost shown in Canadian dollars)

Helicopter Lease Cost: $256,328.55[1]

- Helicopter
- Insurance
- Pilot
- Scheduled Maintenance
- Unscheduled Maintenance
- Component Reserve
- Administration

Spotlight Lease: $6,026.56

Additional Equipment: $11,155.67

- Avionics
- radio interface equipment
- siren/hiler
- LCD mount
- mounts for technical equipment

Cost of Installation of the Equipment: $16,775.00

Extra Maintenance Costs Incurred: $7,922.99

- Shop supplies
- Expendables

Cost of Fuel: $32,820.81

- Total number of Litres Used = 43,168.9[2]

COST OF OPERATION: $331,009.58 or $331/hour.[3]

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[1] The purchase price of the same helicopter is $268,000 (U.S.) or approximately $400,000 (Cdn.).

[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 and the value of in kind and other contributions.

EQUIPMENT

Some of the equipment used is listed below:

- Helicopter: Schweizer 300C[4] Piston Helicopter
- Infra-Red: FLIR, MK2 Inframetrics with 6" video display
- Light: SPX5 Spectrolab, 15 million candle power
- Lap Top Computer: Panasonic CF27 Tough Book
- Radio: Ericsson Digital, 800 megahertz
- Binoculars: Fuginon Gyro Stabilized Binoculars
- Recorder: Sony Video/Audio recorder

TIME

The helicopter (AIR 2) was available for 1,000 hours of flight time over the course of the year: 1 July, 1999–30 June, 2000.

STAFFING

One civilian pilot with over 9000 hours of experience was used.

Three Police Constables served as "observers," or, as we prefer to refer to them in this report, Flight Officers. They alternated turns as their shifts and other responsibilities allowed.

[4] The Schweizer 300C has been used in helicopter policing in a number of jurisdictions including Warren, Michigan, which uses two, and Baltimore City, which according to Alpert (1998) has used them since 1970.

CHAPTER 2

REVIEW OF PREVIOUS RESEARCH

A number of studies of the effectiveness of the use of police helicopters in the prevention of crime have been conducted. A critical review of this literature is provided below. First, however, methodological considerations are introduced in order to provide background on threats to internal validity that need to be taken into consideration in assessing the confidence that one may have in the findings of the studies. They fall into three broad categories: 1) threats to internal validity; 2) choices of comparison areas; and 3) indices of deterrence/ suppression of crime. Previous research is then reviewed.

METHODOLOGICAL ISSUES

Threats To Internal Validity

There are certain threats to internal validity that generate special problems in testing the effectiveness of helicopter patrols on rates of crime. These threats include selection and regression. While these threats to internal validity are concerns in the study of a wide array of phenomena, they are particularly problematic in studies of helicopter patrols because they can occur together and have an additive or multiplicative effect. Other threats to internal validity, for example, history and maturation (cf., Campbell and Stanley, 1963:5) must also be guarded against, but it is selection and regression that appear to be endemic in studies of the deterrence value of police helicopter patrols on rates of crime.

Selection occurs when the experimental or comparison group is constructed (or selected) based on features that influence the outcome. In treatment studies this may include such things as having the experimental group made up of persons who *seek* treatment (they may be more motivated) and the comparison group made up of persons who did not seek treatment (they may not need it or have given up).

Selection bias may increase or decrease the likelihood of finding a difference in the level of change between the experimental group and comparison group for reasons that have nothing to do with the efficacy of the intervention, but because of the differences in the experimental and comparison groups that existed in the first place.

Regression, as a threat to internal validity, occurs when the pre-test observations are made in extreme or unusual circumstances. By their very nature, of being extreme or unusual, it means that other observations, had they been made at an earlier time or at some later time, would not likely find the situation to be so extreme.

Persons entering treatment, for instance, frequently do so when their condition is at its most serious. For many conditions, any intervention – including only the passage of time – may be followed by what appears to be “improvement” in the form of less extreme scores.

In the case of helicopter patrols, if the patrols are introduced into an area *because* it is an area with the highest rates of crime in the city, it will not be surprising that at some later time the rates of crime are lower than previously. This difference can be independent of any impact of helicopter patrols and simply be a function of regression.

It is important, therefore, when testing for the impact of helicopter patrols on the incidence of crime that the timing of the intervention (starting/stopping the patrols) is done independently (without consideration of) the rates of crime.

If we want to find the real effects of helicopter patrols, we need to do so with a design that addresses the threats to internal validity posed by selection and regression. Previous research has, at times, not been sensitive to this problem and it may be that some or all of the changes in incidence that has been attributed to helicopter patrols has been, in fact, the result of some combination of selection bias and regression effects.

Examples of where this was likely to be the case are the following. First, in the 1978 Nashville study the area to be patrolled was selected because it was the area of the city with the highest rate of crime (Schnelle et al., 1978:13). Second, in the 1980 Nashville study the design was one that provided the police with some discretion in terms of when patrols in one area would stop and when they would start in another area (Kirchner et al., 1980:145). This rationale was based on allowing the police a certain amount of operational discretion within the context of a research design. In that study, there was a minimum requirement about the number of days that patrols should continue in an area before patrols were moved to another area. There was, however, no predetermined maximum number of days after which patrols had to be moved.

Let us leave aside the operational advantages that this design may have provided. The issue for us is not just whether it is possible, but whether it is likely that the "operational" decisions would have been made in a way that would bias the findings in the direction of finding an impact of helicopter patrols on rates of crime. We have only to consider the operational considerations that would follow the minimum amount of time having been spent in the area of patrol. If the rates of crime are now low, the patrols can be moved to the next location. Think of the next location, "operationally." Even where the next location is pre-decided by the design, the operational concerns would be mirror images of the decisions about ending the patrols. If rates of crime in the receiving area are low, there is little pressure to begin helicopter patrols. If, however, the rates of crime are high or increasing there are operational reasons to initiate the helicopter patrols in the new area.

What we have, therefore, is an attempt to provide a degree of operational flexibility that creates a bias in the direction of instituting patrols when rates are high and terminating them when rates are low. This combined feature of selection bias and regression effect would give the impression that helicopter patrols decrease rates of crime, but the inference may well be unwarranted. In order to be able to make such an inference with confidence, the design must determine the start and end of patrols independently of rates of crime.

Choices of Comparison Areas

When the rates of crime in an experimental area that receives helicopter patrols are to be compared with those in a comparison area it is important that the experimental and comparison areas be chosen in a manner that does not bias the results. Choosing an experimental area because it has particularly high rates of crime at the time of beginning patrols produces problems of selection and regression covered above.

Selection of the comparison area(s) must also be done in a manner that does not skew the results. For example, it would not be appropriate to have a pool of comparison areas, allow the intervention to take place, examine what happened when the experimental area is compared with each potential comparison area in the pool and then report the results only in terms of the comparison area that affirmed the desired result. In order to ensure that this does not happen, comparison areas should be selected prospectively. Criteria for matching should be established, but most importantly the comparison area should be selected before the intervention begins.

It is also preferred that the pairs of areas that are considered comparable enough to serve as experimental and comparison areas are then randomly assigned as to which will receive the intervention (helicopter) and which will not.

Indices of Deterrence

When testing the hypothesis that helicopter patrols have a deterrence (suppression) effect on rates of crime it is important that the indices be selected prospectively. That is, the types of crimes/occurrences on which helicopter patrols are *expected* to have an impact need to be identified before the patrolling starts and the results with respect to *all* of those types of crimes/occurrences need to be reported. It is not appropriate to examine the results and select the indices after the fact. It is also not appropriate to examine whether the incidence of several crimes change, but report *only* those that change in the desired direction.

Summary

As we review previous research, and as we design new studies, there are methodological considerations that need to be addressed. While those identified also do not constitute an exhaustive list, they do comprise a set that is highly relevant to testing the impact of helicopter patrols on rates of crime.

In brief, the design of the study should not be susceptible to threats to internal validity with selection effects and regression effects being particular risks. Experimental areas and comparison areas should be chosen prospectively and the selection of which will receive the experimental variable (helicopter patrols) should be done randomly. Indices of deterrence should be selected prospectively and the results on all indices should be reported.

QUASI - EXPERIMENTAL STUDIES

Lakewood, 1966

The first statistical study of the effectiveness of police helicopter patrols on crime was conducted in 1966 in Lakewood, California, a "predominantly middle-class residential city best described as one of the many 'bedroom communities' serving greater Los Angeles." It was to involve comparing the experience in Lakewood with that in two "comparison sister cities" named Rosemead and Temple City (Los Angeles and Guthrie, 1968:153, 158). Patrols lasted eighteen months in Lakewood. Patrols were later extended to Lakewood Sheriff's Station, but lasted for only eleven months. Only the results for Lakewood were reported, however.

The presentation of results is confused and confusing. After indicating why Rosemead and Temple City "make for ideal sister-city comparisons" Guthrie (1968:158) says that the comparison jurisdiction was all of Los Angeles County: "since all three cities: Lakewood, Temple City and Rosemead are sub-divisions of Los Angeles County, a comparison with overall County data *seems* warranted [emphasis ours]."

Lakewood had a population of almost 87,000[1] , while Los Angeles County had a population of over 7 million and Guthrie (1968:151-157) indicates that most of the other areas of Los Angeles County would not make for meaningful comparisons with Lakewood since their demographics and rates of crime are so different.

The impact on seven crimes is examined: murder and non-negligent manslaughter; forcible rape; robbery; aggravated assault; burglary residential breaking and entering; larceny of $50 and over; and auto theft. No *a priori* reasons are given as to which of these crimes is expected to be more affected than others.

Guthrie's (1968:161) report offers very little in terms of analysis and presents the following "summary of statistical findings."

First, the comparison appears to be for Lakewood only, before and after the Sky Knight patrols; major offences are said to decrease while "petty crimes" increase:

> When comparing the City of Lakewood's crime rates before and after the advent of Sky Knight patrol, one can state categorically that there was a highly significant decline in crime rate for the "Seven Major Offenses." This difference was found to be statistically significant from a statistician's point of view. However, with respect to minor or petty crimes, with respect to typical misdemeanour offenses, there was a change–but it was in the wrong direction; petty crimes increased during the Sky Knight period (Guthrie, 1968:161).

[1] An area of 9.2 square miles.

Second, an examination of the seven major offences leads to the conclusion that burglary "seems most likely" to have been affected, but no detail is provided as to the basis for such a conclusion:

> ...analysing the seven component offenses of the 'Seven Majors,' or as they are sometimes called, particularly by the FBI, 'Part I Offences,' we are inevitably led to conclude that the crime of Burglary seems most likely to have been affected by the advent of helicopter patrol. Not only was there a statistically significant difference in the volume of Burglary offenses before and after Sky Knight in the City of Lakewood ... (Guthrie, 1968:161).

The earlier section of the report (Los Angeles County and Guthrie, 1968: 100-101) presents results that indicate that the frequency of certain crimes decreased in the City of Lakewood, while they increased in Los Angeles County, in the year of helicopter patrols compared to the previous year (Table 2.1).

TABLE 2.1: Percentage Change in the Frequency of Certain Offences from 1965-66 (No Police Helicopter) to 1966-67 (Police Helicopter)[a]

		City of Lakewood (Helicopter Patrols)	Los Angeles County (No Helicopter Patrols) 1965-66 1966-67
	Actual Major Crimes	-8%	+9%
	Crime Rate / 1000,000 pop.	-11%	+8%
	Robberies	-6%	+22%
	Burglaries	-7%	+9%

Kansas City, 1969

It has been claimed that police helicopter patrols in Kansas City reduced the number of robberies, burglaries and auto thefts during the latter part of 1969. Unfortunately, the selection of the areas to be patrolled, those with the highest rates of increases, means that the design is seriously prone to threats to internal validity in the form of regression. The analysis of the twelve month experience (nine without helicopter patrols and three with helicopter patrols) is further flawed by comparing the frequency of events in the first six months with the last six months, only three of which experienced helicopter patrols.

> During the first nine months of 1969, Kansas City, MO., had increases each month in the number of robberies, burglaries, and auto thefts committed. In those selected areas of Kansas City which were designated for helicopter patrol, the total number of crimes per month (in the

[a] Source: Los Angeles County and Guthrie (1968:100-101).

> aforementioned categories) decreased. The patrol areas selected were those with the highest number of criminal occurrences within the entire city [emphasis ours]. Within the patrol areas, the number of crimes in June showed a decrease of 13.7% from the previous five-month average of 159 crimes per month. The number of crimes in July (38) showed a 7.4% decrease from the previous six-month average of 149. In August the patrol area was changed. August, with 154 crimes, had a 3% decrease as compared to the previous seven-month average of 159. In September, the patrol areas were again revised and the 151 crimes which occurred in those areas represented a 7.6% decrease from the 163.5 crimes per month average of the first six months of 1969. During the last six months of 1969, the number of crimes in the patrol areas decreased 13.5% as compared with those crimes which occurred in the first six months (Center for Criminal Justice, 1971: 25-26).

Los Angeles, 1969

In 1969 the Los Angeles Police Department implemented helicopter patrols in two of its 17 Divisions. The test divisions were selected because of "their differences in crime characteristics and demography" (Weaver and Framan, 1970:5).

One test area had Part I crime offences[2] of 480/10,000 population and the other 1030/10,000 population, but no information is provided on the incidence for the other Divisions of Los Angeles. The lower crime rate area had a population of 4,700/mi^2. The higher crime rate area had a population of 16,500/mi^2.

Given the sizeable difference in the incidence of crime between the two areas, we surmise that the high crime rate area may be among the highest if not the highest of all the Divisions.

Similar comparison areas are not used. Rather, each area is treated as its own control. The adequacy of this manner of estimating whether helicopter patrols are effective in deterring crime was determined by trying a variety of models for predicting rates of crime in each of the 17 Divisions, in 1968 and 1969, from rates of crime that prevailed between 1961 and 1966.

We are told very little about the basis for selecting one model over another and we have no way of verifying that the model selected, out of the 54 tested, is not particularly favourable to or unfavourable to certain conclusions about helicopter patrols. All that we are told is that

[2] Part I crime offences include murder, rape, aggravated assault, robbery, burglary, theft and auto theft.

> three baseline models were selected: linear, quadratic, and logarithmic. Two parameter estimation techniques were used: multiple regression analysis and exponential smoothing. Using these basic combinations, a total of 54 different prediction models were defined.
>
> …
>
> The 54 models were applied to each of the time- series. Only data from 1961 through 1966 were used and predictions were then made for 1967 and 1968. Variances were determined and a "best" model was selected for each time-series (Weaver and Framan, 1970:12).

The focus is on four crimes (no reason is given for the choice and the incidence of these crimes is not provided separate form the other Part I crimes): robbery, burglary[3] , theft[4] and auto theft.

Given the analytical framework established by the authors, and leaving aside for the moment the threats to internal validity posed by using the test divisions as their own controls, the anticipated test of the hypothesis would take the form of comparing the expected incidence of crime, in 1969, with the actual incidence in each of the two test divisions. This is not quite what Weaver and Framan (1970:21) provide. They present the number of deviations from the expected frequency by *quarter* and do not offer the results for the full year. Given the manner in which the results are presented, it is not possible for us to calculate the net deviations over the whole year.

Table 2.2 represents the fashion in which the analysis is presented. The authors contend that, because there is a total of 12 quarters where the actual frequencies are lower than the expected frequencies and that this represents a sizeable proportion of all instances in which the observed frequencies were lower than the expected frequencies, helicopter patrols were effective in reducing crime.

TABLE 2.2: Representation of Weaver and Framan's (1970:16) Presentation of Results "(Number of Calendar Quarters in which Actual Occurrences were Significantly Above or Below (+ or -) Prediction)"

	Division	Robbery	Burglary	Theft	Auto Theft
	Low Crime	-2	0	0	-1
	High Crime	-2	0	-4	-3
	17 Other	+3 -4	+2 -4	-3	-4

[3] Burglary corresponds to what we, in Canada, call "residential break and enter."

[4] This would include, but not be restricted to, theft from auto.

Weaver and Framan (1970:31) conclude that because the number of instances in which observed frequencies are lower than the expected frequencies is proportionally larger in comparison divisions compared to how frequently it occurs in the non-test areas, that helicopter patrols were effective in reducing crime particularly robbery and auto theft and particularly in the high crime area.

We do not find these conclusions warranted, on the basis of the information provided, for three reasons. First, basing the test on quarters is opportunistic and was never suggested to have been part of the original design. Because it is not possible to appreciate the differences between expected and observed occurrences over the whole year, one cannot assume that the most valid analysis is done by quarter.

Second, even the analysis done by quarter can be interpreted differently than the authors choose. To treat the test areas as their own controls, the authors used prediction techniques based on all seventeen LAPD divisions, even though, Weaver and Framan (1970:11) had already decided that the other divisions were not appropriate comparisons.

For each of robbery, theft and auto theft, while half of the observed occurrences are lower than the expected frequencies, the other half is not. In the case of burglary none of the observed frequencies is smaller than the expected frequencies.

Third, we are not surprised that a particularly high crime rate area would display greater decreases in crime than a particularly low crime rate area, especially when they are, in each case, serving as their own control, because of regression effects. That is, extreme scores are likely to be followed by less extreme scores.

Long Beach, 1970

Following what was considered to be the "proven" success in reducing crime by project Sky Knight in Lakewood, California, the city of Long Beach, California, implemented a full-time helicopter patrol in October, 1968. According to Medak (1970: 6), the objective was to further test whether reduction in crime would be achieved.

The program theory on which the expectation of deterrence is based is the following: surveillance increases general deterrence; aerial surveillance is a new addition to ground surveillance; helicopter patrols decrease response times; decreased response times increases rates of apprehension and increased rates of apprehension increase general deterrence (Medak, 1970:7). The study does not test for an impact on response time or apprehensions.

According to Medak (1970:8), the hypothesis to be tested is that the "incidence" of some types of crimes is more likely to be affected (robbery, burglary, auto theft) rather than the other "Part I" serious crimes (murder, rape, assault and larceny). No rationale is provided for this distinction and we cannot be certain whether the two categories were identified at the beginning of the inquiry.

The City of Long Beach had a population of 387,000 and a total area of 47.9 square miles. Two shifts were used (10:00 a.m. to 6:00 p.m. and 6:00 p.m. to 2:00 a.m.). Patrols occurred from October 1, 1968 to September 30, 1969. The actual amount of patrol time is not indicated[5].

The design used is a pre-and post-test with a non-equivalent comparison group of eight nearby communities. The design also allows an examination of two other features of the situation: a) the frequency of crime for the earlier years of the decade (1960-1966); and b) the frequency of crime for other types of less "significantly affected" offences: murder, rape, assault and larceny. The reason for the choice of the eight "nearby" communities is not really explained.

Medak (1970) focuses on the changes in the frequency of various types of crime in the experimental (helicopter patrol) twelve months and the comparison (no helicopter patrol) previous twelve months, October, 1968 to September, 1969, and October 1967 to September, 1968, respectively.

Medak (1970) constantly refers to "crime rates," but what is actually being discussed is frequency of crimes known to the police and whether year-over-year there is an increase or decrease, and the size of that change in relation to the frequency of the previous twelve months. These percentage changes when compared to one another are referred to as "crime rate comparisons."

Crimes expected to be affected decreased 3.2%: robbery (7.3%); burglary (0.1%); and auto theft (6.6%). Those not expected to be affected increased 8.6% (Medak, 1970:12). These results appear to be consistent with the hypothesis that helicopter patrols have an impact on frequency of crime.

When the experimental city, Long Beach, is compared with the combined statistics for the eight comparison municipalities, the percentage increase in crime is less for Long Beach (8.6%) than for the comparison cities (10.9%), with respect to the less affected crimes. With respect to those crimes that are supposed to be affected, the *decreases* in Long Beach are accompanied by increases in the combined comparison municipalities (Medak, 1970:13).

These results *appear* consistent with the hypothesis of helicopter patrols having an impact on the frequency of some crimes.

These findings, however, can be put into a different context. The data that are provided allow us to observe six other year-to-year changes between 1960 and 1966, for each category of crime (see Medak, 1970:13, Table 4-2). This allows us to observe the following patterns:

Less affected. The increase of 8.6% in crimes expected to be less affected is exceeded or about equalled in three of the six years. Thus, increases of this magnitude are not rare events.

Affected crimes. The decrease in robbery (7.3%) was exceeded in 1961 (10%) and the rates of change are highly variable with single digit changes in two of six years and an increase of 32% in 1964.

Burglary, which decreased 0.1%, had a greater decrease in 1966 (2.2%) and 1961 (2.9%).

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[5] From our experience it is unlikely that the helicopter was in the air much more than five hours per shift on average, and it is likely that it was closer to four.

The decrease for auto theft (6.6%) is not matched in any other year. This type of crime also contributes about 27-28% of the total so it has a prominent impact on the total.

Columbus, 1972

In 1972, Columbus, Ohio implemented helicopter patrols with a view to testing whether there is an impact on crime. Eight of the 15 precincts received helicopter patrol on a "called for service basis." No indication is provided as to the amount of patrol activity that is provided to the other seven precincts. Patrol hours are divided on the basis of "crime patterns and divisional needs" (Lateef, 1974:63). No other details are provided and neither is the basis of selecting which precincts received which level of service.

During the 6 month period, *three* helicopters were used to log a total of 2,172 hours, with an average of 11.9 hours/day (Lateef, 1974:63).

The design, in this case, is a pre-post one, where the frequency of occurrences in the months of patrols is compared with the frequency during the same months of the previous year. Only one-half of the results are presented as we are presented information for only January – March, 1972; not, unaccountably, for the entire six months of patrols.

Lateef (1974: 63-64) reports on the "crimes most affected by helicopter patrols," but does not indicate the others for which tests were conducted, or the basis on which the selection was made. In the precincts that received regular helicopter patrols, the frequency of the following occurrences decreased in the first quarter of 1972, compared to the first quarter of 1971: robberies 8.6% (307 from 336), burglaries 9.4% (1524 from 1841) and auto theft 9.4% (775 from 856).

In the precincts that received helicopter assistance on a called-for-service basis, robberies decreased 22.2% (35 from 45), burglaries decreased 9.9% (399 from 443) and auto theft increased 28.8% (to 315 from 224).

Lateef's assessment of these data is curious. He could have viewed the two sets of precincts as tests of the same hypothesis, with considerably different intensity of patrols, which is what the early part of the article suggests. Instead, he chooses to contrast the two areas: average 14% decrease in 8 precincts and average 4.9% increase in the other 7 precincts, as an indication of a displacement effect: "... helicopters simply shifted the location of criminal activity to the adjacent areas" (Lateef, 1974:65). He nevertheless concludes that helicopter patrols are effective in deterring crime: "an overall decrease of 14 percent in the crime rate in robbery, burglary and auto theft is a strong justification for the application of this new tool in police work" (Lateef, 1974:64).

We do not agree that this conclusion is consistent with the earlier interpretation of the findings. The results may be viewed differently. Based on the premise that the seven precincts that did not receive regular patrols are a) similar to the eight precincts that did receive patrols and b) that the seven without regular patrols can reasonably be considered to have a low or no level of helicopter intervention, we would reason as follows. Robberies decreased more in the comparison area (22.2%) than in the area that received helicopter

patrols (8.6%), so no impact of helicopter patrols can be inferred. Burglaries decreased more in the experimental area (17.2%) than in the comparison area (9.9%), so the inference of an impact is appropriate. Auto theft decreased 9.4% in the experimental area while it was increasing 28.8% in the comparison area, so an inference of impact is warranted. Therefore, there is evidence of impact for burglary and much more for auto theft. This evidence would be tempered, however, by the number of other types of crimes for which tests were conducted, but for which there was no apparent impact. That is, were tests conducted for theft, commercial break and enter or other crimes because it was thought that helicopters may reduce the frequency of these crimes? We are not told.

Nashville, 1978

Helicopter patrols were used in Nashville to test the deterrent effect on residential break and enter. The design included the choice of one of 33 police zones as the experimental area. The zone was 5.66 square miles in size with a population of approximately 12,000 persons. The target zone was selected by the patrol chief because of its high level of burglary: 2.8 burglaries per day in the target zone compared to 1.9 per zone in the entire city (Schnelle et al., 1978:13). Two experimental periods were planned, each involving 12 days of helicopter patrols (Mondays-Fridays). The helicopter was prevented from operating due to weather conditions one day in the first experimental period and four days in the second.[6]

The design used is that of a single target area where baseline was established (21 days) followed by the first experimental period (12 days), a return to baseline (18 days), the second experimental period (12 days) and a final return to baseline period (18 days). The baseline periods averaged 1.28 burglaries per day and the experimental periods 0.33 per day.[7]

Second, the target area was chosen because of its very high rates of burglary and this makes the design susceptible to regression effects. Indeed, it should be recalled that the average burglaries per day on which the target area was selected was 2.8 per day. It would appear that even in the baseline periods that burglary decreased 54%.

Third, we are told when the experimental and baseline periods began and stopped, but we are not told how they were selected. Neither are we told why 12 day periods were selected other than the first return to baseline period occurred because of "cost limitations" (Schnelle, 1978:14). It is of interest to note that the highest rates of burglary during the baseline period were not in the 12 days prior to the beginning of patrols; they were in days 13 to 18 prior to patrols. There were no differences in rates of burglaries during the periods of intervention whether or not the helicopter was prevented from flying because of weather (Schnelle et al., 1978:15).

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[6] Total flight time 101.9 hrs (Schnelle et al., 1978:14).

[7] No arrests for residential break and enter were made in the target zone during either intervention period and neither was there evidence of a displacement of burglaries to any zone adjacent to the target zone and there was no change in the city-wide burglaries (Schnelle et al., 1978:14-15)

Nashville, 1980

A second study was conducted in Nashville. It started from the conclusions of the previous study that helicopter patrols had previously been demonstrated to reduce residential burglary in the 5.66 square mile area during two separate 12-day periods. Kirchner et al. (1980) describe that area as having been high density; its density was 2120 persons per square mile.

In the second study two high density (5089 and 4480 persons per square mile) and two low density (410 and 505 persons per square mile) areas were selected. The selection of the high density zones, and perhaps the low density zones, was made by the Assistant Chief of Police based on the zones' relatively high "levels" of burglary (Kirchner, 1980:144). We are not told whether these "levels" are frequencies, incidence or other measures.

For the purpose of the evaluation, the Assistant Chief was requested to patrol any given area for a minimum of ten days: "otherwise the Chief exercised complete discretion of how long the helicopter would remain in an area." The Chief decided the order in which the target areas would be flown. The length of the intervention periods was 10 and 9 days in the areas of high population density, and 21 and 14 days in the zones of low population density. Two helicopters were used to generate 5.2 hours of patrol per day (Kirchner, 1980:145).

Kirchner et al. (1980) report that the average number of burglaries per day decreased in the areas of high density, compared to the baseline and return to baseline days, but that they, in fact, increased in the areas of low density. The authors do not see the results as somehow cancelling-out each other. Rather, they conclude that the deterrent value of helicopter patrols exists in high density areas, but not in low density areas.

Two things concern us about the design. First, the starting and stopping of the helicopter patrols was left to the chief, except for the request that, once started in an area, they continue for at least 10 days. When the decision is left to someone who has operational responsibility, as is the case here, we need to consider whether and how operational considerations could bias the results. Operationally speaking, what kinds of conditions might affect the decision to terminate patrols in one area or begin them in another area once the ten day minimum has been achieved? When the rates of crime in an experimental area are low it is easier to leave it, and when the rates are high in the about-to-become-experimental area it is easiest to make the move. Unfortunately, both of these decisions impairs the internal validity of the study. It is noteworthy that in both high density areas, the intervention began when the number of burglaries was at its highest point in the baseline period and that the movement out of the experimental period was at a point when the daily number of burglaries was lower than average for the experimental period.

The second concern is with the marked differences in length of the various baseline, intervention and return to baseline periods. No reason is given for the variation and this leads to concern over whether they may have been selected retrospectively, rather than prospectively, thereby biassing the results. The length and timing of the baseline periods for the low density areas are not provided.

In both studies, helicopter patrols took place between the hours of 8:00 a.m. and 4:00 p.m., Monday through Friday. Only burglaries that occurred on these days and during these times are counted.

Kirchner et al. (1980:146) report no evidence of crime being displaced to areas adjacent to the experimental areas. They also report no change in other offences for which they collected information: murder, assault, sex offenses, robberies, theft, or arson.

England, 1988[8]

In England, studies of the cost effectiveness of using helicopters have been conducted by the Wiltshire Constabulary (Joint Working Group, 1988:44-52). A series of searches were conducted with a view to estimating whether a helicopter effected the search more quickly than on-the-ground searches and whether the person hours saved were more than the cost of helicopter searches. The findings are referred to in other studies, but not always accurately; they are summarized below.

The comparative efficiencies tested actually involved one helicopter, two fixed wing aircraft and twelve persons on foot. Aircraft (all types) are reported to have been 90% to 100% accurate and persons on foot were 100% accurate. The study makes a serious attempt at estimating the person hours saved by examining the tasks completed by the helicopter and attributing to each of those types of tasks the number of person hours that theoretically would have been allocated to it had the helicopter not been present (Joint Working Group, 1988: 47-52). Whether personnel would have actually been available and dispatched is not known.

TABLE 2.3: Relative Efficiency of Different Means of Searching[b]

	Search Party	Time to Search 1 Square Mile	Cost to Search 1 Square Mile[c]
	Bolkow 105 (helicopter)	12 min.	105
	Optica (fixed wing)	18 min.	27
	Islander (fixed wing)	22 min.	77
	Persons on Foot	454 hours	6946

[b] Adapted from Joint Working Group (1988:45).

[c] In British Pounds.

[8] There is a variety of literature on the British experience with police helicopters (e.g., Walters, 1995), but none contains well controlled studies.

The general conclusion reached by the authors is that helicopter searches are cost effective. We note, however, that the comparator used is that amount of ground search that would be *theoretically* dedicated to the task, rather than how much would be dedicated to it under actual operational circumstances.

The report notes that the "full value" of the helicopter can only be realized if the ground staff who are released from what they would otherwise have done are "re-deployed" into areas or roles where person power can have the most operational significance (Joint Working Group, 1988:47).

In real life, the types of operations where helicopters are most effective are not necessarily complemented with other opportunities of "most operational significance." This makes it more difficult in actual operational situations to demonstrate cost-effectiveness even though the level of effectiveness may be very high and the benefits of greater speed can make significant contributions to health and safety in a given instance. On the other hand, in jurisdictions where the general rule is that there are more calls for service than the number of Police Officers available to be dispatched, time made available through any means (including the use of a helicopter) can be redeployed to reduce the reaction time to other calls for service.

STUDIES WITH OTHER DESIGNS

Calgary, 1995

The city of Calgary has had a police helicopter since 1995. Its use of a helicopter has not been for the purpose of research. Rather it was donated to the Police Service by funds ($1.5 million) raised in the community in honour of a Police Officer who was killed in the course of a pursuit in 1993.

Since that time, the Calgary Police Service regularly publishes reports on the effectiveness of the police helicopter. For example, in its first year of operation (July 1995 to July 1996) it responded to 3,251 requests for assistance and "resulted in the apprehension of 477 suspects" and it is "established that 168 of the suspects may have avoided detention had it not been for [the helicopter] (Calgary Police, *circa* 1996:6). We do not know how that was established.

According to the Calgary Police Web Site (viewed 12 November, 2000) the following deployment statistics prevailed in 1998, a year in which the helicopter flew approximately 1,000 hours:

- Responded to at least 4,087 complaints
- "First on the scene approximately 60 percent of the time"
- "Made 899 arrests"; "402 of which were suspects who would likely have escaped arrest, had it not been for the helicopter's speed and superior search abilities"
- "Involved in 29 pursuits" [No further details].

During the first year of operation the Police Service was contacted by 98 citizens requesting information about the activities of the helicopter or complaining about the noise of the aircraft (Calgary Police, *circa* 1996:32).

The Calgary Police Service regularly publishes good news stories of the helicopter's involvement in a broad range of law enforcement activities and assistance to other agencies.

Durham Region, *circa* 2000

The "final evaluation" of the Durham Regional Police Service Air Support Unit (No author, no date; will be referred to as Durham, 2000) begins with the assumption that the effectiveness of helicopter patrols on reducing crime is already known.

> In the late nineteen sixties, government funded studies documented, for the first time that regular helicopter patrol was an effective means of significantly reducing major crime (Durham, 2000:6).

Durham (2000:50) claims that the Police Helicopter was responsible for 53% of the arrests made when it was on scene: "these are arrests that likely would not have occurred..." without the police helicopter. It is also estimated (we are not told how) that a total of 4270 (units not indicated) of patrol time was saved by the police helicopter (Durham, 2000:51). No comparisons are offered with occurrences where the helicopter was not involved.

It is claimed that break and enter and vehicle theft decreased because the frequencies were lower 1999 than in the corresponding months in 1998 (Durham, 2000:62-63). It is not mentioned whether the frequencies of any other types of occurrences were examined and whether these were the only ones to display this pattern.

Earlier in the report, it is asserted, without providing citations, that "helicopters have proven to be effective in increasing apprehension rates" (Durham, 2000:25). There is a considerable difference between individual apprehensions and displaying an increase in *rates*. Indeed, some of the previous studies claim a deterrent effect on rates of crime, that were produced without increasing rates apprehension (see, e.g., Schnelle et al., 1928: 14-15).

Two figures are presented that suggest a decrease in the frequency crime in 1999 compared to the same period in 1998 (Durham, 2000: 41-42). These data are for commercial break and enter and vehicle theft. No mention is made of other crimes such as residential break and enter, theft from vehicle or robbery. Yet, the broad claim is made that the presence of "the helicopter throughout the region provided a general deterrence to criminal activity" (Durham, 2000:47).

York Region, *circa* 2000

The York Region Police Service (no author, no date; will be referred to as York, 2000) evaluated the use of a helicopter (AIR 1) in policing from 15 June 1999 to 15 December 1999.

The evaluation report begins with two assertions:

1) that "the helicopter has been *proven* by police services around the world to be a cost-effective means of increasing the efficiency of existing resources"; and

2) that “in the late 1960s, government funded studies *documented* ... that regular helicopter patrol was an effective means of *significantly* reducing major crime” (emphasis ours; York, 2000:5).

The Bell 206B Jet Ranger turbine helicopter was used on a region wide basis and no attempt was made to have comparison areas that did not receive helicopter patrols:

> highly visible ... [patrols] over high crime areas were conducted and found to reduce crime and assist in the apprehension of criminals (York, 2000:9).

AIR I was dispatched to 241 calls that were not cancelled and it was first on scene 40% of the time. It was “involved in 62 arrests” (York, 2000:30).

The report offers an estimate of patrol time saved, 142.2 hours, and puts a dollar value on it of $140,778:

> AIR I and flight crews were actively involved in demands for service totalling 142.2 hours.
>
> . . .
>
> It has been estimated that one two-person helicopter is equivalent to fifteen two-person ground units. Multiplying that figure by 142.2 hours gives you a total of 2133 hours. Taking the total hours times the rate of $66.00 (the cost of two officers on the ground), the resulting patrol time savings in dollars would be $140,778.00 (York, 2000:31).

The estimate is without adequate foundation as there is no evidence offered that any of the 142.2 flight hours saved any time of the police on the ground. It is not indicated who or how the estimate of one helicopter being equivalent with fifteen cars was produced.

The claim of a fifteen to one “equivalent” is an embroidered version of one or two other undocumented claims that are made. One of these is that the aerial advantage of the helicopter gives it fifteen times the surveillance capacity of a police car (Calgary Police, 1996). The other claim comes from the Bell Helicopter promotional literature where it is asserted that the “aerial vantage” gives it the surveillance capacity that is fifteen times greater than a police car (Pollock, 1996: 5-1).[9]

Even if both of these claims are valid, they would not constitute an appropriate basis for the calculation of savings in the York Region evaluation.[10]

The report claims that only three complaints about noise were received.

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[9] Pollock (1996: 5-2) also claims that the “constant and persistent” presence of a patrolling helicopter suppresses burglaries by 30% and “street crime such as rape, robbery, auto theft, etc.” are reduced by 50%. He says “studies show” but none is cited.

[10] The Durham Region Report contains many of the same pages as this one, but it does not make a claim of time saved with a dollar value attached to it.

Joint Helicopter Patrol Program, 2000

The Police Services of three regions west of Toronto were part of a shared helicopter program: Halton Region; Hamilton-Wentworth Region; and Peel Region. The three regions shared a single engine turbine Bell Jet Ranger 206B over a five month period (14 July – 21 December, 1999). Each region was allocated 12 hours of flight time per week and each region had the helicopter two nights per week on a rotating schedule.

The evaluation was conducted by independent consultants who "were retained after the experiment had ended" (Research Management Consultants Inc., 2000:7).

The "business plan" for the study and the basis on which it was funded identified performance targets to be achieved by police helicopter patrols in the three regions that have 2235 police officers, a population of 1.7 million persons and an area of 2683 km^2 (Research Management Consultants Inc., 2000:2):

- Reduce the duration of high speed pursuits by uniformed and detective police vehicles
- Reduce response time to alarm calls by 10%
- Reduce break and enter (residence) by 10%
- Reduce break and enter (business) by 10%
- Reduce theft of motor vehicles by 10%
- Increase cultivation of narcotics charges by 100%.

There is no indication of the basis on which these targets were selected, but it is clear that the *intention* was to demonstrate that these targets could be met.

Nevertheless, the Steering Committee of the project decided at the outset that there would be no restricted areas where the helicopter could not fly and that could be used as comparison areas for the purpose of determining whether the targets were met: the Steering Committee wanted "to make the helicopter available to *all* citizens in the region ..." and "could not justify what amounted to a denial of helicopter service to part of the population" (Research Management Consultants, 2000:6).

Due to the limitations of the design of the police helicopter project and the limitations of the data,[11] the consultants found it "impossible to determine" whether the targets were met (Research Management Consultants Inc., 2000: 13, 24). They also note that, in order to evaluate effectiveness in terms of targets, comparison areas should be used, which do not receive patrols, and they recommend "... better segregation of areas served and not served by the helicopters (matched areas) - preferably within the jurisdiction" (Research Management Consultants Inc., 2000: 19-20).

[11] The information system did not allow the consultants to distinguish outcomes from occurrences where the helicopter was involved from occurrences where it was not involved.

According to Research Management Consultants, Inc. (2000: 11, 65-67) operationally the helicopter was found to be a "valuable tool" that "made a contribution to a broad range of calls for service" and had "important impacts" that included "rapid response to priority calls," "increased likelihood of observing the suspect leaving the scene" and "providing assistance to victims." Surveys of Police Officers from all three services found strong support for the helicopter on the part of officers who had experience with it.

Toronto Police Service, 1998

The Toronto Police Service (1998) produced the "Business Plan" for having and "air service."

A six month study period began in August, 2000 so no results are available at the time of this writing. Utilization is district-wide and there is no plan to have unpatrolled comparison areas.

Other

There are various accounts of the use of police helicopters in a variety of other jurisdictions such as Ontario, California (Smith, 1998), Philadelphia (Goldin, 1999), Riverside, California (Griffiths, 19988), and Mesa, Arizona (Kline, 1998). None of those reports or others of which we know use experimental or good quasi-experimental designs to test for deterrence or effectiveness.

CHAPTER 3

PROGRAM THEORY AND METHODS

PROGRAM THEORY

The set of ideas on which is based the notion that a certain intervention should produce a specific result is called the *program theory*. There are three critical elements in the *program theory* as to why helicopter patrols may deter crime. The first is that would-be criminals become aware that there is a police helicopter. The second is that would-be criminals consider that "the eye in the sky" has the capacity to make it more likely that law-breakers will be seen, successfully pursued, and apprehended than is the case when there is no helicopter. The third is that such considerations makes a difference to would-be-criminals such that they alter their behaviour, as in not committing crime, committing fewer crimes or committing crimes, in different areas.

With respect to the first of these elements, the awareness of helicopter patrols taking place, we have three forms of evidence: comments made by members of the community; results from a survey of the community; and 3) anecdotal comments received by police officers.

Comments made by members of the community.[1] Over the course of the one year of police helicopter flights, many Londoners have let us know that they are aware of the helicopter patrols. Records show that 157 persons contacted London Police Service to make their views known. Nine letters to the editor were published in the *London Free Press*.[2] I have received six e-mails, eight phone calls and uncounted (though not countless) comments from people about their having seen, but usually heard, the police helicopter. We have made no attempt to systematically determine the number of unofficial comments received by London Police Officers about the police helicopter, but police officers, to whom I have spoken, indicate that they have received comments. Many of these comments, as reported to me, have been favourable about the use of this equipment.

Community survey. A survey of 500 randomly selected households in the City of London was conducted during the eleventh and twelfth month of helicopter patrols. It reveals that 84.6% of respondents were aware that the London Police Service had a police helicopter because they had seen it.

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[1] The issue of complaints about noise and other features of helicopter patrols that people found offensive are presented in Chapter 6.

[2] Five positive about the helicopter and four negative. During the year of helicopter patrols, nine other items (usually news, but some commentary) appeared in the *London Free Press* mentioning the police helicopter. Two involved a full page with pictures. Prior to the institution of patrols, three other items appeared about the proposed police helicopter.

Anecdotal comments. Police officers interviewing perpetrators about their deeds said that they mentioned their awareness of the police helicopter and that it made some difference to their "work." One, who specialized in stripping vehicles, was asked why he left the job only partly done, which was not his practice. His reply was "you guys have a helicopter now."

It seems safe to conclude that, generally speaking, the community of London was very much aware of the existence of a police helicopter. That this same level of knowledge prevailed for actual and would-be-criminals, we have no way of demonstrating in a systematic manner.

METHODS

Patrol Time/Areal Units

There is no *a priori* basis for deciding the amount of patrolling activity that is needed to deter crime. Previous research is silent on this matter. In the studies that claim to find a deterrent effect on certain types of crime there is considerable variation in the amount of time per population and/or areal unit that was used. There is also little indication of over how long a period of time the patrols must continue to generate any given level of effect. Again there is considerable variability in the number of days and months over which patrols took place in studies that claim to have found a deterrent effect.

The present study deals with this situation in two ways. First, it uses different levels of intensity of patrols as an experimental variable. Second, it uses a three month period of time for experimental patrols rather than the much longer or much shorter period of time used in prior studies. During the experimental phase of the study, three different levels of intensity are employed: intermittent patrols, intensive patrols and very intensive patrols. Definitions and actual patrol times are provided in Figure 3.1.

This amount of patrolling time falls well within the range of most other studies and it is greater than the amount and concentration of patrols used in some of the studies that claim to have had an impact on the suppression of rates of crime.

During the nine months of helicopter patrols in experimental areas of the city, the intensity of those patrols is far greater than would be the case if the same number of patrolling hours were spread evenly over the whole city. Only the core and the access corridor received helicopter patrol over the whole year and these areas, too, received more patrol time than would have been available if the entire city had been covered with 1000 hours of flight time.

Density

The Nashville studies suggest that density of population makes a difference. Schnelle et al. (1978) find a deterrent effect where the density is 2120 persons per square mile. Kirchner et al. (1980) find no deterrent effect where the density is as low as 505 persons per square mile. They report an effect on burglary in areas where the density is 4480 and 5089 persons per square mile. In the low density areas, rates of burglary increase.

In the present study, the experimental area with the lowest density is 864/m^2 and the highest density is 7599/m^2. The density (population/m^2) of the other experimental areas are 2867, 2995, and 3299. Therefore, the study is representative of a broad range of densities.

LENGTH OF EXPERIMENTAL PERIODS

The length of each experimental period was pre-determined and not left to the judgement of persons dealing with operational, political or evaluation issues.

The intervention itself could not be administered in a fashion that no one would know whether the helicopter patrols were occurring or not. Nevertheless, we came close. Only a small number of very senior officers were briefed on the design of the study. Few people knew the boundaries of the experimental areas and even fewer knew on which days the helicopter would patrol.

More importantly, except for two administrative personnel close to the study, no one knew which areas of the city were serving as the comparison areas in any period of time, or for that matter, at any time during the study.

This means, therefore, that there was little opportunity to change policing behaviour, even if there had been an inclination to do so (which we do not believe existed), in the experimental areas. And, there was no opportunity to do so in the comparison areas.

Selection Of Measures

In addition, two other things need to be noted about the types of information on crime and calls for assistance monitored as our measures of change. First, the measures were selected prior to the beginning of the patrols and they were selected based on previous research as well as the program theory of possible effectiveness of helicopter patrols in deterring crime.

Second, the types of occurrences chosen are largely initiated by the general public as witnesses or victims rather than by police activity. Measures such as arrests or tickets written may be subject to change in policing activity, but we did not use any of them in the quasi-experimental part of this study.

DESCRIPTION OF THE DESIGNS

A design is a methodological means of trying to ascertain causality. Experimental designs do this with a high level of certainty. In an experimental design, two identical groups are formed at Time 1. An intervention is administered to one group (e.g., a drug or a procedure) and no such intervention is provided to the other group. At some later time (Time 2) the two groups are measured on the condition of interest (e.g., medical or physical). The amount of change is calculated for both the Experimental group (ET_1 - ET_2) and the Comparison group (CT_1 - CT_2). Change in the scores of the experimental group, may have taken place, but that change cannot necessarily be attributed to the intervention because other things may have also occurred to the members of that group during the time that elapsed between Pre-Test (Time 1) and Post-Test (Time 2): they got older, they may have been exposed to different air or modifications in the supply of water, they

may have been exposed to more or less sunshine. In other words, one or more of these things, or other changes not mentioned, may have contributed to the changes between Time 1 and Time 2, which have been observed.

The way to deal with the reasonable rival hypotheses that other interventions, but not the experimental one, may have "caused" the observed change is by having a control group. The control group is equivalent to the experimental group at Time 1. Because it is equivalent, it is made up of persons who have lived the same way as the members of the experimental group. They are, therefore, exposed to the same factors of ageing, water and sunlight as the members of the experimental group. Ideally, all their experiences are the same as those members of the experimental group, except for the experimental intervention.

Analytically, the amount of change that can be *attributed* to the experimental intervention is calculated as the amount of change that takes place in the experimental group MINUS the change that takes place in the comparison group. The purpose of the comparison group is to allow us to estimate the effects that other influences may have on the experimental group and allow us to *estimate what the condition of the experimental group would have been had there been no experimental intervention* (cf., Mohr, 1988:2; Whitehead and Avison, 1999:65-83).

For operational purposes, the City of London is divided into 21 policing "beats." Records of service and data on offences are kept by beat. The location and boundaries of those beats are not made public. We used combinations of adjacent beats to form various areas used for experimental areas and comparison areas. For the purposes of this report we will refer to "areas" and not "combination of beats"; there is no need to identify the specific beats.

Two designs are used. One is the preferable one, the other is simply the best that can be achieved under the circumstances. The preferred design is a pre-test-post-test design with a matched non-equivalent comparison area (additional details are provided below). The other design is a simple pre-post design where individual occurrences in certain months of one year is compared with the incidence in the same months of the previous year; sometimes referred to as "year-over-year" comparisons (discussed in chapter 4).

Pre-Post Design With Matched Non-Equivalent Comparison Area[3]

Five sets of experimental patrols took place. These are the situations where we established matched areas to serve as comparators. Matching was done by selecting areas from the same general area of the city that had similar rates of residential break and enter and robbery in the previous three years as well as had a similar mix of residential and commercial properties. Each set of experimental patrols lasted three months. Two occurred in the first quarter of the year, one in the second quarter of the year and two in the third quarter of the year.

[3] The design features of this study meet most of the critiques and recommendations made for such research in the Joint Helicopter Patrol Program evaluation (Research Management Consultants Inc., 2000).

Extent of patrols was varied somewhat. There is no literature that indicates the intensity of patrols that is *supposed* to make a difference.

Some previous studies that claimed to have an impact on rates of crime had patrols for very brief periods of time, e.g., nine and ten days, in the case of Nashville. In other cases no particular mention is made of the intensity of the patrols or the length of time over which they occurred.

Three intensities of patrol were planned: intermittent, intensive and very intensive. Their operational definitions are indicated in Figure 3.1 and the actual patrol time is provided as well. Figure 3.1 also provides the definition of full city patrols, which were conducted during the last two months of the study.[4]

FIGURE 3.1 TYPES OF PATROLS

OPERATIONAL DEFINITION	*PATROL ACTUAL TIME*
INTERMITTENT	
Frequency: average of 2.5 days/week	Quarter 1 7.26 hrs/wk
Intensity: average of 2.5 hours/day	Quarter 3 10.46 hrs/wk
Total: average of 6.25 hours/week	
INTENSIVE	
Frequency: average of 4.0 days/week	Quarter 1 10.99 hrs/wk
Intensity: average of 2.5 hours/day	Quarter 3 13.64 hrs/wk
Total: average of 10 hours/week	
VERY INTENSIVE	
Frequency: average of 4.75 days/week	Quarter 2 12.75 hrs/wk
Intensity: average of 3.0 hours/day	
Total: average of 14.25 hours/week	
FULL OPERATION	
Frequency: average of 4.75 days/week	Quarter 4 22.19 hrs/wk
Intensity: minimum of 2.0 hours/day	(2 months)
Total: average of 20 hours/ week	

[4] The original plan was for full city patrols to last for three months. Technical problems with the helicopter occurred between the end of the second quarter and the beginning of the third quarter. The Lycoming engine malfunctioned and had to be prematurely replaced. This was quickly followed by the re-fuelling truck striking the rotor blades and their having to be sent off for repair. The helicopter was inoperative for almost one month. We decided not to compromise the experimental patrols planned for the third quarter, so we started them one month later, but had them for the full three months. This left only two months for full city patrols.

The patrol time called for in the design of the study was met or exceeded in four of the five instances (Figure 3.1). In one case, Intensive Patrols in Quarter 3, they were exceeded by such a margin that the actual patrol time approximates that expected in Very Intensive Patrols. The Very Intensive Patrols in Quarter 2, are 1.25 hours per week short of the objective. It needs to be noted, however, that the area is the smallest experimental area. Judging from the complaints and, comments we received, this was an area in which the helicopter patrols were very prominent.

Measure of Change

We identified the types of crimes and calls for police activity that ought to be affected if police helicopter patrols serve as a deterrent. They were selected by starting with the findings of previous research and the program theory.

The claims of various studies include having found deterrence for up to three types of crime: robbery, residential break and enter and automobile theft. We asked: what do these crimes have in common; and how does that relate to the program theory as to why "the eye in the sky" should deter? All three of these types of crime have a sizeable out-of-doors component. These crimes may be committed there, but it requires getting to that place and away from there. These are all things that potential perpetrators may consider and they may conclude that the eye in the sky can see them and make a contribution toward an apprehension.

This leads to the consideration of what other types of crime and occurrences may, similarly, be deterred if there is, in fact, a deterrent effect. We considered that other "outside" crimes and occurrences that would fall into this category and decided on the following: commercial break and enter, theft from auto, property damage, trespass by night, calls about suspicious persons and about suspicious vehicles.

FRAMEWORK OF ANALYSIS

The analysis is conducted as follows. What is being measured is *relative change in the incidence of crime* and calls for service *between experimental areas and comparison areas*.

Incidence is the number of new events per some unit of population in a given period of time. The period of time in this case is three months. The unit of population used is per 10,000 population. This allows a direct comparison of two areas whose population is of different size because reducing the number of events to events per 10,000 population adjusts for differences in the number of potential victims and number of potential perpetrators across areas.

Change refers to the difference in the incidence of each crime between the three months prior to the experimental period and the three months of the experimental period.

Relative change takes into account not just the change that occurred in the experimental area, but adjusts that change by the change in incidence of the same types of crime that occurred in the comparison areas that did not have helicopter patrols.

Experimental Areas are those that received the helicopter patrols

Comparison Areas are similar to areas that received the helicopter patrols, but not adjacent to them.

Note: First the areas were matched, then the toss of a coin was used to determine which would be the experimental area and which would be the comparison area.

The formula used for analysis is the following:

$I = (E_1-E_2) - (C_1-C_2)$ where

I = Impact of helicopter patrols on deterring crime

E = Experimental area

C = Comparison area

$_1$ = Time 1, three month period prior to helicopter patrols

$_2$ = Time 2, three month period during which experimental areas received helicopter patrols.

The example in Table 3.1 provides the analytic and interpretive framework for this part of the study.

Seven types of crime and two types of calls for service are the focus of this study. The types of crime are the following: residential break and enter, commercial break and enter, auto theft, theft from auto, robbery, property damage and trespass by night. The two calls for service include calls about suspicious persons and calls about suspicious vehicles.

TABLE 3.1: Example – How the Analysis is Conducted

	Area	Population	Number of Events		Change	Incidence of Change
			Time 1	Time 2		
	EXPERIMENTAL	50,889	113	97	16	3.14
	COMPARISON	23,468	48	45	3	1.28

The change in the number of occurrences between Time 1 and Time 2 for the experimental area per 10,000 population minus the change in the number of occurrences between Time 1 and Time 2 for the comparison area per 10,000 population EQUALS the IMPACT.

$$\text{IMPACT} = [(E_1 - E_2)]/[10{,}000 \text{ pop.}] - [(C_1 - C_2)]/[10{,}000 \text{ pop.}]$$

$$E_1 - E_2 = \frac{113 - 97}{5.09} = 3.14$$

$$C_1 - C_2 = \frac{48 - 45}{2.35} = 1.28$$

$3.14 - 1.28 = 1.86$/10,000 population decrease

Interpretation: In this case there is evidence of a small positive impact on property damage as a result of helicopter patrols. The number of events of property damage is reduced by 1.86 per 10,000 population in a three month period.

In the tables that follow, the sign is changed such that a negative number denotes a decrease in incidence. In the case of this example, the Impact is expressed as I = -1.80.

CHAPTER 4

RESULTS: DETERRENCE OF CRIME

The results of multiple tests of the hypothesis that helicopter patrols are effective in reducing rates of crime are presented in this chapter. The strongest tests are presented first. They are the results from having had experimental and matched comparison areas.

The less robust test that relies on year-over-year comparisons is then presented for the core and corridor (from the airport to downtown) areas of the city.

Lastly, three alternative hypotheses are tested and they deal with the possibility of the following: 1) displacement of crime from patrolled to non patrolled areas; 2) spill-over of a deterrence effect from areas that were patrolled to the neighbouring areas that did not have helicopter patrols; and 3) differential deterrence of career criminals.

EXPERIMENTAL AND COMPARISON AREAS

The analysis and results are provided in this section for nine types of occurrences. The results are provided for each of these types of crimes. The results are also combined across time periods and intensity of patrols.

The fundamental tests of the hypothesis that helicopter patrols reduce the incidence of crime in patrolled areas over what it would have been, had there been no helicopter patrols, is tested five times each for six types of crime: residential break and enter, commercial break and enter, auto theft, theft from auto, property damage, and suspicious persons.

In the case of robbery each of the five tests involves a small number of observations so the results are best considered when all five test conditions are combined. Therefore, this is best considered to be a single test. Robbery has not been combined with other crimes because it is different in character from the others considered in this study. Robbery is defined as theft that includes force or the threat of force.

In the case of calls to the police about suspicious vehicles and trespass by night we have frequencies of occurrence that are even smaller than the case of robbery. Therefore, they are not used in this analysis, but the data are reported in Appendix A.

What we have, therefore, are thirty-one tests of the hypothesis that helicopter patrols have a deterrent effect on rates of crime: five each for residential break and enter, commercial break and enter, auto theft, theft from auto, property damage and suspicious persons and one for robbery. In addition, more encompassing meta analyses are conducted across all five tests in order to obtain summary measures of impact.

The experimental areas ranged in population from about 33,100 to 60,800 persons with an average of 46,100 persons. The comparison areas range in size from about 11,100 population to 33,100 population with an average population of 22,300.

Detailed information on each of the tests and categories of tests is provided in Tables 4.1 - 4.7. The results are summarized in two ways: 1) by the direction of the results of various tests; and 2) by the magnitude *and* the direction of the results.

Direction of results. In 17 of the 31 tests the results display some degree of reduction in the incidence of crime in the areas that received helicopter patrols in contrast to what would have been expected based on the experience of the comparison areas. Four of these, however, are very small and have a value of less than -1.0. Fourteen of the other tests indicate no impact (Table 4.8). More importantly, it should be noted that, except for commercial break and enter, the pattern of results is mixed.

Magnitude. When the magnitude of the results is taken into account, in addition to the direction, we find that the over-all change is even more modest than is suggested by the cursory analysis of direction.

An analysis of the results for all the tests for the various types of crime reveals the following:

- Residential Break and Enter: no impact (increased incidence of 12.36/10,000 population)
- Commercial Break and Enter: decreased incidence of 19.02/10,000 population
- Auto Theft: no impact (increased incidence of 31.31/10,000 population)
- Theft from Auto: no impact (increased incidence of 26.06/10,000 population)
- Property Damage: no impact (increased incidence of 0.76/10,000 population)
- Robbery: little or no impact (the numbers are small)
- Suspicious Persons: decreased incidence of 4.32/10,000 population.

In brief, for four of the seven meta analyses, the verdict is clear that the patrols had no impact on the incidence of crime. An impact is suggested in the case of commercial break and enter (a decrease in each of the five tests) and, to a lesser extent, for suspicious persons. The total size of all of the decreases, however, is smaller than the total size of increases experienced in Auto Theft and Theft From Auto. In the case of robbery the net impact of -0.90 is very small and highly unstable because of the very few observations on which it is based.

Two other features of this study need to be considered before forming a conclusion: the occurrences examined and the intensity of patrols. First, all of the types of occurrences included were considered good candidates for suppression effects and that previous research had claimed to find suppression effects relative to some of these (e.g., auto theft, robbery and residential break and enter).

Second, if helicopter patrols deter crime, more intensive patrols should display a greater impact than less intensive patrols. The evidence of impact, such as it is, reveals no apparent relationship between impact and whether patrols were intensive or intermittent. Even in the case of commercial break and enter, where the results are the most consistent, we find that the apparent impact under intermittent patrols (in Quarter 1) was greater than under the three more intensive sets of patrols. For the other of occurrences the variability is even greater; hence, within the range of intensiveness measured in this study the type (amount) of patrolling is independent of evidence of impact.

Therefore, the most reasonable conclusion is that, in the overall, it cannot be inferred that helicopter patrols had a deterrent effect on the incidence of crime.

TABLE 4.1: Summary of Findings for Residential Break and Enter

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	63	93	3.31	69	45	15.51
1 (Intermittent)	5.09	72	67	2.35	18	28	-5.24
2 (Very Intensive)	6.08	69	98	1.46	25	38	-4.13
3 (Intensive)	3.31	79	22	1.11	41	15	6.20
3 (Intermittent)	4.97	69	64	2.95	47	44	0.02
Net Impact							**12.36**

TABLE 4.2: Summary of Findings for Commercial Break and Enter

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	24	37	3.31	21	46	-3.97
1 (Intermittent)	5.09	22	31	2.35	2	22	-6.74
2 (Very Intensive)	6.08	73	25	1.46	31	22	-1.73
3 (Intensive)	3.31	33	13	1.11	8	8	-6.04
3 (Intermittent)	4.97	15	14	2.95	6	7	-0.54
Net Impact							**-19.02**

[a] Received helicopter patrols
[b] Matched area that did not receive helicopter patrols and is not adjacent to the experimental area
[c] Population of the area, expressed per 10,000 persons
[d] Frequency of incidents in the three months prior to patrols
[e] Frequency of incidents during the three months of patrols
[f] For definitions see Figure 3.1
[g] Per 10,000 population, with the sign changed such that a negative number denotes a decreased incidence.

TABLE 4.3: Summary of Findings for Theft from Auto

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	84	130	3.31	80	83	11.76
1 (Intermittent)	5.09	143	126	2.35	69	53	3.47
2 (Very Intensive)	6.08	125	186	1.46	37	55	-2.30
3 (Intensive)	3.31	154	155	1.11	71	43	25.53
3 (Intermittent)	4.97	182	117	2.95	124	122	-12.40
Net Impact							**26.06**

TABLE 4.4: Summary of Findings for Auto Theft

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	65	80	3.31	73	68	5.64
1 (Intermittent)	5.09	47	117	2.35	29	24	15.88
2 (Very Intensive)	6.08	95	130	1.46	26	30	3.02
3 (Intensive)	3.31	81	104	1.11	24	17	13.26
3 (Intermittent)	4.97	67	87	2.95	53	84	-6.49
Net Impact							**31.31**

[a] Received helicopter patrols
[b] Matched area that did not receive helicopter patrols and is not adjacent to the experimental area
[c] Population of the area, expressed per 10,000 persons
[d] Frequency of incidents in the three months prior to patrols
[e] Frequency of incidents during the three months of patrols
[f] For definitions see Figure 3.1
[g] Per 10,000 population, with the sign changed such that a negative number denotes a decreased incidence.

TABLE 4.5: Summary of Findings for Property Damage

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	59	71	3.31	73	76	2.40
1 (Intermittent)	5.09	113	97	2.35	48	45	-1.86
2 (Very Intensive)	6.08	93	139	1.46	31	33	6.20
3 (Intensive)	3.31	79	66	1.11	28	32	-7.53
3 (Intermittent)	4.97	86	92	2.95	55	54	1.55
Net Impact							**0.76**

TABLE 4.6: Summary of Findings for Robbery

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	6	6	3.31	6	5	0.30
1 (Intermittent)	5.09	3	1	2.35	6	3	0.89
2 (Very Intensive)	6.08	5	4	1.46	1	1	-0.16
3 (Intensive)	3.31	4	3	1.11	1	4	-3.00
3 (Intermittent)	4.97	6	13	2.95	3	4	1.07
Net Impact							**-0.90**

[a] Received helicopter patrols
[b] Matched area that did not receive helicopter patrols and is not adjacent to the experimental area
[c] Population of the area, expressed per 10,000 persons
[d] Frequency of incidents in the three months prior to patrols
[e] Frequency of incidents during the three months of patrols
[f] For definitions see Figure 3.1
[g] Per 10,000 population, with the sign changed such that a negative number denotes a decreased incidence.

TABLE 4.7: Summary of Findings for Suspicious Persons

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	13	14	3.31	24	13	3.60
1 (Intermittent)	5.09	25	18	2.35	9	6	-0.10
2 (Very Intensive)	6.08	34	30	1.46	5	12	-5.45
3 (Intensive)	3.31	26	20	1.11	5	6	-2.71
3 (Intermittent)	4.97	15	25	2.95	15	21	-0.02
Net Impact							**-4.32**

TABLE 4.8: Direction of Results for Thirty One Tests Conducted

	Reduced	Not Reduced
Residential Break and Enter	2	3
Commercial Break and Enter	5	0
Auto Theft	1	4
Theft from Auto	2	3
Property Damage	2	3
Robbery	1	
Suspicious Persons	4	1
Total	**17**	**14**

[a] Received helicopter patrols
[b] Matched area that did not receive helicopter patrols and is not adjacent to the experimental area
[c] Population of the area, expressed per 10,000 persons
[d] Frequency of incidents in the three months prior to patrols
[e] Frequency of incidents during the three months of patrols
[f] For definitions see Figure 3.1
[g] Per 10,000 population, with the sign changed such that a negative number denotes a decreased incidence.

YEAR-OVER-YEAR DESIGN

One area of London received helicopter patrols throughout the year of the study. It extends from the airport at the East, (where the helicopter was housed), to the downtown area of the city on the West. The area covers 22.5mi^2 and includes residential, industrial and commercial areas as well as the downtown.[1] The total population of this area is 54,363.

There is no area of the city that can be used as a reasonable comparator. We are reduced, therefore, to comparing frequency of occurrences during the year of helicopter patrols to the frequency of occurrences in the previous twelve months when there were no helicopter patrols. The year-over-year comparisons for the nine types of occurrences are presented in Table 4.9.

Auto theft decreases from 641 in the year prior to helicopter patrols to 574 in the year of helicopter patrols. Property damage decreases from 1141 occurrences to 1104 occurrences. This is more than balanced by increases in residential break and enter (642 to 680), theft from automobile (1270 to 1364) and robbery (104 to 129). When all of the occurrences are summed, there is an increase from 4407 to 4466.

These results do not support the hypothesis that helicopter patrols deter crime. It would be a mistake to point to the exceptions, as we think has happened in other studies, and conclude that there is an impact when, taken within the context of similar types of occurrences, this is not the case.

In addition, it should be noted that the evidence for the suppression with respect to commercial break and enter in the experimental areas is not corroborated here.

TABLE 4.9: Frequency of Target Occurrences in the Year Prior to Helicopter Patrols and the Year of

	July 1998 - June 1999 No Helicopter	July 1999 - June 2000 Helicopter Patrols	Change
Residential Break and Enter	642	680	+38
Commercial Break and Enter	406	408	+2
Auto Theft	641	574	–67
Theft from Auto	1270	1364	+94
Suspicious Person	176	173	–3
Suspicious Vehicle	18	27	+9
Trespass by Night	9	7	–2
Robbery	104	129	+25
Property Damage	1141	1104	–37
Total	**4407**	**4466**	**+59**

[1] Part of that area includes the airport. The area to be patrolled is much closer to 10mi^2.

TESTS OF ALTERNATIVE HYPOTHESES

As part of this study, three alternative hypotheses are also tested. Provision was made in the original design to test for displacement effects (that is, whether helicopter patrols simply move crime to different areas) and spill-over effects (whether helicopter patrols reduce crime not only in the areas patrolled, but in adjacent areas as well). A third hypothesis is also tested; it addresses whether helicopter patrols have a differential impact on high frequency criminals versus those who commit crimes with less frequency.

Displacement/Spill-Over

The design of the first quarter experiments contained an additional feature. It is recalled that two of the earlier studies, tested for and concluded that helicopter patrols did not displace crime from the patrolled area to nearby areas that did not receive patrols (Schnelle et al., 1978; Kirchner,1980).

A third study (Lateef, 1974) contended that there was a displacement effect, though we believe that those results are misinterpreted or, at the very least, open to a quite different interpretation.

Beyond the possibility of there being a displacement effect on crime there is also another theoretical possibility and that is that helicopter patrols may reduce rates of crime in adjacent areas as well; we call this a spill-over effect.

In order to test for displacement and spill-over effects the two experimental areas in the first quarter were matched not only with a non-adjacent comparison area, but also with an adjacent co-comparison area. The purpose of the co-comparison area is to allow us to test for displacement or spill-over effects (represented in Figure 4.1).

FIGURE 4.1: Representation of the Design of the First Quarter Experimental Patrols

COMPARISON AREA	CO-COMPARISON AREA (TEST FOR DISPLACEMENT/ SPILLOVER)	EXPERIMENTAL AREA

Evidence for a displacement effect would take the form of increased crime in the co-comparison area accompanied by decreased crime in the experimental area at the same time that crime in the comparison area either did not change or changed in the opposite direction as crime in the experimental area.

The displacement hypothesis can be tested on the six types of occurrences for which there is a sufficient number of observations: residential break and enter, commercial break and enter, auto theft, theft from auto, suspicious persons and property damage. There are twelve tests in all: six for intensive patrols and six for intermittent patrols.

In only one of the tests does the pattern of results suggest a displacement effect. Residential break and enter in the intermittent condition decreases in incidence by 0.98 while the incidence increases by 4.26 in the comparison area and by 2.67 in the co-comparison area.

Because the same pattern is not found in the other eleven tests, we conclude that displacement of crime is not a likely consequence of helicopter patrols.

Evidence of a spill-over effect would take the form of decreased crime in the co-comparison area accompanied by decreased crime in the experimental area at the same time that crime in the comparison area either did not change or changed in the opposite direction. The same twelve tests reveal that this did not happen.

The prevailing pattern of results does not support the hypothesis that there was either a displacement effect or a spill-over effect on rates of crime.

Selective Deterrence

At the end of the first quarter, when the results indicated that the impact of helicopter patrols on the reduction of crime was at best small, discussions took place to determine why? The reason that stems directly from the reason to do the study, in the first place, is that perhaps helicopter patrols have little deterrent effect on rates of crime.

The issue. There was, however, an alternative hypothesis that was advanced, even though there is nothing in the literature about it and it had not occurred to us previously. Could it be that a relatively small number of persons who commit a high frequency of crimes of interest (e.g., residential break and enter, commercial break and enter, auto theft and theft from auto) produce a large distortion in the data and make it impossible to find a deterrent effect in the data when all such occurrences are considered? The suggestion is that the pattern and quantity of offences may depend on when this fairly small number of offenders leaves jail or returns to London and their criminal activity picks up. In other words, their high frequency of crimes when they are "on the street," adds variability to the crime statistics that masks an effect that helicopter patrols may have on deterring less frequent perpetrators. This view includes the idea of selective or differential deterrence; that is, perhaps these high frequency offenders are less likely to be deterred by helicopter patrols than those who commit such crime less frequently.

We thought that this deserved to be tested.

It occurs to us, however, that the idea that there may be two different categories of perpetrators, one of which may be deterred and the other high frequency offenders less likely to be deterred, may fly in the face of deterrence theory.

Specifically, if there are two categories of perpetrators, "Casuals," who commit such crimes infrequently, and "Hard Core," who commit such crimes with a high frequency and as a way of life, then the criminal behaviour of which category is more likely to respond to helicopter patrols, according to what economists call *utility theory* or what sociologists prefer to call *rational choice theory* (for a discussion see Maxim and Whitehead, 1998: 233 - 255).

Utility theory assumes that people act rationally and that in so doing they minimize their costs and maximize their benefits. They are most moved to act in situations where the gains are high and the costs are low. They are least likely to act when the gains are small and the costs are high.

In this situation we have to ask, which of these two classes of actors, the Casual or the Hard Core, are more likely to act rationally. If there is a difference, it should be the Hard Core who would more likely change their behaviour in response to the higher risk (cost) posed by helicopter patrols.

Auto theft or break and enter is a career for them. They are invested in it as a way of life. The presence or potential presence of a helicopter constitutes an increased cost because of the risk of being seen and the perceived risk of apprehension may be increased. Because they also commit so many more crimes they are "at risk" more frequently.

The test. In order to test these alternative hypotheses the following steps are taken. We want to be able to consider separately the behaviour of the Casuals and the Hard Core. This requires that we be able to identify them in the first place. Records of conviction are inadequate for this purpose as they do not come close to adequately reflecting the actual amount of crime committed by individuals in a given period of time.

We choose instead to focus on "crimes cleared." Crimes are cleared by the police on the basis of collecting information that leads them to a reasonable level of certainty about who committed certain infractions. This process is partly related to collecting evidence to be used for filing charges and the Crown gaining a conviction, but it is also partly separate from it. The police may be convinced that a certain individual committed, say, 15 residential break and enters. The incidents may have occurred in the same area, in the same period of time and similar types of items may have been stolen and similar means of entry used. On the basis of the evidence collected (e.g., some stolen goods and some fingerprints), the Crown may only be able to charge the person with 10 counts rather than 15. A plea bargain may result in the accused pleading guilty to only three counts. As far as the police are concerned, there is no need to look for the perpetrator of the other 12 B & Es; they already have the person, even though that person pled guilty to only three counts. The police count 15 occurrences cleared. In addition, it is not unusual for the police to interview persons who have been apprehended and gain admissions from them about other, usually similar crimes about which the police have little or no evidence. When these admissions are made and a reasonable level of detail provided that the police are confident that the person is not simply bragging, those other occurrences are also listed as "cleared."

For the purpose of the present study, we use crimes cleared by the police for the target occurrences. The frequency of events is calculated for each person during the three months prior to the first experimental period of helicopter patrols to the end of the first quarter. The location of each of these occurrences is also known. Persons with three or fewer, of any of the target crimes, are considered Casuals and those with more than three of the target crimes are considered Hard Core. Hard Core offenders have a range of 4 to 33

occurrences. Thirteen persons accounted for 261 occurrences. The average number of occurrences for these persons is 20, the median is 11. The frequency of occurrences accounted for by Hard Core persons is then removed from the occurrence data in both the experimental areas and the comparison areas for the entire six month period. The change in the pre- and post- helicopter patrols are again compared for the purpose of looking for a difference that could be attributed to the helicopter patrols. There is none.

Therefore, we concluded that **there is no differential impact on the suppression of crime for Hard Core and Casual criminals. The incidence of crime of neither category appears to be suppressed by helicopter patrols.**

SUMMARY

The various designs and analyses conducted in this study do *not* find support for the following: suppression (deterrence) of incidence of crime/occurrences; spill-over effect; displacement effect; or differential deterrence.

It was our intention to convert the value of crimes suppressed in order to estimate whether there is a financial benefit to suppression that may balance some or all of the costs of providing helicopter patrols. Given the findings and conclusions of this part of the study this is moot.

CHAPTER 5

RESULTS: OPERATIONAL EFFECTIVENESS AND EFFICIENCY

It has been asserted, in a variety of other places, that helicopters increase the effectiveness of the police. Among these claims are that they save time, they save lives, they increase the likelihood of apprehensions and that they contribute to the safety of citizens and Police Officers. The London Police Service Helicopter Research Project addresses the questions of effectiveness and efficiency.

METHODOLOGICAL NOTE

It needs to be raised at the outset, though it has not been raised in other evaluations, that there is a bias in examining the *effectiveness* and *efficiency* of helicopter involvement that favours finding the helicopter to be effective and efficient. Neither this study, nor other accounts of helicopter involvement, are based on random assignment of the helicopter to particular occurrences. If the helicopter is available to be dispatched, then, it may be dispatched. If it is in the air and not otherwise engaged it can respond to the most recent call that appears in the dispatch queue. This means, therefore, that it has an edge in terms of being first on the scene that is independent of its speed. When the helicopter is not flying, it has no chance to be *late* to a call so its performance is not measured at all for that occurrence.

There is, therefore, some selection bias in terms of the occurrences to which the helicopter is dispatched and to which it independently decides to attend. We do not think that this accounts for all of the differences that may be observed between the effectiveness of helicopter and no-helicopter conditions. We have no certain way of estimating the relative effects to be attributed to selection, rather than to real effectiveness, but, in our analysis of apprehensions, we did focus on only those calls where the event "just happened" or was "in progress."

Operational effectiveness is addressed in two broad ways. The first presents a statistical analysis of the occurrences at which the helicopter attended and presents indices of relative efficiency with information on such things as frequency of being first on the scene, the amount of time per call and apprehensions compared to similar occurrences when the helicopter was not involved.

The second way in which operational effectiveness is addressed is by using the logs of occurrences to present the context and texture of helicopter policing as it was experienced in London.

The operational topics addressed in this chapter are wide ranging. They include various features and categories of searches: establishing/maintaining the perimeter; search for persons; search for suspect; search of tracks; and search of roofs. Other operational topics covered are the following: the contributions of the police helicopter in dealing with crowds; officers safety; surveillance; and assists to other services. In addition, there are sections on the use of thermal imaging technology, traffic, and pursuits.

Logs of occurrences have been selected because they illustrate one or another operational matter. Typically, each log contains information that relates to multiple operational considerations. There is, therefore, some measure of arbitrariness with respect to which log best displays what about operational issues. This also means that the logs can be read *in toto* with respect to operational issues. There is no criterion as to the correct number of the logs to present, we edged toward presenting too many rather than too few, but we do try to capture the range and variety of experiences.

OPERATIONAL SUMMARIES

First on Scene, Officers Cancelled and Officers Down time

During the year of the police helicopter patrols the crew attended at 844 occurrences. The types of occurrences, the number of calls, the number of times when the helicopter was first on scene and the number of officers that would have potentially been sent to the call, but were cancelled by the helicopter, are reflected in Table 5.1.

There are types of occurrences for which helicopter response is particularly suitable. Prompt response with respect to incidents that have just occurred or are in progress are among these; a high proportion of the time the helicopter is first on the scene. One of the benefits of being first on the scene is that, if the matter is under control, or already resolved, Police Officers who would otherwise be dispatched to the call can be cancelled. This produces a savings of officer time that can be allocated to other occurrences. **A total of 106 officers were cancelled by the helicopter.** (97 indicated in Table 5.1 and 9 from other occurrences).

Another type of efficiency deals with whether the response of the helicopter can mean a reduction of down time for Police Officers per call.

Table 5.2 identifies all of the types of occurrences where the helicopter responded ten or more times and presents the average officer down time for those occurrences as well as average officer down time for calls of that type responded to by all of the London Police Service between 1 July, 1999 and 30 June, 2000.

The table allows us to appreciate, for example, that for “assault” the average amount of down time per occurrence was 89.20 minutes for the service as a whole and 76.00 minutes when the helicopter was involved. If two Police Officers were involved in a given occurrence the amount of time “saved” would be the difference (89.20 - 76.00 = 23.20 minutes) times two (two Police Officers) or 46.40 minutes. The column with the number of occurrences allows one to appreciate the number of observations (occurrences) over which the average times are calculated. The fifth column indicates the total number of Police Officers who were involved in the various categories of occurrences. In the case of “assault,” we note that the 14 occurrences were responded to by a total of 32 Police Officers, including the helicopter. The *apparent efficiency* is the difference in time per Police Officer for that type of occurrence, multiplied by the number of Police Officers who responded to those occurrences. The net amount of time saved takes into consideration

that for some types of occurrences helicopter involvement may mean more time spent per Police Officer. Whether this is worthwhile is not a matter of efficiency, which is what is being measured here, but of effectiveness which is dicussed below.

From Table 5.2 we find that the apparent level of efficiency over the 563 occurrences amounts to a savings of 12,163 minutes or 203 hours. If the same level of efficiency prevailed over the remainder of the 844 occurrences, to which the helicopter responded, the savings would have been 18,234 minutes or 304 hours of Police Officer time, available to be deployed.

Apprehensions

Flight Officers make no apprehensions, but they contribute to apprehensions by locating and tracking suspects, setting perimeters, illuminating areas and directing Police Officers on the ground. As a measure of effectiveness we have examined the proportion of occurrences that resulted in an apprehension (i.e., where a charge was laid or a warning issued). Table 5.3 presents occurrences where the helicopter was involved ten or more times. All the incidents covered in this analysis are those that had "just occurred" or were "in progress."

Except for Noise in Progress and Prowler, **occurrences in which the helicopter participated had a much higher ratio of apprehensions than in those where the helicopter did not participate.** This strongly suggests that helicopter policing makes a significant contribution to the rate of apprehensions. Apprehensions made at the time of the occurrence have the additional advantage of not requiring additional police time to track down those who got away at the time of the original occurrence.

TABLE 5.1: Occurrences to which Police Helicopter Responded, Frequency of First on Scene and Number of Officers Cancelled.

	Type of Occurrence	Total number of Occurrence	# First on the scene	Officers cancelled by helicopter
	Robbery in progress	3		
	Robbery just occurred	7	1	
	Mental Health	5	1	2
	Assault in Progress	4	3	
	Assault just occurred	10	6	
	Weapons in Progress	17	5	
	Weapons just occurred	20	12	
	Domestic in progress	16	10	
	Missing person in progress	25	8	
	Missing person just occurred	3		
	Noise in progress	21	12	1
	Disturbance in progress	69	45	12
	Disturbances just occurred	8	6	
	Trouble with person I/P	58	35	7
	Trouble with person J/O	27	16	4
	Drunk in progress	12	10	3
	Check welfare in progress	13	9	
	Check welfare just occurred	3	2	
	Assist other agency in progress	16	10	1
	Assist other agency just occurred	3	1	
	Assist Fire Dept. in progress	9	4	
	Assist Fire Dept. just occurred	9	5	3
	B&E in progress	16	6	

	B&E just occurred	19	8	
	Theft in progress	4	1	
	Theft just occurred	12	4	1
	Property Damage in progress	6	2	3
	Property Damage just occurred	10	6	4
	Prowler in progress	23	15	19
	Prowler just occurred	3	2	
	MVC / H&R	10	4	
	Traffic (other) in progress	8	7	4
	Traffic (other) just occurred	4	2	1
	Impaired in progress	7	6	
	Impaired just occurred	2	1	
	Suspicious person in progress	102	63	10
	Suspicious person J/O	22	14	2
	Suspicious vehicle in progress	20	14	3
	Suspicious vehicle J/O	9	4	2
	Alarm in progress	55	37	15

TABLE 5.2: Efficiency: Apparent Time Saved When the Helicopter is Involved in Various Types of Occurrences

Type of Occurrence	Helicopter Patrols		Service as a whole			
	Total number occurrences	Average officer down time (min.)	Total number occurrences	Average officer down time (min.)	Number of Police Officers Involved (Helicopter)	Apparent Helicopter Efficiency[a] (min.)
Assault	14	76.0	958	89.2	32	422
Weapons	37	69.11	367	104.5	198	7007
Disturbance	77	47.33	2194	46.00	359	-477
Trouble with Person	85	44.82	8589	55.26	299	254
Assist Fire Dept.	18	51.48	747	77.78	74	1946
Break and Enters	35	52.2	540	59.22	207	1453
Theft	16	64.24	704	78.72	58	840
Property Damage	16	51.08	665	67.85	52	872
Prowler	26	32.17	1028	42.01	75	738
Traffic	22	64.03	2208	64.65	67	42
Impaired Drivers	9	73.43	655	88.31	31	461
Suspicious Person	124	43.60	3249	42.00	426	-682
Suspicious Vehicle	29	50.68	789	42.00	105	-911
Alarm in Progress	55	24.88	2805	26.00	177	198
Total	563				2160	12,163

[a] Average officer down time (total Police Service) MINUS average officer down time (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 5.3: Apprehensions - Percent of Occurrences Cleared ("In Progress" or "Just Occurred") by the Laying of a Charge or the Issuance of a Warning: Comparisons of Occurrences Where the Helicopter Was Involved with Those Where it Was Not Involved[a]

Type of Occurrence	HELICOPTER			
	NOT INVOLVED[b]		INVOLVED	
	Number	Percent Cleared	Number	Percent Cleared
Assault	958	22	14	36
Weapons	367	13	37	46
Domestic in Progress	2862	14	16	31
Missing Person	1723	2	25	28
Noise in Progress	4686	29	21	10
Disturbance	2194	13	77	25
Trouble with Person	8589	15	85	31
Drunk in Progress	1800	32	12	67
Check Welfare	4422	3	16	6
Assist Other Agency	1337	2	19	5
Assist Fire Department	747	1	18	6
Break and Enter(Res.)	540	6	35	29
Theft	704	9	16	35
Property Damage	665	14	16	31
Prowler	1028	29	26	15
Traffic MV H & R	2208	18	22	27
Impaired Drivers	655	51	9	89
Suspicious Persons	3249	5	124	33
Suspicious Vehicles	789	4	29	41
Alarm in progress	2805	1	55	2

[a] All occurrences where the police helicopter was involved at least ten times are reported.
This includes all of the instances where the helicopter was involved, but these cases involve a small proportion of the total. The impact is to *minimize* the difference of having the helicopter involved.

FROM THE LOGS

In the sections that follow, we present excerpts that are slightly edited from the AIR 2 logs, in order to provide some details and texture to the operational involvement of the police helicopter. The excerpts are not randomly selected. Rather, they are selected to illustrate types and variability of usage and outcome. With respect to outcome, readers will note that unlike other "evaluations" we have included logs of events that appeared to produce little or no results, no apprehensions and participation in events that are not only undramatic, but quite ordinary. We think that this is an accurate portrayal of policing, generally, and helicopter policing, specifically. Getting the job done in a timely and professional manner is the goal. The job involves many activities that, while important to the complainant, are fairly routine occurrences. A search does not always lead to finding that for which one is searching.

With a view that this report will be of interest to many who are not intimately familiar with London, specific identifiers have often been replaced with descriptive ones to communicate the nature of the situation. We believe that the excerpts still remain faithful to the logs.

The amount of time devoted to each call is noted as is the nature of the involvement of AIR 2. We believe that the excerpts from the logs, when taken in conjunction with the tabulations and analysis of involvements in the earlier part of this chapter, present a reasonable portrayal of the operational involvement of the police helicopter and the considerable range of activities in which it was involved during the one year trial period. It can not, however, adequately capture the full detail and range of the experience of the flight crew. The three Flight Officers and the pilot remain a significant source of practical knowledge about helicopter policing. Their stories are not only about the successes of the missions they flew, but also about how at the onset they thought/hoped that even more would be accomplished. Our experience with them is that they are highly committed to this project, dedicated to the needs of their job and this study and very nice people with whom to work. In the previous section we offered a variety of indexes of operational effectiveness and we did this without relating the specifics of any of the occurrences. Flight Officers kept logs of all occurrences. The logs add background to the numerical pictures offered earlier. It is easy to go through the occurrence reports and pick out the "good news" and "success" stories that they contain. We have been dismayed, however, when they have been used in this way in other reports, as the means of "collecting" evidence on the operational effectiveness of police helicopters. Having read through these occurrence reports, this evaluator can say that the London study also provides many good news stories, but they are not as concentrated as would appear to be the case judging from the "evaluation" reports that have been produced by other services.

We think that the contents of the occurrence reports allow readers to develop an appreciation of how the helicopter can be used. Unless, of course, some of the "less than good news" stories are also included, the utility to an evaluation is too limited. Four alternatives were rejected as bases for the selection of logs to be presented: present none of the occurrence reports; present all of the occurrence reports; select the most interesting occurrence reports; and present a random sample of reports. While the random sample

has considerable appeal because of the external validity it produces, it does not allow an appreciation of the range of activities for many specific types of uses. In the sections that follow we include “From the Logs” where occurrences that display the uses of the police helicopter are displayed in edited form (Figure 5.1). Instances where they did not find what they were looking for and where “no apprehension occurred” are also included because this is representative of the general experience.

FIGURE 5.1: Notations in the Occurrence Logs

AIR 2	The flight name of the London Police Service Helicopter. AIR 1 was provided to York/ Durham.
PC	Police Constable; the name of the Constable has been deleted.
FLIR	Forward Looking Infra Red; the commercial name for the principal type of thermal imaging equipment that was used.
**	Indicates comments by the Flight Officer about what appeared to be the unique contribution of the police helicopter to the occurrence.
Generic Designations	In many, but not all cases, street names, names of apartment buildings and names of commercial establishments have been removed and sometimes given a more general name, such as “Popular Bar.”
Other Editing	Minor editing has been done to provide clarity. In a few cases supplementary information from the occurrence reports that were not in the logs (e.g., number of persons apprehended) has been included.

NOTES ON SEARCH AND RESCUE

Almost all that follows falls into the broad categories of search and some in the category of rescue. London is an urban area with over 325,000 population spread over 162mi^2 . Whether searching for suspect or seniors who have wandered, the reality is that of a search in an urban area. We have highlighted the particular areas of search that characterize London, some of these types of areas are also found in other cities so there is the opportunity to appreciate the advantages and limitations of conducting such operations with the use of a police helicopter.

SEARCH

Search operations can be successful in two ways. The first, is when the object of the search is found. The second, however, is when the areas of concern, those that need to be searched, are searched, even if nothing is found. The latter is particularly the case when the area of concern is one that presents special dangers for the person who may be missing; this is most obvious in cases of young children or elderly adults who have wandered away and there is concern that they may be along river banks or other hazardous places. AIR 2 responded to many such calls. While it would be nice to report that young children or elderly persons were regularly found by the helicopter, they were not always found. We can report, however, that many searches of difficult places and searches that would have been more time consuming by car or on foot were conducted by the helicopter, freeing Police Officers to search other locations (e.g., indoors) that, in some cases, did result in finding the missing person.

The arrival of the helicopter, as first on scene, can have a number of advantages. If nothing is going on, ground units can be cancelled; if there is activity, the ground units can be directed to their optimal locations. The helicopter is frequently effective in securing the perimeter and getting a response from suspects, as when they go to ground. One such incident is summarized below where the officer assures, and we concur, that a pursuit situation was probably avoided.

- Retrieved call from Holding Queue
  Citizen reported that two males had just exited a vehicle and were checking out other vehicles on the parking lot. Headed to area and arrived, first on scene, at 0332 hrs. No ground unit dispatched at this time. Immediately began a low level flight and utilized search-light to establish a perimeter until arrival of ground units. Ground units arrived on scene approximately five minutes after arrival of helicopter. Ground units located male hiding inside stolen vehicle which was parked on lot. Area searched for other possible suspects. Neg Results.

*** I firmly believe that the helicopter was instrumental in the arrest of the male suspect in this event. By arriving on scene and immediately establishing a perimeter using the search-light and low level flight, it is likely that the subject felt no other option but to hide inside of the stolen auto.*

Had the helicopter not arrived on scene it is quite likely that the subject would have evaded police or even worse engaged in a dangerous pursuit involving a stolen auto. This is an excellent example of the helicopters effectiveness in establishing a quick and efficient perimeter and to encourage subjects to "go to ground," rather than running.

Of course, it also happens sometimes that being first on the scene leads to the suspects dispersing. If it is a fight, it is usually desirable that it breakup even though no apprehensions may result.

Establishing/Maintaining the Perimeter

Sometimes, because the police helicopter is first on the scene, and other times, because there are few or no other Police Officers in the area, the contribution of the Police Helicopter is to establish or maintain the perimeter and make it possible for ground units to pursue the search.

- Recovered Stolen Auto

  Officer reported four people running from stolen vehicle which had been dumped. Attended and contained perimeter with use of search light.

  Three persons arrested within perimeter.

  ** The helicopter was effective in establishing a quick and secure perimeter which assisted in keeping subjects within immediate area until arrest effected by ground officers (43 minutes).*

- CDSA Investigation

  Ground unit had male bolt from him upon discovering narcotics in his possession. Lengthy foot chase resulted and AIR 2 attended scene from airport. Spotlight search was conducted in relation to block perimeter. Information was then received that suspect had entered a dwelling. Spotlight was used to assist ground units and maintain perimeter on that dwelling. Suspect was arrested inside (35 minutes).

Break/Enter just occurred

Citizen reports two males running from residence. One party arrested by ground unit prior to AIR 2's arrival and one male still outstanding.

AIR 2 immediately began flying low level perimeter around block in hopes of containing subject. Male was located (By K-9) within perimeter hiding under snow fence. Although AIR 2 did not have visual on this party (as he was sheltered by the snow fence) - it is believed AIR 2 assisted greatly at keeping subject within perimeter (25 minutes).

Search for Persons

Searches for persons take many different forms. In the first two below, without a helicopter, it would have taken far more time with only a ground search. In the case of the four youths, the operation took only thirteen minutes of helicopter time and the youths were safely returned.

- Missing Person, Suicide, Fanshawe Park (1)
  Vehicle owned by missing person found at the entrance to Fanshawe Park. Male has been suffering from depression and occurrence has been on going from time he was reported missing. AIR 2 attended scene and conducted FLIR and spotlight search in park area for male. Negative results. Further checks will be made during next day's dayshift (4 hours, 47 minutes).

- Missing Person, Fanshawe Park (2)
  Follow up search of park in relation to missing person. At approx. 11:50 AM, while conducting an intense grid search, pilot noted a possible figure in the wooded area on the south boundary of the park. Lower elevation check revealed possible male hanging from tree branch. AIR 2 set down west of scene and constable approached area on foot, re possible first aid treatment. Upon closer inspection male party involved was obviously dead and radio was advised of situation. Ground units took control of scene.
  ** FLIR and spotlight were not used during daytime portion of search and it appears that male was dead from 2 days prior, which would have resulted in him not being detected on FLIR during search on the previous day.*
  This was the second day of intense search of the park for the male involved and it is apparent without the assistance of AIR 2 many more manpower hours would have been used in locating/searching for the male involved. (3 hours, 8 minutes).

- Missing Persons X 4

  Four youths missing from children's treatment facility, thought to be hiding in the woods behind the complex AIR 2 attended and spotted youths in an open field behind the complex. All youths were returned (13 minutes).

- Section 11 MHA / Missing Person

  Mother contacted Police reporting her 32 year old son had just left the residence on bike wanting to commit suicide. AIR 2 attended scene to assist ground units already searching for the male. Upon AIR 2 arrival PC advised of a possible sighting of male at the extreme north end of Kains Rd. Due to the brush and fields located at this location PC could not confirm whether it was male involved in this occurrence. AIR 2 set down in the field near the male and PC confirmed it was the male involved. PC escorted male to ground units who took him into custody. Male was taken to hospital for assessment (29 minutes).

- Complaint

  Citizen contacted police reporting a possible plane crash.
  AIR 2 attended area and checked using spotlight, with negative results. No ELT transmissions were coming from the area and flight service at London Airport reported no over due aircraft. AIR 2 saved considerable time and manpower by conducting search (20 minutes).

- Recovered Stolen Vehicle / Break & Enter

  Ground Units requested AIR 2's assistance in checking area for male who had committed B/E and then dumped stolen auto. Male also believed to be armed with shotgun and responsible for armed robbery which had occurred during the night. A great deal of time had elapsed since incident occurred, however ground units still wished area checked due to the seriousness of incident. AIR 2 assisted by checking a large area surrounding which saved ground units a great deal of time. Area cleared and male was not located (50 minutes).

Search For Suspects

Searches for suspects take many forms and cover a wide array of situations. The ability to take calls from the Queue and not wait for ground units to be dispatched means that the police helicopter has a good chance of being first at the scene and in a position to direct ground units or cancel the need for further dispatches.

- Robbery - Dangerous Driving

  Strip Club, Female victim robbed at knife point and thrown out of vehicle. Suspect description and vehicle were given out all cars. AIR 2 spotted bright yellow van matching description of the suspect vehicle at residence, AIR 2 contacted ground units who attended and had closer inspection of vehicle. As a result male party was arrested inside for robbery. Weapon used in robbery was seized inside of vehicle (20 minutes).

- Recovered Stolen Vehicle

  Dispatch advised Officers following behind stolen van in downtown area. Aircraft being fueled and pre-flight checks being conducted at time. Advised dispatch that we would attend area as quickly as possible in event subjects bail from vehicle prior to take off from London Airport. Officers advised vehicle had been involved in accident.

  *En route officer advised that he had one in custody, but three still outstanding. Further info indicated subjects fled east-bound through rear yards. Upon arrival searchlight was activated and altitude lowered. Orbited the block in attempt to put fleeing suspects to ground, as no perimeter set by ground units at this point. Used searchlight to maintain perimeter while ground officers searched rear yards. At 2118 hrs second party located hiding in a rear yard. This party advised that the others involved had fled further east. Checked further to east, but unable to locate other two parties. ** The helicopter was effective in maintaining the perimeter while officers searched the rear yards. If the helicopter had not been involved in this incident it is likely that the second arrest would not have occurred. The subject would have been able to keep running from the area for a great distance. A sound perimeter could not be quickly established by ground officers as they were still busy dealing with the van involved in the accident and the first party arrested. The helicopter was able to cover the entire block perimeter. This allowed officers to actively search for suspects rather than several being tied to points on perimeter(25 minutes).*

- Trouble with Person

  Male at the address banging on door wanting to get in. AIR 2 attended the area and was 1st on scene. The area was checked and no persons seen in area. Once car 07A arrived on scene, she requested that we check local phone booth nearby as the male had just called from there. AIR 2 located

the phone booth within 10 seconds of the request and the male was still in the phone booth. Car 07A was advised and guided to the location and the male was arrested. If AIR 2 had not located the male so quickly, it is likely that he would have eluded Police. He was on the phone and a cab was waiting for him beside the phone booth. AIR 2 was most certainly instrumental in this arrest (14 minutes).

- Property Damage

  Complainant advised of 3 youths doing property damage to a fence near above location. Ground units were dealing with 2 of the youths involved while a third youth remained outstanding. AIR 2 attended scene and conducted spotlight search of area for third youth. While performing search AIR 2 noted third suspect fleeing on foot. AIR 2 maintained spotlight on suspect and directed ground units, who were also chasing on foot, to suspect. Suspect was arrested without incident. It was apparent without the use of the spotlight from AIR 2 the suspect would not have been taken into custody (20 minutes).

- Assault

  Complainant approached by male wearing a balaclava who grabbed her around the throat then fled westbound through backyards. AIR 2 first on scene and conducted spotlight search west of the scene, with negative results (24 minutes).

- Property Damage

  Complaint of youths throwing rocks at vehicles. Complainant had front window of her vehicle smashed. AIR 2 retrieved the call from dispatch queue and attended scene. Spotlight and FLIR search, within zone, were conducted with negative results. Call was cleared by AIR 2 as complainant attended PRC re report. No ground units required to attend (18 minutes).

- Stolen Motor Vehicle

  Four males fled from stolen vehicle above location. AIR 2 first on scene and conducted spotlight search for males with negative results (19 minutes).

- Attempt Auto Theft

  Citizen advised of youths attempting to get into vehicles. AIR 2 first on scene and conducted spotlight search for suspects. Ground unit officer determined that youths had left scene in cab and were dropped off in the

area of ... Dundas St. AIR 2 attended this area and assisted ground units in search. Youths were located by Sgt just west of the Dundas address and investigation is continuing (34 minutes).

- Shoplifter

  AIR 2 overheard ground unit being dispatched to store in regards to store security chasing a male for shoplifting. Dispatch advised male was running west from the scene. AIR 2 first on scene and began checking area. AIR 2 spotted a male and several other people standing around waving to AIR 2. AIR 2 directed ground unit to male who was subsequently arrested (17 minutes).

- Attempt B/E in Progress

  Complainant reports three males trying to enter from door of school. Complainant believed males had smashed the glass.

  *AIR 2 attended and was on scene within one minute **First on Scene** PC observed three males right up against the front doors of the school. All three males began running once the search-light focussed on them. One male ran in a north-bound direction and the other two ran east. AIR 2 followed the two running east. The males attempted to hide in bushes several times. AIR 2 followed the males for about five minutes as ground units were coming from a distance. AIR 2 directed ground units to these two males who were subsequently arrested. AIR 2 checked to the north, but front door of the school and found damage to the door.*

  *** The helicopter was instrumental in this incident and subsequent apprehension. It is likely that these subjects would have evaded police due to the distance of ground units attending (32 minutes).*

- Prowler, Branch Library

  Staff of library contacted police reporting male wearing black ski mask was exposing himself via the west side windows. AIR 2 first on scene and started a spotlight grid search of the surrounding area. Negative results, however second ground unit was not required and spotlight search reduced the amount of time on call (16 minutes).

- Indecent Act

  Male exposed himself to 7 year old girl in park. AIR 2 attended and checked bike path for suspect. Male similar in description was located w/b on path and illuminated for ground unit who was on e/b path. Investigation revealed male was suspect involved (11 minutes).

- Stabbing / Weapons Call

  Stabbing just occurred at above location. AIR 2 attended scene and assisted with perimeter of apartment building until secured by ground units. Suspect had fled address prior to police arrival and AIR 2 subsequently conducted surveillance on associate address of suspect. AIR 2 noted associate vehicle entering the complex and advised ground unit who intercepted the vehicle and dealt with occupant. Suspect was not in the vehicle (1hr 14 minutes).

- Trespassers / Liquor Violations

  Youths at the rear of the mall causing problems drinking underage. AIR 2 attended scene and noted one youth bolt from a ground unit into the housing complex. AIR 2 followed the youth and gave his direction and location to ground units who apprehended him (6 minutes).

- B&E / Assault with Weapon

  Six suspects entered the complainant's apartment and assaulted her with baseball bats. A CID officer in the area at the time, noted the suspects entering a vehicle in the parking lot of the above address and followed it to the McDonald's lot. Two occupants fled from the vehicle and AIR 2 conducted surveillance on them, while directing a ground unit to their location where they were arrested for B&E (22 minutes).

Search Of Tracks

Railroad tracks are difficult and time consuming to search with ground units and on foot. The police helicopter is well suited to this duty. The areas to be examined can be searched quickly, problems can be identified and reported, and, perhaps most importantly, when the tracks are clear, the message can be quickly conveyed.

- Property Damage CP Engine

  CP Tracks east of Hwy 100, Railway ties placed across the tracks east of Hwy 100 were struck by E/B freight train resulting in damage to the gas tanks on the engine. AIR 2 checked the tracks, east and west of scene, for further obstructions and suspects with negative results. Ground unit, sent to assist original unit was cancelled (55 minutes).

- Trespassers - Railway tracks

  Report of males taking railway ties, damaging tracks, and placing shopping cart on tracks. Remained at south border of Zone in event males walked north from location. Used binoculars and observed group of males which had placed shopping cart on tracks. Advised officers of shopping cart location due to damage it could cause in relation to rail traffic. Did not go out of zone. Males walked east and escaped (30 minutes).

- Check Welfare

  CN reports 80 yr. old male walking down tracks. AIR 2 attended (from airport) and assisted by checking tracks south of Dingman Dr. CN had stopped all trains until search could be conducted. AIR 2 saved ground units as well as a great deal of time by searching and clearing the tracks. Upon completion CN returned to normal operations and the trains were only delayed for a short period. No persons located on tracks (25 minutes).

Search Of Roofs

Roofs are dangerous and time consuming to search on foot, but much more quickly and safely searched from a helicopter. Note that the incidents listed below were dealt with in 5 to 15 minutes and in some cases multiple apprehensions occurred.

- Trespass (Chronic Problem)

  At request of Downtown Ground Unit, helicopter patrol was made of rooftops on North side. Chronic problem in area. Three persons were spotted and fled along rooftops. AIR 2 directed 64A and 64B to the location of the fleeing persons and all three were apprehended and charged. It is not likely that these persons would have been apprehended without the assistance of the helicopter to guide the Officers along the rooftops and alleys to their eventual hiding spot, where they were apprehended and charged accordingly. Search light used (10 minutes).

- Trespasser

  Report of males on roof of school. Arrived second to ground officers as attended from airport. Officers dealing with group at rear of school upon arrival. Officers requested that AIR 2 check roof for any other males. Checked roof and all clear. Helicopter useful in this call as it saved officers time of climbing and checking entire roof of school (5 minutes).

- Trouble With Persons - Downtown

  Not first on scene as responded from airport. Report of persons throwing beer bottles off roof and onto street. Assisted by checking roof. Negative results. Helicopter saved ground officers a great deal of time by checking area roofs (12 minutes).

- Trouble With Youths

  Report of kids on rooftop throwing rocks at passing buses. AIR 2 attended and checked the area. Youths not located (9 minutes).

- Weapons Call

  Citizen advised of five males on the roof of neighbouring building firing a pellet gun. AIR 2 attended scene and illuminated roof and males involved. ERS members dealt with the males. All five persons were apprehended (15 minutes).

CROWDS

In response to the presence of the helicopter, crowds generally disperse. This is well illustrated in some of the incidents that follow.

- Disturbance

  Ground unit advised of large number of people about to fight in front of popular drinking place. Attended area and used spotlight to illuminate the area. Group dispersed as more ground units arrived in area (No time indicated).

- Trespass (Chronic Problem)

  Secondary school, requested by Communication to check area for youths on highschool property. Several calls on it apparently. Attended area and 15 to 20 youths were spotted. A ground unit was directed to their location. A second car was detailed and it was then directed to another groups location. That group ran from marked car and assisted in search for youths. Most youths ran to a residential area and did not return. Helicopter was very effective in this incident to locate the youths and assist ground Officers to location of same, then to illuminate the area for increased Officer safety. Search light used (29 minutes).

- Disturbance Downtown

  Report of several people fighting on street. First on scene. Several people still fighting. Flew low level and utilized search light. Fight broke up immediately and several people scattered in various directions (14 minutes).

- Disturbance

  Disturbance involving approximately 20 youths, some carrying baseball bats. AIR 2 first on scene and conducted surveillance on gathering. No physical altercations were observed and group began to disperse on our arrival. Call was cleared no report by ground unit that attended (7 minutes).

- Disturbance

  Citizen advised of disturbance involving 20-30 youths out front of public school. AIR 2 first on scene and upon arrival the group immediately started dispersing. Circuits around the area resulted in group totally dispersed prior to ground unit arrival (14 minutes).

- Disturbance

  Report of several people fighting. First on scene. Flooded lot with search light to "Show the Flag." Several people went on their way. Maintained observation while ground units dealt with various people at scene (22 minutes).

- Disturbance

  Report of youths fighting in a parking lot and mention of a gun was made. AIR 2 was in the area within 1 minute and the lot was checked. There was a large group in the lot of approximately 20 persons. They were illuminated and dispersed. All but a couple went inside. Area was observed until uniformed car arrived on scene (6 minutes).

- Disturbance, High School

  Ground units requested Code 1 assistance and ambulance to above highschool. AIR 2 attended scene and directed additional ground units to location of disturbance. AIR 2 further assisted by using spotlight to disperse the crowd after the school was cleared out (16 minutes).

OFFICER SAFETY

By dispersing crowds, putting suspects to ground and illuminating the scene, the safety of ground officers can be enhanced by the presence of a police helicopter.

- Disturbance Popular Bar

  Report of a large fight in front of popular bar and Officer called for Code 1 assistance. AIR 2 was in the extreme north east, conducting property checks with the FLIR at Fanshawe Park, and responded within 3 minutes to the scene. The scene was illuminated for officer safety and AIR 2 seemed to have a dispersal effect on the crowd upon it's arrival on the scene. A person was arrested for assault and no Officers were injured (11 minutes).

- Drunk/Drugs

  *Crew Initiated - Observed male walking in front of traffic. Manufacturing plant security approached and male became confrontational. Went to low altitude. Male went to ground. Kept male under observation until ground units arrived and transported male to Police Cells. Charged LLA 31(4) and also charged re possession of drugs. Male is well known offender to London Police. ** Helicopter very effective in providing safety and security to Officers which were attempting to deal with party. Male immediately went onto ground until arrival of ground units. This party would have likely gone undetected had AIR 2 not noticed him. He may also have wandered into traffic causing potential harm to himself (12 minutes).*

- Disturbance / Weapons

  *Citizen report of four males fighting - One with a gun. AIR 2 retrieved call from "Q" and began immediately heading into area. Arrived first on scene. AIR 2 directed officers to maintain perimeter while AIR 2 searched for males and attempted to establish if any weapons were being held. AIR 2 located all four parties and confirmed that none were holding any weapons. AIR 2 went low level and illuminated subjects with search light. AIR 2 directed ground units to move in. One male subsequently arrested for robbery. **The helicopter was instrumental in the arrest of this party as he did not even attempt to run once the search light was focussed on him. The helicopter provided excellent officer safety for the ground units attending this call. The gun was located on the grass near the incident and was found to be a replica. Male to be charged with robbery and other offences (27 minutes).*

SURVEILLANCE

The police helicopter provides a platform for surveillance that has dimensions of height, speed and mobility that far exceed what can be done solely on the ground. With rare exceptions, such as when the helicopter was able to land and provide assistance, it is the combination of air and ground units working together that produces effectiveness in operational situations.

- Warrant Execution

  Assist CID with arrest of suspect in vehicle N/B on Nissouri Rd from Dundas St. Provided surveillance assist and advised when target vehicle was approaching set up area. Provided high cover during the arrest in event that a suspect ran from scene once vehicle was stopped. 2 persons arrested by CID without incident (15 minutes).

- Weapons Offence, Downtown

  Youth flashed large knife at Downtown location, then got on LTC bus with other youths. AIR 2 first on scene and conducted surveillance on bus, which did not move, until arrival of ground units. Youth was arrested on bus by ground units (9 minutes).

ASSISTS TO OTHER SERVICES

The London Police Service helicopter twice found marihuana growing operations in fields, a task usually done by the Ontario Provincial Police, and provided assistance to other services including, as seen below, the Fire Department and the Ambulance Service. AIR 2 even assisted in transporting an organ for transplant.

- Fire Call

  Crew initiated call. AIR 2 spotted what appeared to be a petroleum product leaking into a small pond between two properties. Fire dispatch was contacted and advised. A Fire crew was detailed to determine the source and amount of leakage (6 minutes).

- Assist Fire Dept.

  Citizen reports smoke bellowing from building on N/E corner. Fire Dept. attended. Assisted Fire Dept. by checking roof of building and neighbouring buildings for any smoke or signs of fire. No fire located.

  *** AIR 2 was of great assistance in checking the roof and saved London Fire Dept. a considerable amount of time with this assistance (12 minutes).*

- MVA / Assist TVA re Heart Attack

  *Citizen called reporting vehicle gone into ditch and driver having heart attack. AIR 2 was at the west border of Zone F at this time. No emergency personnel on scene. Due to the life threatening nature of this call AIR 2 landed in field area at west border of Zone F. PC exited the aircraft and attended on foot to the victim. **First on Scene** PC assessed victim who was conscious, but somewhat disoriented. Ambulance attended and confirmed male had suffered a stroke (11 minutes).*

- MVA-PI/Impaired

  Report of vehicle roll-over on Pond Mills under Hwy #401 overpass. AIR 2 attended and arrived at same time as ground units. AIR 2 illuminated area as road very dark. Ground unit effected arrest of Impaired driver. AIR 2 remained on scene to provide light to Ambulance / Police / Fire Dept. who were looking after victim and accident scene (19 minutes).

- Assist Fire Dept.

  AIR 2 noted large fire in bush area near above location. Attended scene and noted several people running from the area. Fire dept. was contacted and attended. Fire was put out and there was no damage (18 minutes).

- Organ Transplant Transport, University Hospital

  AIR 2 landed at U.H. Helipad and picked up kidney organ for transplant. Kidney was transported to OPP H.Q., where it was turned over to OPP ground unit for Code 1 transport to Toronto. Time and safety factor, was reduced re transport as London City ground unit was not required to be used Code 1 (19 minutes).

THERMAL IMAGING (INFRARED) TECHNOLOGY

Infrared (IR) detectors can be used from airborne units to detect sources of heat that are different from the ambient conditions, sometimes called “anomalous sources,” which can include persons, warm automobile engines and animals. It is a passive system that is non-intrusive. It does not transmit anything. It is not like an X-RAY, it “sees through” nothing and requires an unobstructed line to the source of heat.

The ideal conditions for its functioning include a warm object, a cool environment and open spaces. It is most effective when the instrument is used by an experienced operator who has access to a high quality monitor. It is clearly preferable to have the IR device “slaved to” the search light, so that the two can be used in tandem when necessary.

The Test

The test of such equipment in London occurred under less than ideal circumstances. The equipment was only in place for three months (51 shifts), so the opportunity for the three Flight Officers to become familiar with, and adept at using the equipment was very limited. It did not help that the IR was not slaved to the search light and that the monitor was small and of low quality.

Even from this limited experience the Flight Officers were able to reach certain conclusions about the actual and potential utility of the device in an urban environment.

First, they fully agree that it takes more time to become proficient in the use of the device than was available to them. They also agree that a good monitor and having the IR slaved to the search light are basic requirements.

Second, some features of urban environments reduce the utility of the device. Buildings retain heat, called solar loading, and, even on a cool evening, may continue to emit that heat until 3:00 a.m. or 4:00 a.m. As a result the IR identifies many large readings that make smaller readings, especially if they are close to buildings, difficult, if not impossible, to identify.

Trees and other forms of foliage seriously limit the effectiveness of IR, especially in some residential areas of London, known as "The Forest City."[1] The closeness of buildings also makes it difficult to get proper angles from which to search. On the other hand, when searches had to be done the helicopter was most effective in searching the types of areas that are among the most difficult to do on foot or by car. Large open spaces, river banks and railroad tracks are difficult and time consuming to do from the ground, but they can be searched efficiently and effectively from the air. IR is useful in many of these situations.

Searches of rooftops (discussed earlier) are effectively done from a helicopter, but our Flight Officers saw no advantage of IR over the search light, which they judged to be highly effective. Even the unobtrusiveness of IR is not particularly helpful, because the noise of the helicopter is certainly enough to catch the attention of persons on roofs who may be targets.

One of the Flight Officers had the opportunity to test a hand held IR unit. Its use required that the doors be off the helicopter. The unit was not gyrostable and was cumbersome to use. It had the advantage of being easy to aim, requiring less practice than the mounted FLIR unit, but is not a unit that our Flight Officer would recommend for a police airborne unit. At approximately $90,000 (Cdn.) it is less expensive than mounted units, but still expensive.

High quality IR units are quite expensive, on the order of $175,000 to $225,000 (Cdn.) with additional costs for a high quality monitor and slaving gear. London's brief experience with the equipment is insufficient to allow us to estimate precisely its marginal utility. While there are some circumstances where the technology

[1] The leaves of trees also cause problems in the use of the searchlight because of the reflection they produce.

might be very valuable and cost effective[2] (e.g., looking for a child lost in a large field of corn), we have no basis for estimating how frequently such occurrences would take place. We also have no ability to ascertain the number of person hours that would actually be deployed in a given search. Just because a grid search done on foot may theoretically take 800 person hours, whether that number of person hours would *actually* be allocated to the task cannot be known for sure (cf., Joint Working Group, 1988).

Other parts of this report contain log entries that include mention of the infra red technology. The excerpts below include information from normal operational occurrences as well as specific attempts to conduct searches for the purpose of this study.

As part of our attempt to study searches in an urban area, some searches were conducted only for their research value. The helicopter patrol was asked to look for persons sleeping under a bridge and to find persons who were hiding in a given neighbourhood. These are reported in "From the Logs." Briefly, it was difficult to get a good angle to use the infra-red under a bridge because the helicopter would have had to fly at too low an altitude. When persons were concealed or hiding too close to a home the thermal imaging technology was not able to detect them. At one point a person hid in a metal sewer pipe by the roadside. His presence could not be detected until he placed his hand on the inside of the pipe and the instrument picked up the heat rays. **Our experience, as limited as it was, leads us to the following conclusions. Infra-red searches are best directed to areas that are open because the technology is least effective in confined spaces and areas very close to buildings that retain heat. Foliage is a problem because the technology requires a direct sight line to the object that emits heat rays. When buildings are high or close together it can be difficult to get a proper angle for the technology to be effective.**

From The Logs

- Attempt B&E

  When checking the call Q, I noticed a call not yet dispatched to a car. I put AIR 2 on the call and we attended and scanned the area with the FLIR. A "hot" automobile was located in the apartment building parking lot immediately behind the residence. I requested a uniform car attend and it was directed to the target to check for any suspect(s). Shortly after that, 2 persons were spotted in the parking lot, getting into a "hot" car. The uniform car was directed to that location and those persons were spoken to. On

[2] York Regional (2000:17) Police Service reports that the thermal imaging system "has proven to be the single most important piece of equipment on the helicopter, and has been used to locate suspects in areas where ground units could not see." The experience in London is that more important pieces of equipment are the laptop computer, which allows monitoring of the dispatch queue, and the radio, which allows contact with Police Officers on the ground. The search (spot/flood) light is perhaps more important, as well, over a broad set of applications.

this call, the helicopter was the first on scene, scanned the area for suspects and "hot" vehicles and then a Cruiser was called for. Without the assistance of the FLIR, the Cruiser would never have known to check the 2 vehicles which could have easily been the suspects. In this case, however, they were not (44 minutes).

- Missing Person

  Missing eleven year old boy, with mental capacity of 3, reported missing. Flir searches conducted of school yards and playgrounds etc. Boy eventually located inside Mall.

  *** FLIR very effective in searching school yards, playgrounds, etc. Searching these areas on ground would have taken much more time. Searching with the FLIR allowed officers on ground to concentrate on other possible locations and indoors (38 minutes).*

- Property Damage - Day Care Centre

  Employee reports group of youths at rear possibly causing property damage to business.

  *Attended (first on scene) and checked area with search-light and FLIR. Youths no longer present. Ground unit attended and checked business and no damage noted. **Helicopter saved a great deal of time for Ground Unit / Officer, as AIR 2 confirmed, with FLIR, youths no longer present. Officer would have otherwise had to walk through bush area and along ravine to establish if youths were still present and hiding from Police (11minutes).*

- Urban Search Research

  Riverside Dr. near Thames St. As per request made for the study, AIR 2 attempted to obtain FLIR footage of homeless persons living under the bridges east of Labatt Park. Unable to obtain any useable footage due to operational limitations of helicopter and flight safety parameters. Low level passes were attempted to limits of operational safety. Search light was used.

- Disturbance

  First on Scene

  Dispatch advised male called police from pay phone at gas station and stated "hurry" caller provided address on Jalna. Checked pay phone at Petro-Can., but male no longer present. Attended Jalna Blvd., and remained in area in event ground officers needed any assistance. Ground unit requested that AIR 2 check rear yards for a male who was in violation of court release conditions. Ground unit felt male may have been hiding in rear yards in area. Checked with FLIR and searchlight and was able to confirm for ground units that no person was in area yards.

  *** Helicopter saved time for ground units who would have had to check through several yards on foot** (27 minutes).*

- Missing Person

  (First on Scene) Elderly Female which suffers from mental illness and is delusional went missing from her home. Information that female was located by river the last time reported missing. FLIR and Searchlight utilized in searching riverbanks as well as area near the residence. Neg. Results (1hour, 45 minutes).

TRAFFIC

The use of the police helicopter in traffic situations produced some results of interest. During routine patrol Flight Officers observed patterns of driving that were unsafe. In some cases they joined with ground units to secure apprehensions. In other cases, simply making the driver aware of the presence of the helicopter was enough to get the driver to reduce speed.

Attempted Study

An attempt was also made to conduct a specific study of whether having signs that indicated that the helicopter was involved in traffic enforcement was enough to deter speeding or whether the actual presence of the helicopter was also needed. Unfortunately, three sets of circumstances foiled our attempt: 1) the traffic and speed monitors malfunctioned; 2) the week that the experiment was to take place was subject to so much fog that the helicopter was able to fly much less than had been planned; and 3) the speed monitors were not available for our use in a subsequent period of time.

From The Logs

- Traffic Study - Patrol with AIR 2 only and no ground units.
  *Monitored traffic** (From 700 - 3000 ft.)*
  Numerous vehicles monitored -Almost all vehicles maintained speed of 80 km/hr or less. A couple vehicles exceeded limit, but only to 85 km/hr and only one vehicle was timed going over 85 km/hr. This vehicle reached 95 km/hr, but then rapidly slowed down to limit, likely as a result of observing helicopter overhead. Almost all vehicles braked as they passed warning signs and entered study zone. There appeared to be no noticeable difference in vehicle speeds from patrolling at various altitudes.

- Continued Traffic Study - Clarke Road - (1120-1230 hrs)
  Traffic Patrol with Traffic Unit on Ground. No speeders observed and no vehicles had to be stopped by Traffic Unit. Once again most vehicles appeared to brake once entering past warning signs or possibly due to seeing helicopter overhead.

- Traffic Study - Clarke Rd. north of Fanshawe Park Rd.
  Patrolled area between 700 - 1000 ft. Several vehicles were observed during this time period. (Both from close - with helicopter in view to drivers and from afar - with helicopter out of view of drivers.) In both cases most vehicles were doing 80 km/hr or less. Several vehicles braked as they entered study area, and only one vehicle was observed going in excess of 100 km/hr. AIR 2 made itself visible to this driver who immediately slowed down to posted limit (40 minutes).

- Traffic / Complaint, major artery
  Citizen complained of debris causing traffic problem. AIR 2 retrieved call from dispatch queue and checked roadway with use of spotlight. No obstruction was noted and traffic was moving normally. Call cleared by AIR 2 (15 minutes).

- Traffic / Impaired Driver
  Off duty police officer called in white cube van possible 253 at above location. Off duty officer had left the area and AIR 2 attended and noted the vehicle w/b. AIR 2 advised ground unit, who was headed into the area to check for the vehicle, of suspect vehicle's location and direction. Ground unit arrested driver for impaired.

*** It was very clear that the vehicle and driver involved would not have been located without the assistance of AIR 2 (20 minutes).*

- Traffic / Driving Comp. **Initiated by AIR 2**
  On routine patrol observed vehicle driving erratically E/B Bradley Ave. from Wellington Rd. Veh ran red light / exceeded speed limit / drove wrong way / and made improper left turn onto Adelaide St. Followed Veh to townhome where driver exited and went inside. AIR 2 requested ground unit attend to obtain driver / Veh info. AIR 2 contacted driver who advised he was driving in an upset manner after having dispute with girlfriend. Driver charged (25 minutes).

- Traffic
  AIR 2 spotted a vehicle westbound at high rate of speed, passing another westbound vehicle. Vehicle was illuminated and followed for several minutes. Driver reduced to an acceptable speed (5 minutes).

- Traffic / Serious MVA
  Multi vehicle MVA with serious injury. AIR 2 attended area and observed excessive southbound traffic on Clarke, north of accident scene. No car available to close road off to southbound traffic. AIR 2 landed in field beside intersection and closed off road. Flight Officer directed traffic until relieved by uniform officer (1 hr., 22 minutes).

- Traffic
  Vehicle was spotted at obviously extreme high rate of speed on 401 e/b from Wellington Rd. Vehicle was illuminated using the searchlight and the vehicle reduced to normal highway speed. Excellent deterrent effect. Car reduced speed only AFTER it was illuminated using searchlight.

- Traffic / Road Rage
  AIR 2 on routine patrol observed white vehicle travelling at high rate of speed, cutting off several vehicles, and driving recklessly / carelessly. White vehicle was trying to catch up to a yellow sports car. Yellow vehicle stopped at traffic light and driver from white vehicle exited car and started walking up to the yellow vehicle. Yellow vehicle took off. AIR 2 went low level, as it appeared there was going to be a disturbance. White vehicle cut in front of yellow vehicle causing yellow vehicle to pull into lot of gas station on s/e corner of Wellington Rd./Exeter Rd. Several persons exited white car and

a second white vehicle pulled onto lot. People from both white vehicles approached yellow vehicle. AIR 2 requested ground units. AIR 2 made presence known and persons from white veh's entered back into their vehicles and left east on Exeter. Yellow car remained on lot. AIR 2 had ground unit attend and speak to driver of yellow veh, who advised that the other parties were upset because he would not engage in a road race with them. AIR 2 directed ground units to the other vehicles which were stopped. Driver of white vehicle charged with careless driving.

*** It is likely that if AIR 2 had not acted on this situation a disturbance would have ensued between these parties and the reckless driving would have continued into the city (36 minutes).*

PURSUITS

Much has been made of the potential of police helicopters in pursuits. Anyone who has watched FOX TV or COPS has witnessed the use of police helicopters in situations involving pursuits. The principle claim for the effectiveness of helicopters in such situations are the following: 1) pursuit from the air can go on without, in at least some instances, the fleeing driver knowing that the police are in pursuit; 2) ground units can back off even if they had become engaged and this allows the fleeing car to reduce its speed, thereby reducing the risk of collision for the police, and the person fleeing and bystanders; and 3) air pursuit is more effective and safer than ground pursuit because it can wait until the suspect leaves the vehicle and direct ground vehicles to complete the apprehension (cf., Alpert and MacDonald, 1997).

As near as we can tell, all police services that have used helicopters in pursuit situations have favourable anecdotes to tell about the experience. In the London study, we had incidents where pursuit was initiated by the police helicopter and the ground units did not join in the pursuit vehicles, though they were later directed to where the apprehension could be made.

The favourable experiences aside, however, we have nothing conclusive to say about the collision and life saving aspects of the use of police helicopters in pursuits. We would point out, however, that no police service has experimental or quasi-experimental evidence on the efficacy of helicopters in pursuits. All of the "evidence" is anecdotal not very systematic even though much of it is interesting.

Pursuits are one of the most "damned if you do, damned if you don't" conundrums of modern policing. Almost no one wants to see perpetrators of serious crime get away just because they refuse to stop for the police. It is also true that there have been tragic deaths of Police Officers, innocent bystanders and fleeing suspects as a consequence of pursuits, especially when the pursuits are conducted at high speeds.

As far as we know, all police services have rules on the conduct of pursuits and these regulations are taken seriously. In most jurisdictions, they have been reviewed more than once in the past ten years and modifications have always been in the direction of narrowing the scope of pursuits and making it easier for

the police officer who has initiated a pursuit to terminate it.[3] In many jurisdictions, the orders even specify that there can be no second guessing of a police officer who terminates a pursuit, while making it clear that questions and disciplinary action can follow the continuation of a pursuit.

Unfortunately, whether it is the rules that govern pursuits or the interest of the community, pursuits are most likely to take place in the very situations where property damage, personal injury and death are most likely to take place. To be specific, the rules of engagement in pursuits include that the reason for pursuit is that serious crime has taken place. What is also true is that this is the very circumstance under which the fleeing perpetrator is most motivated to attempt to avoid arrest. Such situations lead to higher speeds, disregard for stop signs, red lights and ambient traffic patterns and greater likelihood of a crash ending.

Design Conditions

Police helicopters may have an overall beneficial impact on the outcomes of pursuits, but so far the evidence is non-systematic. No one has yet conducted the experiment that could provide convincing evidence one way or the other. What would such a study look like? The principle components (measures of outcome and research design) are as follows.

First, the measures of outcome need to be identified. Some or all of the following are candidates: rate of apprehensions; rate of collisions; value of property damaged per pursuit; incidence of personal injuries; incidence of fatalities; and incidence of crashes.

Second, there needs to be a suitable design. A design that would work for research purposes could be something like the following. In circumstances when the helicopter is available for dispatch (operationally defined) and a pursuit is initiated, the decision to dispatch the helicopter to the pursuit would be done on a random basis. Information on the measures of outcome identified above would be kept and after some number of occurrences (experimental ones where the helicopter was dispatched and control ones where the helicopter was not dispatched) the results could be tabulated. The effectiveness of the helicopter is measured as the difference between where the helicopter is dispatched and where it is not dispatched.

That this would be a useful research design does not mean that any police force will find it operationally satisfying. “I could not, in good conscience, not dispatch the helicopter if peoples’ lives are at stake” will surely be a position taken by many sworn Police Officers. That is not the last word on this issue and neither is this the only way in which the study could be done. It is the issue, however, that is so difficult to get past, that we may, for the foreseeable future, continue to be limited to speculation and anecdotal evidence on the question of whether the use of police helicopters in pursuit situations really saves lives, injury or damage.

[3] The same applies to Police Supervisors who, in some jurisdictions, must authorise the initiation of a pursuit as well as its continuation.

From The Logs

The excerpts from the logs indicate a variety of ways in which the use of a police helicopter can contribute positively to pursuit situations. It can do so in ways that go beyond being the primary vehicle in a pursuit. In the examples below we see how the helicopter can assist by assuming a passive role in some cases and by keeping situations from resulting in a pursuit, in others. The contributions in pursuit situations were, generally speaking, low key rather than dramatic, but the contribution to operational effectiveness is none-the-less present.

- Passive Pursuit: Impaired in Progress / Code 1 Officer Needs Assistance
  Officer requested Code 1 assistance, having trouble with Impaired Driver. AIR 2 was the first on scene within 1 minute. P/C was outside the suspect car and driver was in the car. Moments after AIR 2 arrived on scene the driver turned on his lights and left the scene. Not knowing the condition of P/C, AIR 2 followed the vehicle eastbound on Trafalgar. Uniform cars also responded very quickly and took up pursuit, keying off AIR 2 position above the suspect vehicle. Once the uniform cars were in position on the pursuit, AIR 2 maintained some distance and observed the pursuit's progression. The vehicle was never lost from sight of AIR 2 and the vehicle was always illuminated by the search light. At one point during observation, the vehicle turned off all his running lights and blacked out. AIR 2 was able to maintain observation on the vehicle no problem. AIR 2 provided information on the progress of the Pursuit, advance traffic conditions, spike belt coordination assistance and when the driver finally arrived at the rear of the ... apartments and bailed from the vehicle, he was lit up and followed with the search light until AIR 2 guided the ground Officers to an intercept point where the driver was arrested just moments before he was able to enter the rear doors of the building. It is possible that if the driver had been allowed to enter the building, he could have successfully evaded Police. AIR 2 was a very effective tool in the pursuit by maintaining observation of the vehicle at all times and certainly was instrumental in the eventual arrest of the suspect. Once the ground Officers had the driver in custody, the area was illuminated for Officer Safety (30 minutes).

- Pursuit Assist: Recovered Stolen Vehicle /Stolen Plates / Drugs
  Ground unit advised they were following behind vehicle with stolen plates. AIR 2 second on scene and maintained observation until more ground units arrived in area. Vehicle stop conducted at Wellington St./Horton St.

AIR 2 illuminated area and was prepared should subjects attempt to run. Investigation found that vehicle was reported stolen and occupants also in possession of drug paraphernalia and large amount of cash. All three occupants arrested without incident. Subjects did not attempt to run and thus a dangerous pursuit did not occur.

***Helicopter was likely a large factor in occupants not attempting to run on foot or lead police in a pursuit as the subjects were very aware of the helicopter's presence** (1 hour, 2 minutes).*

- Control of Pursuits: Recovered Stolen Vehicle.

  Ground unit advised of suspicious vehicle in Downtown area. Ground unit attempted to stop vehicle, but vehicle fled. AIR 2 advised that they had vehicle in sight. Advised Officers not to pursue and that AIR 2 would keep vehicle in observations. Requested Officers to run parallel routes. Followed vehicle East King St., North Ontario, West Central, North Adelaide, East Cheapside, North Boullee. Vehicle pulled into housing complex on East side of Boullee. Advised ground units to move into area. Activated search light and descended. Vehicle immediately stopped and three occupants attempted to bail. Ground Officers directed to two which fled South-East, and one hiding on balcony of nearby building. All three arrested without incident. Vehicle listed as stolen on CPIC.

  ***There is no doubt that these subjects would have evaded police without the intervention of the helicopter. The streets were busy due to New Years Eve and the early hour at which this incident occurred. This would have made pursuit conditions too dangerous. The helicopter enabled all three parties to be in custody in approx 15 minutes. No injury resulted to the accused, citizens or police** (16 minutes).*

- Possible Impaired, Restaurant

  Staff at Restaurant advised of possible impaired in the drive thru of restaurant. AIR 2 attended scene and noted vehicle in question leaving the restaurant. AIR 2 followed vehicle and directed ground units to its location. Investigation revealed driver had been drinking but was not impaired. Appears vehicle would not have been located and driver checked without the assistance of AIR 2.

- Pursuit

  Ground units involved in pursuit where vehicle had struck a tree and occupants fled. AIR 2 attended scene from Southend and established a perimeter east of scene. AIR 2 began grid search of area and shortly after ground units arrested both males who had fled from the vehicle (20 minutes).

CHAPTER 6

RESULTS: VIEWS OF COSTS AND BENEFITS

Prior to London beginning the London Police Service Helicopter Research Project, various persons expressed their views about whether London should have a police helicopter. This continued throughout the year of helicopter patrols and on to the present. We expect that it will continue in the future. These views are summarized below in the lists of "objections" and "pro-police helicopter comments."

In the other sections of this chapter, we attempt to provide additional information that relates to some of these ideas. Principally, there is some discussion of financial cost, the issue of noise and the views of citizens and Police Officers that were elicited in surveys.

OBJECTIONS

The objections to the use of a police helicopter that we have heard most frequently and most forcefully are presented below, without judgement or other commentary at this point.

1. Whatever the operational merits, the cost is just too great in noise and disturbing people. Evening and night flights spoil the "peace and tranquillity" of London.
2. The financial cost (however perceived) is too great and the money should be spent on something else: e.g., more police, more social services, better roads.
3. "This is not L.A." "London does not have a crime problem that warrants a police helicopter." This is a tool for larger American cities (Los Angeles and New York City, the most frequently mentioned) with higher rates of more serious crime. It has not been unusual for those taking this view to express that other Canadian cities do not need a helicopter either. For many, a single Canadian Chief of Police, is seen as the instigator of the marked over-attention to this policing tool.
4. Helicopter patrols are an unacceptable intrusion into our civil liberties and therefore inconsistent with the type of society we want to have.[1]
5. Helicopters are only a toy for the police or for the Police Chiefs who want to display their importance.
6. Police helicopters will not make a difference so we should not have them. The variation on this theme is that there is very little that the police helicopter can do that cannot be done better by having more Police Officers on the ground.

[1] For a discussion of aircraft surveillance and the right to privacy see Felkens (1973: 345-348) and for a perspective on when helicopter observations constitute a search see Williams (1988: 379-395).

PRO-POLICE HELICOPTER COMMENTS

Comments made in favour of the police having a helicopter are characterized by the following; again, without judgment or commentary.

1. "To fight crime, the police need the tools. A helicopter is one of those tools."
2. Helicopters prevent crime, we should have one.
3. Criminals are more sophisticated all the time, the police need a helicopter to keep up.
4. "Lives can be saved with a helicopter"; this is sometimes said with respect to pursuits, searches and rescues.
5. "I feel safer now that we have a helicopter."
6. The police need all the help they can get.
7. We have more crime and more serious crime in London than a lot of people want to recognize.

VALUE: IT RESIDES IN THE EYE OF THE BEHOLDER

The cost of the helicopter tested in London comes to about $331 per hour of operation. In addition there is the cost of personnel. "Is it worth it?" is not a question answerable by research. The "worth" depends on the *value* placed on the results it achieves. That value is affected by personal preferences that have, at the very least, social, political and economic dimensions.

Costs can be discussed in relative terms, that is, in comparison to how the same amount of money could otherwise be spent.[2] Comparisons, however, to some number of police cars or some other number of police on bicycles are not really compelling because there are certain features of helicopter policing such as speed, aerial perspective and mobility that are not matched by any number of additional Police Officers or bicycles.

The results of this study may have some impact on future debates. The argument that helicopter patrols reduce rates of crime and thereby produce savings that perhaps could be transformed into payment for the cost of a helicopter is not supported by this study. On the other hand, the case for enhanced operational effectiveness does receive support. The evidence is heavily – but not completely – anecdotal. Our analysis does point to time being saved when the helicopter is involved in many types of occurrences and there is evidence that apprehensions are more likely when the helicopter is involved. There are also unique contributions of the helicopter that cannot be substituted with ground alternatives. Speed of response, aerial presence, aerial perspectives and ability to illuminate an area ("turn night into day") are not achieved by other means.

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[2] Some techniques for the prevention of residential break and enter have been evaluated and the conclusions continue to be controversial twenty five years later, Kelling et al., (1975) concluded that altering (increased or decreased) the number of patrol cars did not affect the frequency of serious crime, including residential break and enters. Other studies found no evidence that burglary-specific patrols reduced residential break and enter (Schnelle et al., 1975; White et al., 1975).

The debate will probably focus on four issues each of which is a matter of personal preference and the view of the world that we espouse: 1) is it worth it?; 2) do we need it?; 3) are we willing to put up with the noise?; 4) and is a police helicopter consistent with the type of society that we (think) we have.

Comments to the London Police Service

During the period 1 July, 1999 to 30 June, 2000, the London Police Service received 157 commendations and complaints about the police helicopter: 91% were complaints and 9% commendations.

Commendations. Fourteen commendations were received. Summaries, as provided by the Patrol Service Branch, are as follows:

1) Commendation from Oxford County Police Service: helicopter located marihuana crop in their jurisdiction
2) Commendation from Police Officer: helicopter located three fleeing residential B & E offenders prior to ground units arriving
3) Commendation from citizen: appreciated helicopter assistance in apprehending two offenders who stole the citizen's vehicle
4) Commendation from citizen: appreciates presence of helicopter - feels safer
5) Commendation from citizen: elderly female has been the victim of various offences at her home and appreciates the presence of the helicopter, feels safer
6) Commendation from citizen: helicopter presence broke up large youth party in a ravine area
7) Offender charged with stealing and stripping a vehicle advises he was only able to strip half the vehicle due to the presence of the helicopter
8) Commendation from citizen: "...great to see London Police moving forward into new areas of enforcement..."
9) Commendation from citizen: citizen writes letter of support for the helicopter project
10) Commendation from citizen: citizen writes letter of support for the helicopter project
11) Commendation from citizen: citizen writes letter of support for the helicopter project
12) Commendation from a citizen living in Old South, states she feels safer hearing the helicopter
13) Commendation from a citizen supporting the helicopter
14) Commendation from a police detective reporting the helicopter assisted in arresting two males wanted in several jurisdictions for auto theft. They were spotted heading for a stolen vehicle. One of the males advised the officer they were just about to begin a break and enter/stolen vehicle rampage, but gave up when spotted by the helicopter. The detective reported the males had been difficult to arrest as conventional surveillance techniques had been unsuccessful.

Complaints. Ninety percent (90%) of those complaints related to the noise of the helicopter and fifteen percent (15%) related to the spot light (some complaints were about both). Complaints were initially high in July, 1999 (47) then dropped in August, 1999 (9), perhaps due to the installation of a new muffler system:

July (47)	August (9)	September (5)	October (1)
November (6)	December (11)	January (6)	February (2)
March (7)	April (9)	May (13)	June (27)

One hundred forty three persons contacted the London Police Service to complain about the noise/ light of the helicopter, during its year of operation.[3] Calls to the police were returned by the Inspector operationally in charge of the project. These calls were for the purpose of explaining to residents what the helicopter was doing near where they lived and why it needed to be there for so long. Some callers were pleased with the explanation and minded less the disturbance that the event had caused. Other callers took the opportunity to reiterate their anger over their loss of sleep, their children being awakened and their dogs having barked.

Comment to the Evaluator

Arguably, no one complaint is typical of the sum, but this evaluator did receive one that articulates key sentiments expressed by those who made complaints. It is reproduced here not because it is typical, but because it captures ideas and concerns that have been relayed to us in various ways:

> *Hi Paul:*
>
> *On the helicopter trial, here are a few thoughts that you might wish to take into account in your study.*
>
> *First, there are important political and social issues involved that go far beyond police logs and operational details. Night-time helicopter surveillance is among the most extreme and intrusive measures that a city government can impose upon its citizens, for it takes away their expectation of night-time peace and tranquillity. In effect, it makes their nights no longer their own, for the police may now disturb them at will, in their homes, randomly and without cause. That is why it is standard practice under dictatorships.*

[3] We have been told that the Toronto Police Service received 160 complaints about noise in its first *month* of operation. Toronto operates two Bell Ranger helicopters, which are larger than the quite small Schweizer 300C used in London.

In a democratic society, resort to such a measure is an extraordinary political act that must be continuously justified by those in power. In some cases, the justification is obvious: as in cases of natural disaster or where widespread civil conflict makes military-style policing an unfortunate necessity, as has been the case for so many years in Northern Ireland. (One of the attractive features of the current power-sharing agreement for so many, especially in Belfast, Catholic and Protestant alike, is the prospect of relief from helicopter surveillance.)

But what is the justification in the case of London, Ontario? This is hardly Belfast or Pristina. Nor is it Los Angeles. I have had visitors ask "what is going on here?"

A good question, but I have no answer. Nor has City Hall or the police offered one. Perhaps they are secretly convinced that London had become the crime capital of the universe!

Second, there are long-term economic and social consequences that flow from inflicting damage to the quality of life in a city. These are not easy to predict, but once residents begin to give up on a city it is hard to stem the decline. One need look no further than London's downtown.

No one objects to the use of helicopters for search and rescue or as air ambulances or in any genuine emergency. Imposing helicopter surveillance upon a city, however, is an entirely different matter. It cannot be done without causing widespread disturbance. And for some Londoners, who once lived under tyrannical regimes, to be placed once again under night-time helicopter surveillance is terrifying in a way that the rest of us can hardly begin to understand.

One final word. I hope you maintain a healthy skepticism about police data. A helicopter can be given an "assist" on virtually every arrest that is made anywhere while it is in the air – even if a cop on a bicycle would have been of more practical use!

I look forward to reading your report. It is going to be an important document.

Best regards,

NOISE

Background

Helicopters make noise. Larger helicopters generally make more noise than smaller helicopters (there are exceptions). Helicopters sound more noisy to persons on the ground when flown at lower altitudes than when they fly at higher altitudes. When a police helicopter is operationally involved in an occurrence, such as search for a person, the helicopter, generally, is more effective at lower rather than higher altitudes. As a result, citizens are more likely to hear the helicopter when it is involved in an occurrence. The same is true of seeing the search light of the helicopter when it is trained on the ground or on roof tops during a search.

In London, as with many other cities, many of the places that a helicopter is useful are close to places where people live. In addition, calls for service and the types of occurrences where a police helicopter is operationally useful tend to occur in the late evening and nighttime hours (*viz*, 9:00 P.M. - 3:00 A.M.).

The confluence of all these circumstances means that when the police helicopter is actively doing its job, it is most likely to be heard and have its light seen by members of the general public. Some of these persons may be glad that it is there, but some others clearly are not.

From The Logs

Logs from hundreds of the occurrences could be used to illustrate the fundamental point about noise. If any of the operations are going to be conducted in residential areas or downtown areas, where people also live, people will be disturbed. Whether, in time, people get used to it is not something that we know. What we do know is that the operations noted below, especially because they lasted for much more than just a few minutes, cannot help but disturb some citizens.

- Attempt Break and Enter and Property Damage in Progress
  Report of 3 males acting suspicious in the area. Car 15A requested AIR 2 to attend area. AIR 2 was nearby and was on scene in less than one minute, the. first on scene. The area was checked using the searchlight and AIR 2 maintained a searchlight perimeter until uniform arrival. Once car 15A arrived and was on foot checking the residence, AIR 2 spotted 3 males walking from the parking lot immediately to the west. These males walked northbound and continued into the back yards of the townhouses immediately to the north west. AIR 2 advised 15A and directed him to their location. AIR 2 maintained surveillance on the 3 males at all times using the searchlight. At one point, the 3 males ducked in between the rows of townhouses and then one of the males bolted from the group running right into the waiting arms of 15A. All 3 males were arrested. The area was illuminated for Officer Safety until a back up Officer arrived on scene.

Given the circumstances in this incident, there is no doubt that without the aerial surveillance of AIR 2, the 3 males would have surely evaded the Police. Car 15A was the only car on scene when AIR 2 spotted the males and he could not possibly have seen them from his location. AIR 2 was certainly instrumental in this arrest (23 minutes).

- Robbery

  Call came in as possible robbery just occurred. Ground units dispatched Code 1. AIR 2 first on scene and conducted spotlight search west of scene for suspect. Negative results. Several low level circuits were conducted while searching for the suspect (46 minutes).

- Weapons Call, hotel near residential area

  Large disturbance outside the hotel involving clubs and handgun. AIR 2 first on the scene and upon illuminating the area the large crowd began to disperse. Upon arrival of ground units AIR 2 searched area for suspect vehicle that was in possession of the handgun, with negative results. AIR 2 then assisted ground units in the dispersing of the crowd, from the hotel, by use of the spotlight (1 hr., 18 minutes).

- Recovered Stolen Vehicle

  CID conducting surveillance on stolen vehicle parked at rear of billiards parlour.

  CID had suspect info and felt suspect would be returning to vehicle. CID officers reported male suspects were walking back towards vehicle. Suspects evaded CID Officers and began running through rear yards in a south-east direction. AIR 2, which was in area, maintained a perimeter with search-light. AIR 2 spotted the two males running out towards Dorinda St. ran back west bound. AIR 2 followed and directed ground units to the males who were hiding in a rear yard on Dorinda St. Males arrested without incident.

  *** AIR 2 was instrumental in this situation as the suspects would have no doubt evaded police had AIR 2 not maintained the perimeter and located subjects running through the rear yards of Dorinda St., as there was no ground units in the immediate area on Dorinda St. when suspects were spotted by AIR 2 (1 hour, 34 minutes).*

Postscript On Noise

There is a final consideration about noise that deserves mention. In total there were about 1000 hours of flight time, which is typical of a single aircraft with a single pilot over the course of the year. The flight time was used in eleven months. In nine of those eleven months, the areas of the city that received patrols at any one time amounted to no more than 30% of the city. The areas that received patrols, therefore, experienced far more presence of the helicopter than would have been the case if the 1000 hours had been spread more evenly over the whole city.

Arguably, if citizens had seen/heard less of the helicopter and if it had flown in their neighbourhood less frequently at lower altitudes while involved in occurrences, there may have been fewer complaints about noise and less sense of a constant presence of the helicopter.

The purpose of the intense patrolling was to test for suppression effects on rates of crime and to have areas of the city that could serve as comparison areas in one quarter and be available as experimental or comparison areas in other quarters. There is no longer any need to restrict flights in London and, we think, other cities to relatively small areas. Further, there appears to be no advantage to patrolling for the purpose of reducing rates of crime. This means that flight time would best be directed to operational pursuits over a whole community. Even if a police helicopter were involved in the same number of occurrences, the number of occurrences per specific area would be smaller than was experienced in the experimental areas. It is *possible*, therefore, that the presence of the helicopter and its attendant noise would be less annoying because it would be less frequent.

TWO SURVEYS

Two surveys were conducted to ascertain views about the police helicopter. One was conducted of citizens of London and the other of Police Officers.

Surveys of Citizens

From time-to-time the London Police Service conducts a survey of the community to determine the level of satisfaction and areas of concern about policing in the city. Two of these were timed to correspond to the London Police Service Helicopter Research Project. The first of these was conducted in the month prior to the initiation of the project and the second about one year later during the eleventh and twelfth month of the project.

In each case, 500 randomly selected homes were called and, if the person answering was over the age of eighteen, asked questions about safety and policing in London.

Two sets of questions are of particular interest here; they have to do with perceptions of safety and requests for more patrols.

Perceptions of Safety. Both surveys asked respondents how safe they felt "during daylight hours" and "at night" in a variety of settings. Three of the settings ("in your neighbourhood," "downtown" and "in parks") are of particular interest because they are the places where the presence of a police helicopter might make a difference, in contrast to "in your place of work," for example. **There was no significant difference in people's perception of safety between the time of the two surveys** (Table 6.1).

Respondents were also asked whether they would like to have more of various types of patrols (car, bicycle, marine, motorcycle, helicopter and foot). Car patrols and foot patrols remained the most popular with about 70% of respondents wanting more, but this is not a significant change from the previous year. **The largest change is the call for more helicopter patrols** that went from 37.4% to 51.0% (Table 6.2).

TABLE 6.1: Perception of Personal Safety (Safe and Very Safe) in London, Ontario Prior to (1999) and Following (2000) Helicopter Patrols (N = 500 in Both Cases), by Setting and Sex

	% SAFE OR VERY SAFE					
	TOTAL		MEN		WOMEN	
	1999	2000	1999	2000	1999	2000
IN YOUR NEIGHBOURHOOD	83.5	81.6	91.4	88.9	78.2	76.4
DOWNTOWN	29.2	29.6	44.9	44.8	18.4	20.5
IN PARKS	29.4	30.8	44.0	48.2	19.0	18.1

TABLE 6.2: Proportion of Londoners Indicating a Preference for Increased Police Patrols of Various Types Prior to (1999) and Following (2000) Helicopter Patrols (N = 500 in Both Cases)

TYPE OF PATROL	% WANTING MORE	
	1999	2000
CAR PATROLS	68.8	70.8
BICYCLE PATROLS	46.4	53.6
IN MARINE PATROLS	21.2	19.8
MOTORCYCLE PATROLS	56.4	58.6
HELICOPTER PATROLS	37.4	51.0
FOOT PATROLS	67.2	69.6

Survey of Police Officers

In order to determine the reaction of Police Officers on the ground to the police helicopter, a survey of their views was conducted. All Police Officers who were involved in any occurrence in which the police helicopter played a role were sent a questionnaire. These persons were identified from computer logs of Police Officers dispatched to occurrences. These logs do not indicate the extent of contact with the police helicopter; in many instances the contact may have been none or peripheral.

A total of 234 Police Officers were sent questionnaires and 116 returned them. Responses were returned anonymously. Eighty five percent all who returned questionnaires, 99 of 116, indicated that they had direct contact with AIR 2 on a call for service. This suggests that non-responses may have been a function of not having had direct contact with AIR 2. The percentage of positive responses is presented in Table 6.3, based on the 99 Police Officers who responded and indicated that they have had direct operational contact with AIR 2. Police Officers generally consider that the Police Helicopter saved time, was an asset to them, improved officer safety and improved public safety**. They thought that it would suppress crime and they indicated that it made a positive difference in their policing activities.**

TABLE 6.3: Responses of Police Officers Who Had Direct Contact With the Police Helicopter (N = 99)

QUESTION		
Did the presence of AIR 2 save you any time?	YES	73%
Do you think that AIR 2 has been an asset to you as a Patrol Officer?	None	3%
	1	3%
	2	6%
	3	13%
	4	15%
	5	22%
	Very Much	37%
Do you think that AIR 2 has improved Officer Safety?	Not at All	1%
	1	5%
	2	5%
	3	8%
	4	8%
	5	23%
	Very Much	39%
Do you think that AIR 2 has improved Public Safety?	Not at All	1%
	1	6%
	2	6%
	3	15%
	4	16%
	5	23%
	Very much	32%

	How effective do you believe AIR 2 patrols are in suppressing crime?	Not at All	5%
		Somewhat	28%
		Effective	48%
		Very Effective	18%
	Have helicopter patrols made any difference in your policing activity?	Positive	63%
		Neutral	7%
		Negative	8%
		No Response	22%

CHAPTER 7

DISCUSSION AND CONCLUSIONS

We have no conclusions about whether London or any other city *ought* to have a police helicopter. That is an administrative or political decision to be made by those charged with *weighting* and *weighing* the evidence from various sources.

This study adds information and analysis that can be used by those who are charged with making the decisions. There is enough in this report that one could pick and choose pieces of information to support almost any position. There are, however, certain conclusions that are fairly clear to us and we wish to put them forward as our best assessment of what the findings mean.

It is frequently asserted that past research demonstrates that helicopter patrols reduce rates of crime. **Our review of the literature does not support the conclusion that helicopter patrols reduce rates of crime.**

Our quasi-experimental studies avoid many of the pitfalls of previous research. The results obtained do not support the view that helicopter patrols have a deterrent effect on *rates* of several crimes**. What may or may not happen in an individual situation is a different matter. We also have an anomalous finding with respect to commercial break and enter. In all five of our "experiments" there is indication of a suppression effect. Whether, how and why this type of activity appears to get a different response should be the subject of further research.**

That a police helicopter makes operational contributions to policing has been clear from the anecdotal evidence presented in other studies and is supported in this study by our review of policing logs. In addition, our analysis of occurrence reports also adds information on efficiencies and effectiveness that appear to result from the involvement of the police helicopter in wide array of occurrences. We believe that this is the most systematic evidence of its kind that has been made available. We find that **involvement of the police helicopter saves Police Officer time, produces a more prompt response and increases the likelihood of apprehension.**

Public opinion on the police helicopter is split, but not evenly. While some hate it and find everything about it objectionable, there are others who support it and do so enthusiastically. A survey of 500 randomly selected Londoners was conducted during the eleventh and twelfth month of the operation of the police helicopter: 84.6% of the respondents indicated that they had seen the helicopter and 88.4% indicated that they thought that the police helicopter was at least somewhat helpful with 38% considering the helicopter to be very helpful.

Comparing the results of surveys conducted in 1999 and 2000 we find that when respondents are asked whether they want more of various types of patrols the largest change by far is the increase in those who wanted helicopter patrols, from 37% to 52%. By comparison, those wanting increases in foot patrols, bicycle patrols and automobile patrols did not increase by any more than between two and seven percentage points.

Police Officers, who in the course of their patrolling responsibilities had operational involvement with the police helicopter had favourable views about its usefulness and contribution to effectiveness and officer safety.

Noise is a problem for some citizens, and having a police helicopter at all is a problem for others. Noise appears to be less of an issue when patrolling takes place at at least 1000 feet in a smaller helicopter, such as when the Scheweizer 300C. It is when the helicopter is operationally engaged, reduces its altitude, and stays in a small area for a while that citizens are particularly disturbed. This is also when the police helicopter does its best work.

ALTERNATIVES

Types of Helicopters/Types of Use

The helicopter tested in London is, in comparison to the range of equipment available, relatively small, relatively inexpensive, and relatively quite. It also has more limited functionality than larger equipment. Because it only has space for two good size persons, it is not useful to transport even small groups of persons. It was not equipped with flotation devices needed to operate over water. Nevertheless, it appears adequate for the task of policing London.

Flight crews frequently operated at altitudes below the 1000 feet when patrolling. We wanted it to be visible to test for deterrence. Larger or more noisy helicopters would produce more citizens complaints at 1000 feet and even greater complaints at lower altitudes. On balance, it appears to be preferable to have a smaller helicopter that can operate at lower altitudes than to have one that is larger and has broader functionality, but is limited to significantly higher altitudes.

Some suggest that a community may be well served by having a police helicopter that is used on a stand-by basis; parked at its base until needed for a specific occurrence. Presumably, this would reduce the total amount of flying time per year and reduce the total amount of noise produced. It would also reduce some, perhaps even most, of the variable costs. It would do nothing, however, for the fixed costs of having the helicopter and, perhaps most importantly, it would dramatically increase response times and the benefits that arise from responding in just a few minutes and being first on scene. The helicopter would attend at fewer minor occurrences, which some may find desirable, but it would also be later, and not even get to some major occurrences. It is with respect to crimes that are in progress or that just happened that the helicopter is particularly effective. When airborne, the helicopter can respond within a few minutes. If the crew must scramble, start the helicopter (it requires some warm-up time) and obtain flight clearance, response times would be dramatically increased and the speed component of the helicopter's unique contribution abandoned.

Tying Things Together

The results of our quasi-experimental tests are consistent with our conclusions from the review of past research. Specifically, the available evidence does not support the view that police helicopter patrols have an independent impact on the incidence of crime. Is this surprising?

This is not surprising for two reasons. First, the methodological problems with previous research mean that the results of the current tests do *not run counter* to the *results* of previous studies, even though they run counter to some of the *conclusions* that have been reached about the meaning of those results.

Second, it needs to be recalled that having helicopter patrols in one area, or not having them, is far from the same as having policing or no policing in that area. The starting point of helicopter patrols is made up of police services and communities that engage in a broad range of programs and activities that directly or indirectly are aimed at suppressing crime. At the same time that this is going on, career criminals, more causal perpetrators, and relative novices to conflict with the law, lead their daily lives and contribute to normal fluctuations in the incidence of crime, which are further complicated by long term trends and seasonal variations. We consider it unrealistic that helicopter patrols could have an impact as large as is suggested in some promotional materials for police helicopters, for example, 30%-50% in burglaries, rape, robbery and auto theft (Pollock, 1996:5.2). Nevertheless, smaller impacts on rates of crime could have been detected in our quasi-experimental tests that used matched comparison areas. A relatively small number of decisions, however, made one way or the other, would have little observable impact on rates of crime.

The program theory of the effectiveness of helicopter patrols on rates of crime is that the knowledge and presence of the “eye in the sky” causes potential perpetrators of crime change their behaviour because of their observations and awareness. If potential perpetrators are significantly less aware of the existence of the police helicopter, than the rest of the population (84.6%), then the potential for the suppression of rates of crime is less than it would be if levels of awareness were elevated. On the other hand, if the level of awareness were the same or even greater than that of the general public, some of the very same features of helicopter patrols that contribute to awareness – visibility and noise – mean that, on any given day or evening, would-be perpetrators could fairly easily determine whether the helicopter was policing the area where they would like to commit crime.

Such considerations speak to why there may be no impact on rates of crime. There is a corollary, however, that speaks to why operational effectiveness may be increased. When the helicopter is airborne in one part of the city, it is out of sight and sound of most of the city. In a minute or two, however, it can cover a significant distance and be present at the scene of an occurrence that is in progress or just occurred. It can effect searches, direct ground searches and pursue fleeing suspects.

These two sets of findings, lack of general deterrence, on the one hand, and apparent operational effectiveness on the other, suggest the best use of police helicopters. Starting from the air, anywhere in the city, is preferable to starting from the ground. Air patrols do not have to take place in order to be noticed, since there is no demonstrated advantage. This means that they can be conducted at higher altitudes where

citizens are less likely to be bothered by noise. At altitudes over about 1000 feet, vehicular driving patterns can still be observed, as can fires (thermal imaging technology has proved helpful in some places) and the formation of crowds, to name just some. The helicopter is available for dispatch or to take "hot" calls from the queue and generate prompt response. At the site of the occurrence operating altitudes may be lower, but, as displayed in our excerpts from the logs, a large number of involvements last fewer than fifteen minutes.

In brief, patrolling can take place at higher altitudes than occurred in our test period and this may reduce complaints about noise even though operational engagement in an occurrence may be done at the same altitudes as prevailed during this study.

Post-Script

It may be fair to say that with police helicopters, as with so many other things, there is something satisfying about the *status quo* and change is annoying and disruptive, not only by definition, but emotionally as well. Communities that do not have a police helicopter, find it difficult to decide to have one. It is also true that, once communities have one, they find it hard to give it up. Warren, Michigan, a community much smaller than London in area and population, has two police helicopters on regular duty. They fly at very low altitudes with their search light on. A few years ago, the municipality wanted to eliminate the helicopters as a way of cutting costs. The citizens protested loudly that they did not want their helicopter patrols removed. They said that the patrols make them feel safe and their community a better place to live. Warren continues to fly two police helicopters.

SUMMARY

In summary, our conclusions are the following:

- A critical review of the literature does not lead to the conclusion that helicopter patrols reduce the incidence of crime; rather, it points to the need for a study of deterrence that does not have the same limitations as previous research.
- Results from the London Police Service Helicopter Research project do not support the hypothesis that police helicopter patrols have a suppression effect on rates of crime.
- Helicopter patrols do not displace crime to other areas and neither do they have a positive spillover effect to nearby areas.
- The operational benefits of helicopter policing stem directly from the unique dimensions that it provides: aerial perspective, speed, mobility and ability to light an area. It facilitates many types of searches, saves time, adds to citizen and officer safety and increases apprehensions.
- Citizens of London are somewhat favourably disposed to the police helicopter, but some members of the general public are vehemently opposed to the very idea of it.
- Noise complaints are an inevitable consequence of helicopter involvement at low altitudes, especially when the policing takes place during late evening and nighttime hours. When not involved in an occurrence, patrolling can and does occur at higher altitudes and this is less bothersome. We would not consider it reasonable, if a helicopter is to be used in policing, that it be restricted to altitudes much over 1000 feet or to daylight hours.
- Police Officers on the ground who have been involved with occurrences, in which the police helicopter participated, have highly favourable views about the experience and the place of a helicopter in policing.
- There are ways of using a police helicopter that are different from those used in this study. It is possible to reduce the level of annoyance while maintaining operational effectiveness and efficiency.

APPENDIX A

SUMMARY OF FINDINGS:

SUSPICIOUS VEHICLE

TRESPASS BY NIGHT

TABLE A.1: Summary of Findings for Suspicious Vehicle

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	2	4	3.31	1	1	0.55
1 (Intermittent)	5.09	3	2	2.35	1	2	-0.63
2 (Very Intensive)	6.08	2	6	1.46	1	1	0.66
3 (Intensive)	3.31	3	0	1.11	0	1	-1.81
3 (Intermittent)	4.97	0	3	2.95	3	0	1.62
Net Impact							**0.39**

TABLE A.2: Summary of Findings for Trespass (Night)

Quarter	Experimental Area[a]			Comparison Area[b]			Incidence Change[g]
(Type[f])	Pop[c]	Pre[d]	Post[e]	Pop[c]	Pre[d]	Post[e]	
1 (Intensive)	3.63	0	1	3.31	0	0	0.28
1 (Intermittent)	5.09	1	2	2.35	0	1	-0.23
2 (Very Intensive)	6.08	3	1	1.46	0	0	-0.33
3 (Intensive)	3.31	0	0	1.11	0	0	0.00
3 (Intermittent)	4.97	0	0	2.95	0	1	-0.34
Net Impact							**-0.62**

[a] Received helicopter patrols
[b] Matched area that did not receive helicopter patrols and is not adjacent to the experimental area
[c] Population of the area, expressed per 10,000 persons
[d] Frequency of incidents in the three months prior to patrols
[e] Frequency of incidents during the three months of patrols
[f] For definitions see Figure 3.1
[g] Per 10,000 population, with the sign changed such that a negative number denotes a decreased incidence.

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