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thesis entitled

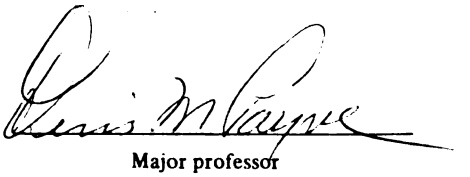
A Comparison and Analysis of the Rates of Injury and Fatal Accidents in Michigan State Police Pursuits, As Defined by the Michigan Emergency Response Study

presented by

John Charles Fenske

has been accepted towards fulfillment of the requirements for

Master of Science degree in Criminal Justice



Major professor

Date September 22, 1993

A COMPARISON AND ANALYSIS OF THE RATES OF INJURY AND FATAL ACCIDENTS IN MICHIGAN STATE POLICE PURSUITS, AS DEFINED BY THE MICHIGAN EMERGENCY RESPONSE STUDY

By

John Charles Fenske

THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

College of Social Science
School of Criminal Justice

1993

ABSTRACT

A COMPARISON AND ANALYSIS
OF THE RATES OF INJURY AND FATAL ACCIDENTS
IN MICHIGAN STATE POLICE PURSUITS,
AS DEFINED BY THE MICHIGAN EMERGENCY RESPONSE STUDY

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The purpose of this study is to evaluate the relative danger of police pursuits, by evaluating the rates of injury and fatality accidents that occurred in police pursuits, as described in the Michigan Emergency Response Study (MERS). The MERS surveyed Michigan State Police (MSP) troopers from June 23, 1991, through May 31, 1992. The troopers were to complete the survey anytime they participated in a vehicular pursuit. This resulted in 197 pursuits, 65 accidents, with 30 injury accidents and one fatal accident. This data was compared to analogous data for the overall accidents of the MSP, and for the general population of Michigan. MERS pursuits did have significantly higher overall injury accident rates than did the comparison groups. Overall fatality rates were only higher than those of the MSP. MERS pursuit accidents were found to occur most often during darkness, while the accidents of the comparison groups occurred most often during daylight.

Acknowledgments

I would like to acknowledge the assistance of Ms. Judy Snow of Office of Highway Safety Planning, Michigan Department of State Police. Ms. Snow was extremely helpful in providing data on Michigan motor vehicle accidents.

I would also like to acknowledge the help, advice, and understanding of my thesis committee members, Dr. Dennis Payne, Dr. Kenneth Christian, and Dr. Frank Horvath. All three gentlemen provided invaluable assistance in the design and execution of this thesis.

I would like to thank my wife, Janice Hilson, for her assistance. Janice assisted me greatly in the production of this paper, providing much needed impetus and encouragement. Janice also collaborated with me on the research for the literature review and methodology sections of this thesis.

Finally, I would like to thank my parents, Beatrice and E. Charles Fenske. The education, assistance and moral support they have provided throughout my life, has contributed in many untold ways towards the completion of this project.

To the others who have helped me, but were not named here, your assistance is not forgotten. Thank you all.

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Chapter I

Introduction

The front page of the January 19, 1993 issue of the Detroit Free Press featured an article entitled, "Police Examine Risks of Pursuits". This story by Ghannam and Andrews discussed the danger police pursuits present to the public, highlighting the pursuit related deaths of five people in the Detroit area within the previous week. Articles such as this alert the public to the potential hazards of some police pursuits. Do these articles accurately portray the outcome of most police pursuits? Do police pursuits present an unreasonable hazard to the public served by the law enforcement agencies? Do accidents and injuries occur more frequently during police pursuits than during normal motor vehicle operation? These are some of the questions being asked by law enforcement administrators, legislators, and court officials.

Statement of Problem

Police vehicular pursuits are normally initiated to apprehend a known or suspected violator of the law. As in any action taken by law enforcement personnel, occasional

injuries to the property and person of suspects occur. Less frequently, injuries occur to uninvolved third parties. In police vehicular pursuits, these injuries and damage often take the form of traffic accidents.

Traffic accidents are a fact of life for operators of motor vehicles, be they civilian or law enforcement personnel. Accidents related to police vehicular pursuits do represent some of these accidents. The question is, are police pursuit related accidents are as serious a problem as media portrayal would lead us to believe, or do the numbers represent accident rates that are reasonably small compared to the population of all accidents? If the numbers are unreasonably high, it may suggest a need for policies limiting pursuits, or a need for developing specific training directed towards limiting pursuit related accidents.

One avenue for accurately portraying police pursuits lies in empirical research. Research can aid in determining the number of police pursuits, factors surrounding police pursuits, and the number of accidents, injuries and deaths occurring. Only when accurate data surrounding police pursuits is examined, can police administrators, legislators and court officials develop sound legislation, policy guidelines, and training.

Several studies have been conducted concerning the police pursuit issue. These previous studies, though

important, are generally limited to observations of activities within the limited geographical or jurisdictional area. It is necessary, therefore, to conduct further studies with different population groups and geographical locations to evaluate the generalizability of the previous results.

A continual problem in the study of police pursuits is the extensive number and variation of factors surrounding police pursuits. No one study can realistically examine each of these factors. To this end, each researcher must determine which factors are important and construct the study based only upon those factors. New studies should examine some factors similar to those in previous studies, as well as consider factors that have not been exposed to empirical analysis.

Police Pursuit Concepts

Police pursuit has become a popular, yet controversial, topic among law enforcement officials, researchers and the media. Each expound their own findings and beliefs as theory, yet often these "theories" are based upon desires, impressions and suppositions, rather than upon properly analyzed empirical data. Clearly, a great number of differing philosophies on the police pursuit issue exist.

Some view vehicular pursuits as a practice the police should refrain from entirely, where others view the pursuit

as a central part of policing that should be engaged in almost without limitation. Beckman (1986) concluded that no pursuit is particularly safe, regardless of speed, distance or duration. On the other hand, the California Highway Patrol (1983) suggests the pursuit and apprehension of minor traffic violators is necessary to maintain order, and submit that the number of people who flee from the police would balloon to a much larger number if the public knew the police would not pursue them. Others follow a moderate path, and suggest pursuits must be restricted in varying degrees (Abbott, 1988; Alpert & Dunham, 1990; Kennedy, Homant & Kennedy, 1992; Payne & Corley, 1992; Shuman & Kennedy, 1989).

Views on the content of pursuit policies also show little consensus. Fennessy, Hamilton, Joscelyn, and Merritt (1970) reported that police agencies that had instituted pursuit policies had adopted one of three models: the officer judgement model, the model that places specific restrictions on pursuits, and the model that discourages or prohibits pursuits.

The officer judgement model allows the officer to make all decisions regarding pursuits. This would include the decision to pursue, whether to continue the pursuit once engaged and how to conduct the pursuit in the interim (Fennessy et al., 1970).

The specific restriction model of police pursuits "places specific restrictions on how a pursuit may be conducted" (Fennessy et al., 1970, p. 8). Policy dictates if a pursuit should be initiated, how it will be executed, when it will be terminated, and who possesses the authority to make these decisions.

The last policy model category discussed by Fennessy et al, (1970) is the pursuit policy that strongly discourages or totally prohibits pursuits. It was found that this is the least likely type of pursuit policy to be adopted by police agencies.

Law enforcement officer training has also been an area of contention. Pursuit related training has been in place for quite some time. However, the character of that training has changed over the years. Initially, police pursuit training reflected the "get your man at any cost" attitude, tempered by a concern for the safety of the officer (Kroeker & McCoy, 1988). Training later espoused a concern not only for the officer's safety, but also for the safety of the suspect and the public. Training began to change from purely a physical skill orientation (Basham, 1978; Clark, 1976; Dougherty, 1961; International Association of Chiefs of Police [IACP], 1965; IACP, 1968; Schultz, 1979; Traffic Institute, 1981) to one that emphasizes policy issues and restrictions in addition to physical skill development (Auten, 1985; Auten, 1989; James,

1980; Fyfe, 1989; Halloran, 1985; Wisconsin Department of Justice, 1984).

The change in philosophy towards pursuits was due to many factors. Two of the primary stimuli were empirical research and liability lawsuits. Since 1982, five major empirical studies have been published concerning the pursuit issue: the California Highway Patrol Pursuit Study of 1982; the Michigan State University Study of 1984 (Beckman, 1986); the Miami-Metro Dade County Pursuit Study (Alpert & Dunham, 1990), from 1985 through 1987; Police Pursuit Driving Operations in Illinois, 1990, by Auten (1991); and the Illinois State University Study, 1991, by Charles, Falcone, and Wells (1992).

The duration of these studies ranged from six months to three years. The number of pursuits examined in each study ranged from 286 to 952. The studies varied in the number of police agencies involved, going from a low of two agencies to a high of eighty-six. In most of the studies, pursuits were initiated for traffic violations. The lone exception was the Charles, Falcone and Wells study, where "non-felonies" were found to be the most common initiating factor. It was not clear from that study if "non-felonies" included traffic violations by definition. All five studies agreed that most pursuits (68% to 77%) ended in arrest of the suspect. In studies that examined pursuit termination factors, 18 to 36 percent of the suspects voluntarily

terminated the pursuit by stopping and surrendering. Most pursuits studied were short, both in time and distance. The pursuit accident rate noted in these studies ranged from 26 to 41 percent. Injuries occurred in nine to seventeen percent of these accidents, and fatalities transpired in zero to three percent of the pursuit accidents.

Several of the studies offered some general conclusions on the subject of police vehicular pursuits. Beckman (1987) suggests police agencies should adopt restrictive policies regarding police pursuits. Alpert and Dunham (1990) found relationships existed associating both officer age and gender with negative pursuit outcomes. Additionally, Alpert and Dunham performed an interesting examination of the pursuit question utilizing a cost-benefit analysis. Falcone, Wells, and Charles (1992) reported that younger, less experienced officers do not suffer from a greater number of pursuit accidents, which is counter to prevailing beliefs. Falcone et al. (1992), also discovered that police agencies generally equate emergency driving training with pursuit driving training, when in fact the two types of training do not necessarily possess the same content.

Pursuit liability lawsuits and the consequent court decisions have focused upon several areas of legal opinion. The general legal concepts include negligence, deliberate indifference, due care, sovereign immunity, proximate cause, reasonableness, and officer duty (Alpert & Fridell, 1992;

del Carmen, 1991; Kohl, 1990; Koonz & Regan, 1985). The general trend has been to increase the causal liability of law enforcement officers and their employing governmental bodies, particularly concerning third party injuries. This is no doubt due in part to the "deep pockets" concept, in which governmental bodies are seen to possess a greater financial ability to pay damages, even though the involved governmental agents may not bear the majority of the actual negligence. A fair amount of disagreement has existed among courts on this matter and others surrounding the legal issues of police pursuits.

Current Study

The Michigan Emergency Response Study contributed the data base for this thesis. The study was conducted from June 23, 1991 through May 31, 1992, utilizing a 58 question survey instrument. The participating police agency was the Michigan State Police (MSP). Briefly, the study requested all MSP road patrol troopers to complete the Michigan Emergency Response Study survey form anytime they were involved in a vehicular pursuit during the year long study period. Additionally, the troopers were to complete the survey whenever they were involved in either a response to an alarm, a medical emergency run, or a response to a crime in progress. The non-pursuit vehicular response types were surveyed only during specified time-frame sampling periods,

and not during the entire study period. (The reader is directed to the methodology portion of this paper for more detail.)

The Michigan Emergency Response Study was designed with three basic purposes in mind. One purpose of the study was to obtain police pursuit data specific to Michigan that included environmental and officer behavior information. A second purpose of this study was to utilize the data to aid in formulating a state-wide police pursuit policy, and to develop a reporting system for recording environmental and officer behavior factors during future pursuits. Finally, this study was to serve as a model for future police pursuit research involving Michigan county, city and municipal police agencies. The data derived from application of this survey instrument to other agency types would be used to determine the generalizability of the Michigan Emergency Response Study, and to provide a broader database upon which to base future decision making.

Purpose of Thesis

The purpose of this thesis is to determine the relative seriousness of the police pursuit problem, by comparing the rates of police pursuit accidents identified in the Michigan Emergency Response Study, to traffic accidents suffered by certain selected comparison groups. The groups selected for comparison will include the general population of motor

vehicle operators in Michigan, and Michigan State Police troopers (on duty). Ultimately, it is hoped the results may be useful in developing future policy and training programs for pursuit operations.

Hypotheses

In order to logically examine the data gathered in the Michigan Emergency Response Study, and direct the analysis of the data towards the purpose of the thesis, it is necessary to establish appropriate research statements, and design hypotheses to test these research statements. The three research statements and their associated hypotheses are described in the remainder of this section.

The first research statement contends there is a significant difference between Michigan State Police pursuit accidents and accidents suffered by the general population. The hypotheses testing this statement are:

1) Injury rates in pursuit accidents are different from those in general population accidents.

2) There is a difference in fatality rates of pursuit and general population accidents.

The second research statement examines the relationship that Michigan State Police pursuit accidents bear to all accidents suffered by Michigan State Police troopers. The hypotheses testing this statement are:

1) Pursuit accidents do have a different injury rate than general MSP accidents.

2) There is a difference in fatality rates between MSP accidents and pursuit accidents.

The third research statement says that when traffic accidents are examined in relation to the light conditions at the time of the accident, a difference will exist between pursuit accidents and all other accidents. Hypotheses in support of this research statement are:

1) There will be a difference in pursuit accident injury rates compared to general population accident injury rates, across differing light conditions.

2) There will be a difference in pursuit accident injury rates compared to overall MSP accidents, across differing light conditions.

3) There will be a difference in fatality rates in pursuit accidents as compared to general population traffic accidents, as examined across differing light conditions.

4) There will be a difference in fatality rates in pursuit accidents as compared to overall MSP accidents, across differing light conditions.

5) Pursuit accidents will occur at a different rate than do the accidents of the general population, or the MSP overall, under similar lighting conditions.

Definitions

Presentation of the following definitions should enhance understanding of the remainder of this paper.

Police pursuit: the attempt by law enforcement officer(s), in a police vehicle, to apprehend a suspect, also in a motor vehicle, when that suspect is aware of the attempt and responds with evasive driving tactics and/or increased speed.

Negative pursuit outcomes: the occurrence of a traffic accident or the escape of a suspect during the execution of a police pursuit.

Road patrol personnel: sworn law enforcement officer(s) of the Michigan State Police whose primary duty is patrol.

Injury accident: any traffic accident that has involved one or more personal injuries, but no fatalities, is counted as one injury accident.

Fatal accident: any traffic accident that includes one or more fatalities is counted as one fatal accident. A fatal accident that includes non-fatal personal injuries is counted only as a fatal accident.

Overview

The goal of this thesis is to utilize the data developed in the Michigan Emergency Response Study to establish information on the subject of police pursuit

accidents, as compared to all accidents experienced by the general population, and to accidents experienced by other police officers. An outline of the police vehicular pursuit issue, discussing some of the information uncovered in previous studies has been reviewed. A brief description of the Michigan Emergency Response Study, and how this study will be analyzed in the course of this thesis, has been presented.

Chapter II will be a more in-depth analysis and discussion of the previous studies that have been conducted regarding the police pursuit issue. Additionally, some significant legal issues and cases will be considered.

Chapter III is a more detailed description of the hypotheses, including null hypotheses. Chapter IV is a description of the methodology of the Michigan Emergency Response Study, and a discussion of the data analysis procedures. Chapter V will contribute the results of the data analysis. Finally, in Chapter VI a summary and conclusion based upon the findings will be offered.

Ultimately, it is hoped that by contributing to the body of knowledge concerning police pursuits, that reasonable and well-considered policy, training, and legislation will be developed. The results of this analysis may also serve to be useful in the development and evaluation of future studies in the area of police vehicular pursuits.

Chapter II

Literature Review

Introduction

Police pursuits have been a popular subject for law enforcement, academicians, legislators and media for many years. Several police pursuit studies have been conducted in the past 30 years. All have played a role in developing opinions regarding police pursuits.

The literature will be reviewed in three sections. The first section will examine the major studies that have been conducted. The findings of each study will be discussed and the strengths and weaknesses of each study will be addressed.

The second section will encompass the liability issues of police pursuits. The cases which have set precedents, concerning the pursuit issue, will be examined briefly. The effect of these decisions will also be discussed.

The third section of this chapter will be a summary of prior police pursuit studies and pertinent traffic safety

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The review of previous police pursuit studies was completed with the assistance of Janice Hilson. Hilson, J. R. (1993). The Michigan Emergency Response Study: Parameters of police pursuits in different population density areas. Unpublished master's thesis, Michigan State University, East Lansing.

information as it relates to the research statements and hypotheses of this paper. This is being done in order to establish a base for comparison between the available literature and this paper.

Prior Studies on Police Pursuit

Michigan State Police Pursuit Study.

Michigan State Police conducted one of the earliest recorded police pursuit studies in 1958 and 1959. This study resulted in 885 high speed pursuits being reported during an 18 month period. This study was conducted in response to an increase in the number of high speed pursuits. According to Frazier (1961) high speed pursuits were defined as the police vehicle exceeding 90 miles per hour.

Speeds up to 130 miles per hour were recorded during the study. Speeding was the most frequently cited reason (580 cases) for initiating the pursuit. In addition, fleeing felons accounted for eleven pursuits. The findings are summarized by Frazier (1961, p. 39) as, "Most of them occurred in the after-dark hours, a good share were on Saturdays and Sundays and, fortunately, the majority were on trunkline highways in clear, dry weather conditions." Two fatalities occurred during the study as the result of high speed pursuits. A traffic accident claimed the life of one

suspect and another suspect drowned trying to escape after exiting his vehicle.

One must remember the definition of pursuit that was used for this study when examining the data. By not utilizing any pursuits under 90 miles per hour, lower speed pursuits would have been omitted. This may have resulted in pursuits occurring in more congested areas not being recorded, therefore the conclusions reached may not accurately depict the pursuit phenomena at the time of the study.

Physicians for Automotive Safety.

In 1968, the Physicians for Automotive Safety released a study of police pursuits. The Physicians for Automotive Safety (PAS) study was based upon a sample of newspaper articles published from April to June, 1967 (Charles, Falcone & Wells, 1992). For this reason, caution must be taken when utilizing the results.

Fennessy et al. (1970, p. 46) reported the findings of the PAS study of newspaper articles on police pursuits as follows:

- One out of five pursuits ended in death.
- Five out of ten pursuits ended in serious injury.
- Seven out of ten pursuits ended in an accident.
- One out of 25 killed was a policeman.

- More than 500 Americans die each year as a result of rapid pursuit by the police.

PAS made six recommendations concerning police pursuits which are based upon the findings listed above. These recommendations are:

- Higher selection and training standards for police and uniform national police standards.
- Pursuit should be limited to only 20 miles more than the speed limit and only to the cases of violent crimes and felonies. Traffic violations and 'suspicious behavior' should not prompt 'life and death chase.'
- Speed control with governors for all general public vehicles to no more than 80 mph.
- Residential and densely populated areas should never become the scene for rapid pursuit.
- The development of more sophisticated and scientific means of identification and communication to obviate the need for rapid pursuit.
- Severe penalties for the fleeing driver and the pursuing police when the law pertaining to both has been broken (Fennessy et al., 1970, p. 47).

The PAS study was one of the first studies to apply research evaluation methods to the police pursuit issue. The execution of the study, however, presents some serious methodological problems. One flaw in the methodology is the reliance upon newspaper accounts for information. The California Highway Patrol (1983, p. 9) reported the weaknesses of the PAS study as:

> Apparently, the PAS group failed to consult with any law enforcement personnel before conducting their study. The California Highway Patrol's experience with pursuit-related publicity is that the vast majority of pursuits go completely unnoticed by the media. This fact seriously affects the validity of any of the results of the PAS study.

Normally, newspapers report only those police pursuits that are newsworthy. This may be at the expense of many pursuits that end without accident or fatality (Charles et al., 1992).

As more studies on police pursuits have been conducted since the release of the PAS study, most being methodologically sound, the reliance upon and the credibility of the PAS study has diminished. This makes the PAS study valuable for its historical significance only.

North Carolina Highway Patrol Pursuit Study.

The North Carolina Department of Motor Vehicles conducted a study of police pursuits by their officers in response to the Physicians for Automotive Safety study. The purpose of this study was to compare the findings of PAS to the police pursuit experiences of the North Carolina Highway Patrol. This study was conducted for one week, from November 4, 1968 through November 10, 1968 (Fennessy et al., 1970). The study resulted in 44 high-speed pursuits.

It was found that all of the police pursuits were initiated for traffic-related violations. None of the pursuits were initiated because of stolen vehicles or other

crimes. Twenty-nine of the pursuits were initiated because of speeding or reckless driving (Fennessy et al., 1970). Three people sustained injury due to accidents that concluded five pursuits (Charles et al., 1992). No fatalities were reported and four pursued drivers were able to escape (Fennessy et al., 1970).

Driving records of 36 randomly chosen North Carolina residents were compared to the 36 North Carolina drivers who were arrested as the result of the pursuits. The control sample had 20 reported accidents and 49 traffic violations among them. This compared to 44 reported accidents and 130 prior traffic arrests of the pursued drivers (Fennessy et al., 1970).

Fennessy et al. (1970) report three flaws in the North Carolina pursuit study. These flaws include the number of cases acquired, the questionable training of the officers involved concerning the study purpose and questionnaire, and the length of the study. Questions about attaining a representative sample during such a short study period is raised by Fennessy et al. (1970). They also expressed doubt about the statistical reliability of the data, due to the subdivision of the small numbers obtained during this study.

Study of the Problem of Hot Pursuit by the Police.

From July, 1969 through June, 1970, Edmund Fennessy, Thomas Hamilton, Kent Joscelyn and John Merritt conducted a

study on police pursuits. The purpose of this study was to determine the extent of the problem of police pursuits and to recommend pursuit guidelines to the police (Fennessy et al., 1970).

The first step Fennessy et al. employed in this study was to request statistical information from 178 police agencies concerning hot pursuits. Fifteen agencies were able to supply some statistics concerning pursuits by their agency, however some of this data was of little use.

The researchers determined that trying to describe police pursuits, using information supplied by the police, would not be viable. Fennessy et al. then decided a one month field survey involving four different law enforcement agencies should supply adequate information concerning hot pursuits. All officers of the participating police agencies were to complete the survey any time they participated in a hot pursuit. Hot pursuit was defined as:

> An active attempt by a law enforcement officer on duty in a patrol car to apprehend one or more occupants of a moving motor vehicle, providing the driver of such vehicle is aware of the attempt and is resisting apprehension by maintaining or increasing his speed or by ignoring the law officer's attempt to stop him (Fennessy et al., 1970, p. 5).

Collection of the pursuit information was to take place for one month at each of the police agencies. The agencies began collecting the data at various times between November, 1969 and January, 1970. Once collection was started by a police agency, it was to continue for one month. Fifty-

eight forms were completed, however, only 46 actual pursuits had occurred (Fennessy et al., 1970).

An officer observing a traffic violation was the most frequent reason given for initiating a pursuit. The mean speed attained was approximately 85 miles per hour. Five miles was the average distance of a pursuit (Fennessy et al., 1970).

Thirty-seven of the reported pursuits terminated in the arrest of the suspect (Fennessy et al., 1970). Five pursuits ended in collisions and the suspect escaped in another five pursuits. No fatalities were reported; however, one police officer and four occupants of suspect vehicles were injured.

Fennessy et al. estimated the national magnitude of police pursuits using extrapolation of results from a variety of sources. These included mailings and telephone conversations with law enforcement agencies, the data obtained during the one month study, and police agency visits. In addition, data developed in the Physicians for Automotive Safety study were also utilized. Fennessy et al. (1970), estimated from 50,000 to 500,000 pursuits occur annually in the United States. During these pursuits, an estimated 6,000 to 8,000 accidents, 2,500 to 5,000 injuries, and 300 to 400 fatalities occur.

Several recommendations were made as a result of this study. These include the development of technical devices

in motor vehicles (such as vehicle speed limiting devices, vehicle identification systems, and remote vehicle ignition disabling systems), an increase in pursuit driving training for police, an increase in penalties for those who flee the police, a database on police pursuit policy, a nationwide data collection system of pursuits, and an analysis of offender traits (Fennessy et al., 1970).

The statistical data the researchers sought to acquire from police agencies was not available. Consequently, a one month field survey was conducted. This study period may not be representative of all police pursuits that occur, as the limited time may not account for seasonal differences in environmental and driver activity.

The national police pursuit estimates, as derived by the researchers, must be viewed cautiously. The researchers themselves admonish about the certainty of the estimates given. "Such estimates cannot, of course, be precise" (Fennessy et al., 1970, p. 85). Furthermore, one must remember that the 1968 study by the Physicians for Automotive Safety was used as part of the formula from which the estimate of national incidence of police pursuits was based. The PAS study is problematic in itself. Other conclusions using this data, may therefore be suspicious. As shown previously in this literature review, that study is methodologically flawed and thus unreliable. Consequently,

data that are based upon that study, may also be questionable.

Many of the recommendations made by Fennessy et al. (1970) are reverberated in studies that have been conducted since. Unfortunately, the sound and sensible recommendations that were made in the study have yet to be adopted by police agencies.

Phoenix Study.

From February 1, 1980 through April 30, 1980, Phoenix (Arizona) Police Department conducted a survey, within their department, of pursuits and other high speed driving incidents. This study was to ascertain the magnitude of high speed pursuits in the Phoenix Police Department and to determine if any changes of policy were needed (Margolis, 1981).

Patrol officers were to complete the survey every time red lights and siren were used and/or the officer drove over 55 miles per hour. The squad sergeant collected the completed forms from the officers at the conclusion of the shift. Forty-eight surveys were collected during the 90 day study period.

Fifty percent of the pursuits were initiated because of traffic violations. The suspect was apprehended in 63 percent of the pursuits (Margolis, 1981). In addition, 27 percent of the pursuits ended in accidents, however, no

injuries or deaths occurred. Speeds of 50 miles per hour or more were reached in 88 percent of the pursuits and 88 percent of the pursuits involved a single police vehicle.

A problem with the Phoenix study is that the study is based upon high speed runs, not only pursuits. These included fights, hot calls and other emergency incidents (Margolis, 1981). In reporting the findings, Margolis (1981) does not differentiate the results of pursuits and those that occurred during the other incidents. The study may therefore not accurately characterize pursuits. The study, however, may have met the objectives of the Phoenix Police Department, which was to review their policy concerning high speed driving.

Solicitor General's Special Committee on Police Pursuits.

The Ontario, Canada Solicitor General's office collected data on 6,757 police pursuits, from 1981 through 1984 (Alpert & Dunham, 1990). These data represent pursuit information from all police agencies in Ontario. The agencies ranged in size from five to 5,000 officers.

The initiating reason in 57 percent of the pursuits was speeding and other minor traffic offenses. The next most frequently given reason for initiating the pursuit was dangerous driving (17%) (cited in Alpert & Dunham, 1990). Stolen cars were the reason for 9.5 percent of the pursuits.

In addition, five percent of the pursuits were instituted for serious criminal offenses. All of the pursued drivers were male and the average age was 22.7 years.

It was reported that 1,578 (23.4%) pursuits concluded in property damage accidents. In addition, 872 total injuries were reported in 642 (9.5%) personal injury accidents and 33 deaths occurred in 26 (0.38%) other pursuits (cited in Alpert & Dunham, 1990).

The committee recommended that vehicle pursuits be conducted only when a criminal offense has been committed and that pursuits be prohibited for certain offenses. In addition, the committee suggested that a new policy be adopted by all police forces in the province (cited in Alpert & Dunham, 1990). Additionally, these new restrictions must be accompanied by alternative means for apprehending violators (cited in Alpert & Dunham, 1990). These included, impoundment of the vehicle, cameras in squads to photograph the suspect vehicle, holding the owner of the vehicle criminally responsible, and using air support in metropolitan areas.

One must be careful when generalizing the data to the United States. This caution is due to legal, cultural and social differences.

California Highway Patrol Pursuit Study.

A police pursuit study was conducted by the California Highway Patrol from April 1 through September 30, 1982. The purpose of the study was to "...identify the true magnitude of the pursuit phenomenon and to gather information about those causes and relationships of pursuits that are presently left to assumption and speculation" (California Highway Patrol, 1983, p. 1). Seven objectives were established so that this purpose could be met. These objectives were to identify:

1. Hazards of pursuits.
2. The effect of the officers' actions on the pursuit hazards.
3. The need for change in the pursuit policy or procedure.
4. Techniques which are effective during pursuits.
5. The impact of the type of vehicle on pursuit outcomes.
6. The reason for pursuits.
7. Factors that cause injuries.

Ten police agencies from California and the California Highway Patrol (CHP) participated in this study. All officers from the agencies were to complete a survey instrument for each pursuit that occurred. The six month study yielded a total of 683 pursuits (California Highway Patrol, 1983). The California Highway Patrol reported 480

pursuits and the remaining 203 were from the other participating law enforcement agencies.

Once completed, the questionnaires were forwarded to CHP researchers for analysis. The California Highway Patrol (1983) found the initiating reason for most pursuits (63%) was violation of the vehicle code.

Sixty-eight percent of the pursuits terminated for one of three reasons (California Highway Patrol, 1983): 1) the pursued suspect voluntarily stopped and surrendered (36%); 2) a collision occurred which involved the pursued vehicle, at which time the suspect surrendered (19%); and, 3) the suspect escaped after out-running the police vehicle (14%).

It was found that 29 percent of the pursuits terminated in accidents, 11 percent ended in injury accidents, and one percent resulted in a fatal accident (California Highway Patrol, 1983). The accident rates determined in this study, when compared to those reported in the Physicians for Automotive Safety study, are much less severe.

Another result of this study was the formation of a profile of the typical police pursuit (1983, p. 20):

- The pursuit will be initiated after an officer witnesses the driver of the pursued vehicle commit a Vehicle Code violation.
- The pursuit will occur toward the end of the week between 1500 and 0300 hours.
- The pursuit will travel one mile and last one to two minutes.
- Two ground units will be involved in the pursuit with no air support.

- The pursuit will take place in an urban area.
- The pursuit will terminate because the pursued driver voluntarily stops or crashes and surrenders; or because the pursued driver outruns the police vehicle.
- The driver of the pursued vehicle will be arrested and booked.
- No firearms or forcible stop will be used during the pursuit.
- The pursued driver will be a male, 20 years old.
- High speed driving will be the method used by the pursued driver while trying to evade arrest.

The majority of the participants were California Highway Patrol officers, whose primary duties were traffic law enforcement. The results of this study did not differentiate between surveys completed by CHP officers and surveys completed by officers with general police responsibilities. Had this occurred, the most common reason for initiating the pursuit may have been different. In addition, this may account for the majority of initiating reasons for pursuits being vehicle code violations. Furthermore, the results of this study may not be generalizable to urban traffic situations, as the majority of respondents (CHP officers) enforce traffic laws on freeway, expressway and state highways, rather than upon city streets.

The authors of the California Highway Patrol pursuit study (1983) state the spring and summer months are periods

of low precipitation. This may affect the number of pursuits as well as the number of accidents which may have been related to road and weather conditions.

The California Highway Patrol Pursuit Study is regarded as pivotal in the examination of the full magnitude of police pursuits. The data derived from this study are statistically well analyzed and the study is well defined. Simple percentages and cross-tabulations are not solely relied upon, rather, measures of significance were applied to the data.

Michigan State University Study (Beckman).

A police pursuit study that involved 75 law enforcement agencies was conducted by Erik Beckman. This study was conducted from April 1, 1984 through September 30, 1984. Thirty-five sheriff's departments and 40 city police departments were involved. The law enforcement agencies were from several states and territories including: Alabama, Arizona, California, Florida, Georgia, Hawaii, Louisiana, South Carolina, Tennessee, Guam, and the Virgin Islands (Beckman, 1986). Each officer, who had participated in a pursuit, was to complete a survey questionnaire. Four hundred twenty-four questionnaires were completed and analyzed.

Beckman (1986) acknowledged the California Highway Patrol Study as the first valid study on pursuits. He then

chose to utilize a modified version of the CHP questionnaire for his study.

The majority of reported police pursuits were initiated for violations of the vehicle code (Beckman, 1986). This corresponds to the findings of the California Highway Patrol Study concerning the initiating reason.

Analysis of the terminating event for the pursuits, showed 77 percent culminating with the suspects being apprehended; the suspect escaped in 22 percent of the pursuits; and, one percent were continued by another police agency. In addition, 28 percent of all pursuits terminated in voluntary suspect stops, while seven percent ended by ramming or in forcible stops. Those pursuits that ended with forcible stops, subjected suspects to injuries in 12 percent of these pursuits, but yielded an arrest rate of 96 percent. The injury rate to suspects during ramming or forcible stops was higher than the 9.9 percent injury rate to all suspects.

This study reported 22.87 percent of the pursuits resulted in property damage accidents, 14.85 percent of the pursuits resulted in injury accidents, and 2.83 percent resulted in fatalities (Beckman, 1986). Based upon these findings, as well as accidents occurring during pursuits of all time and distance durations, Beckman (1986) concluded that no pursuit is particularly safe.

Police agencies should adopt a policy that places restrictions on pursuits, due to the hazards presented to police, suspects and third parties. This policy would include when and how to pursue, termination of the pursuit, and the use of forcible intervention (Beckman, 1986). In addition, Beckman stated that this policy should balance the hazards to persons against the need for apprehending the suspect. In addition, officers must be trained in observing and executing their agency's policy, as well as in pursuit driving techniques.

Beckman's study is not without criticism. No reasons are reported for choosing the law enforcement agencies which were selected for the study. In addition, Beckman does not explain why he chose to include police agencies from territories, such as the Virgin Islands, instead of additional states. He does not describe the size of the police agencies involved, the number of sworn officers of each department, and if all officers from each of the departments were to participate or if he relied upon an officer sample from each agency. Replication of the study is hindered by these oversights. In addition, these omissions make it difficult to determine the accuracy of the study.

Beckman relies primarily on percentages in the analysis of the data and often fails to cite raw numbers. Inaccurate perceptions can result as large percentages do not

necessarily indicate large numbers of incidents. No measure of significance was used or given by Beckman.

Beckman enlarged the scope of the study of police pursuits to previously unexamined geographical areas. This study is also valuable in that it provides additional data which pertain to police pursuits at a time when little empirical research had been completed. This study did serve to expand the general knowledge of police pursuits.

Miami-Metro Dade County Pursuit Study.

A two phase study of police pursuits was conducted by Geoffrey Alpert and Roger Dunham (1990) in Dade County, Florida. The main purpose was to develop information about the role of pursuits in policing and crime control. The first phase analyzed the pursuit policies of numerous law enforcement agencies throughout the country. This review, which began in 1984, resulted in the formation of a model pursuit policy. This policy was then adopted by all law enforcement departments in Dade County. A portion of this policy directed all officers, who were involved in a police pursuit, to complete a form regarding the pursuit. This form was a modified version of the questionnaire used in the 1983 California Highway Patrol pursuit study.

After implementing the pursuit policies, the second phase of the study ensued, from 1985 through 1987. This involved an empirical analysis of police pursuits involving

members of the Metro-Dade Police Department and the Miami Police Department. This study used data obtained from the form developed during the initial phase of this study. The Metro-Dade County Police Department was involved all three years. This resulted in 819 pursuits reported from that agency. The Miami Police Department participated only during calendar year 1986; however, this yielded 133 pursuits. In all there were 952 pursuits reported.

Fifty-four percent (514) of the pursuits were initiated for traffic violations (Alpert & Dunham, 1990). Felony stops or suspected felons accounted for 312 (33%) of the pursuits. Alpert and Dunham (1990) reported that of all the pursuits, 310 (33%) resulted in accidents. Personal injuries occurred during 160 pursuits (17%) and seven (0.7%) pursuit related deaths occurred. The suspect escaped in 298 of the pursuits and pursuits were terminated by the officer or supervisor in 40 cases. A total of 646 suspects were apprehended.

Several conclusions were reached by Alpert and Dunham (1990). These included the application of a cost-benefit analysis, officer gender and negative pursuit outcomes, the relationship of officer age to negative pursuit outcomes, and the role of aleatory elements in police pursuits. A negative pursuit outcome is the occurrence of an accident, the suspect escaping, or injuries to any party, including indirectly involved third parties (Alpert & Dunham, 1990).

Alpert and Dunham (1989) implemented cost-benefit analysis in the determination of the risk of police pursuit, by comparing the number of apprehensions to negative outcomes. The authors resolved that the cost factor of a pursuit is substantially less than would be expected. In essence, negative outcomes do not occur as often as textbooks and the media speculate. The benefit of pursuits, as revealed in this study, is fairly high. This is shown by the arrest rate of approximately 75 percent. In addition, 50 percent of these arrests were for felony charges. The administrator responsible for developing police pursuit policy must determine the acceptable and unacceptable risks of police pursuits.

Male officers exhibited a higher likelihood for negative pursuit outcomes than female officers. This did not apply to the suspect escaping, where no significant discrepancy existed between male and female officer performance. Alpert and Dunham (1990) concluded female officers conducted superior pursuits on a cost-benefit basis.

Alpert and Dunham (1990) determined officer age was a meaningful factor in determining pursuit outcome. In the majority of cases, the likelihood of a negative pursuit outcome was greatest for officers under the age of 40. This probability increased for officers in their twenties. Younger officers were less likely to arrest suspects.

Alpert and Dunham (1990, p. 63) concluded, "Age was not a factor in explaining apprehension. In other words, younger officers conducted less efficient chases with respect to the cost-benefit ratio than older officers."

Aleatory element analysis considers the effect of chance events upon the outcome of a police pursuit (Alpert & Dunham, 1990). These events can encompass happenings such as the unintended intervention of uninvolved motorists or pedestrians, and unexpected offender behavior. Also contributing to the outcome are the psychological processes of the individual officer. For example, a less aggressive officer may employ more cautious driving behavior than a more aggressive officer. Another example may be that some officers see the fleeing offender as a slight to the officer's authority, thus angering the officer. Pursuit policy must therefore reflect the existence of these factors and attempt to limit their impact. During a pursuit, officers and supervisors must continually measure the need of immediate apprehension of the offender to the risk of the pursuit (Alpert & Dunham, 1990). Officer training in pursuit issues should include the pursuit policy, the psychological processes undergone during the pursuit and the mechanics of pursuit driving.

One must remember that the police departments involved in this study, had adopted a comprehensive police pursuit policy prior to the study. The character and intensity of

the pursuits that took place during the study period may have reflected this policy. The existence of a pursuit policy may limit the applicability of the study to agencies lacking a police pursuit policy. In addition, this study was conducted primarily in a metropolitan area. Due to nature of the locale, one must be cautious when generalizing this study to less populated areas.

Of particular interest to this thesis, Alpert and Dunham (1990) compared pursuit-related traffic accidents to all traffic accidents in Dade County. They reported that Metro-Dade Police investigated 10,045 accidents in 1987. These accidents included 6,118 injury accidents (61%), and 113 (1%) fatality accidents. Less than one percent of these accidents were attributable to police pursuits.

Alpert and Dunham (1990) also compared the pursuit accidents to all police accidents experienced by Metro-Dade officers. This is an important comparison, as the police officers would likely have been exposed to similar driving hazards and similar levels of vehicle operation training, thus constituting a fairly homogeneous group for comparison. In 1986, Metro-Dade Police Department employed approximately 2000 officers, and operated approximately 1000 patrol cars. These officers were involved in 614 accidents in 1986, including 78 (14%) injury accidents. In 1987, the officers were involved in 602 accidents, including 67 (12%) injury accidents. The 1987 police accident figures represent six

percent of all Dade County accidents, and 1.1 percent of all Dade County injury accidents.

The Alpert and Dunham study reflected sound methodological practices. The total number of pursuits was quite large (952). The data on all pursuits were verified, and 10 percent of the cases were reconfirmed (Alpert and Dunham, 1990). The accuracy of the data was enhanced by checking officer and defendant information, radio communication records, and previous year driving and accident records of the Metro-Dade police officers. The data were analyzed statistically, to determine if the values were significant.

Alpert and Dunham's application of the data involving injuries to the offenders can be misleading. There is no differentiation between injuries sustained by the suspects as the result of pursuit accidents and those that occurred during the post-pursuit arrest of the suspect. Alpert and Dunham (1990, p. 59) state, "... nearly one-third of the injuries occurred after the chase terminated and while the officer was attempting to make an arrest." All injuries to suspects are included in the analysis of personal injury. This may lead one to believe that all injuries of the suspect are traffic accident related, when indeed they are not.

Chicago Police Department Statistics.

At the same time a new police pursuit policy was adopted by the Chicago Police Department, data collection on police pursuits commenced. Seven hundred and forty-one pursuits were reported (Patinkin & Bingham, 1986). Patinkin and Bingham reported a pursuit accident rate of 18 percent, with five percent resulting in injuries, and 0.1 percent concluding in fatalities. Seventy-six percent of the pursuits concluded with an arrest.

Patinkin & Bingham (1986, p. 61) do not directly report the time span of the study, noting only, "However two years ago the present administration, under Superintendent Fred Rice, realized there was a need to reevaluate the department's pursuit policy." The authors do state compilation started in May, 1984. The information previously given is the only data presented by the authors and no other data analysis is performed.

Patinkin and Bingham (1986) note the officers reported additional information to the agency, such as initiating reason, speeds attained, and distance traveled, however, no attempt is made to describe this information in the article. The Chicago Police Department has taken an important step in attempting to answer the question of the magnitude of police pursuits. Such information has been lacking in the past. Realistically, the utility of the information is dependent upon the quality and extent of analysis that is performed.

In that regard, the value of this data has not been entirely realized.

Kentucky State Police Pursuit Study, 1989-90.

The Kentucky State Police collected data of police pursuits conducted by that agency from May 1, 1989 through April 30, 1990. This study had two stated purposes. The first was to gather and analyze police pursuit data from a rural police agency. The second purpose of this study "was a comparative analysis of what types of pursuits lend themselves to an incidence of accident and, hence, injury, and what type don't" (Oechsli, 1990, p. 4). Intra-agency teletypes were used to collect the data. Oechsli does not discuss if all pursuits were reported via the teletype or, if some pursuits were reported by other means.

This study resulted in 235 police pursuits being reported (Oechsli, 1990). The majority of pursuits, 174 or 74.1 percent, were initiated for traffic offenses. Apprehension of the suspect occurred in 76.4 percent of the pursuits. The accident rate was 22.6 percent (53), resulting in 13 (5.5%) injuries and one death.

Oechsli (1990) compared this study to the findings of the Miami-Metro Dade County Pursuit Study. Reckless driving/DUI was the initiating reason for 32.3 percent of the rural pursuits as compared to four percent of the pursuits in the Miami-Dade County area. It was also found

that apprehension of the suspect is more likely to occur in Kentucky than in the urban area (77.9% to 61.8%). Personal injury from accidents are less likely to occur in the rural area (5.5%) than in the urban area (14.3%). The duration of pursuits was longer in the rural area than the urban area. Kentucky experienced 17.4 percent of the pursuits lasting eleven minutes or more, while the urban area reported 6.5 percent of their pursuits lasting that long.

A new dimension to the information already available on police pursuits is introduced by this study. This dimension is the rural police department. Unfortunately, the lack of a description of the data collection method hinders the determination of the reliability and validity of the information discussed by Oechsli.

Police Pursuit Driving Operations in Illinois.

A study involving 86 Illinois police agencies was conducted by James Auten from January 1 through December 31, 1990. The purpose of the study was "...to expand upon the currently existing body of knowledge concerning police pursuit driving operations. However, this current project is also an extension of a similar project begun in March, 1989" (Auten, 1991, p. 13).

The 1989 study surveyed 824 Illinois law enforcement agencies. The response rate to this section was approximately 36 percent (296). The purpose of the

preliminary project was to ascertain each agency's concept of a typical pursuit. This study also served as a field test for the 1990 study and to modify the questionnaire later used.

Of the 86 participating police agencies in the 1990 study, all officers were to complete a survey questionnaire after each police pursuit. A total of 286 pursuits were reported during the study.

In 58 percent of the pursuits the initiating event was a minor traffic violation (Auten, 1991). The second most frequent initiating event was operating a motor vehicle while intoxicated (12%). Auten (1991, p. 30) states, "In the final analysis, the nature of the initiating event, in almost every instance, becomes the criteria against which the reasonableness of all pursuit related decisions will be judged."

Traffic accidents occurred in approximately 41 percent of the reported pursuits (Auten, 1991). Property damage accidents occurred in 28 percent of all pursuits; injuries were sustained in 12 percent of the pursuits; and, fatalities occurred in 1.4 percent of the reported pursuits.

Thirty-four percent of the pursuits were terminated when the suspect voluntarily stopped and surrendered. In 33 percent of the pursuits, the terminating event was the involvement in a traffic accident (Auten, 1991). Forcible stops terminated 15 percent of the reported pursuits.

Approximately 18 percent of the suspects attempted to escape on foot following the termination of pursuit (Auten, 1991). Nine out of ten attempts to escape on foot happened after the suspect had either "voluntarily" stopped or had been involved in a traffic accident. Forty-three percent of these suspects were successful in evading capture by the police officer.

This study paralleled many of the factors and characteristics of the previous police pursuit studies. Not only does this study add to the existing knowledge on police pursuits, it examines characteristics not fully developed in previous studies. One such factor is information on suspects escaping on foot, after the pursuit had supposedly ended.

Unfortunately, this study does not include the two largest police agencies in Illinois, the Illinois State Police and the Chicago Police Department. Auten (1991) warns that any attempt to generalize the data to the entire State of Illinois must be done with caution.

It is not clearly explained who was responsible for the completion of the survey. This can be a problem in that the party who actually participated in the pursuit incident may not have completed the survey. The data may not have been accurate if the participating officer in the pursuit did not complete the survey. No explanation of the collection procedure for the completed surveys is given. This

oversight creates concern regarding the accuracy and anonymity of the surveys. If supervisors had access to the completed surveys, lower ranking officers may intentionally alter the data to protect themselves from possible disciplinary action.

Police Pursuit in Pursuit of Policy.

From January through December, 1991, Michael Charles, David Falcone and Edward Wells conducted a study of police pursuits. Rather than examining empirical data on specific pursuits, this study examined police attitudes and policies regarding pursuits. Four separate surveys constituted this study: the Officer Survey; the Administrative Survey; the Police Field Interview Form; and, the Administrative Telephone Survey. This study involved 51 police departments from Illinois. The purpose of the study was to "develop a data base helpful to government officials, police administrators, and police personnel" (Charles et al., 1992, p. 25). According to the authors, the data base derived from this study can be the foundation for the formation of sound police policies and for informed debate concerning the pursuit issue. In addition, Charles et al. (1992) state this study differs from previous studies. This study collects information about organizational response to the pursuit issue, as well as attempting to understand and

compare how police officers and administrators operationalize police pursuits.

Fifty-one police agencies were contacted to complete the Administrative Survey. Thirty-five agencies did provide the requested information (Falcone, Wells, & Charles, 1992). Of these agencies, 18 had maintained records on police pursuits and were able to provide data from the previous year. A total of 149 pursuits were reported.

The Officer Surveys were distributed to officers of 44 police agencies. Of the 2,780 surveys, 784 were returned, yielding a response rate of 28 percent. Of the responding officers, 339 officers claim involvement in at least one pursuit during the study period (Falcone et al., 1992). The officers reported a total of 875 pursuits, as some officers were involved in more than one pursuit and some officers claimed to have been involved in as many as 20 or more pursuits.

The Officer Survey reported a median pursuit distance of 4.4 miles, lasting an average of 5.1 minutes (Falcone et al., 1992). This corresponds to the findings from the Administrative Survey of 3.2 miles and five minutes. Both the officers' and the administration's perception of the initiating event is very different from the actual precipitating factor. Felonies were perceived as the initiating event by 62 percent of the responding officers and by 66 percent of the administrators. When officers were

asked what the actual precipitating event was for their own pursuits, at least 75 percent replied that they initiated the pursuit for non-felony offenses.

The pursuit accident rate reported in the Administrative Survey was 26 percent. This is slightly lower than the rate reported in the Officer Survey, which was 34 percent.

The Officer Survey related that 97 percent of the reported pursuit accidents involved the suspect vehicle. This is higher than the Administrative Survey, which indicated only 80 percent of the pursuit accidents involved the suspect vehicle. Administrative and Officer Surveys both reported a 16 percent involvement of third parties in accidents.

The Officer Survey found injuries had occurred in 17 percent of the pursuits. Again this is higher than the nine percent rate reported in the Administrative Survey. The Officer Survey attributed 15 deaths to pursuit accidents. This is in sharp contrast to the results of the Administrative Survey which reported no fatalities. It is not known why this discrepancy in fatality rates exists. Falcone et al. (1992) conjecture that "telescoping" of data could have occurred. They do not, however, believe this would account for all fifteen fatalities reported by the officers.

The third section of the study, conducted by Falcone et al., was field interview surveys. These field interviews were to validate information derived from the Administrative and Officer Surveys (Falcone et al., 1992). In addition, the interviews were to provide information that was not obtainable through the other formats. Interviews were conducted with 107 law enforcement officers of all ranks, representing 29 law enforcement agencies.

It was found that some supervisory and administrative personnel were reluctant to engage in pursuits. Yet no particular reason was given for this reluctance. The same personnel stated that they were aware of unauthorized pursuits being conducted by subordinate officers, as well as the deceptive behavior regarding these pursuits.

Interviews with lower ranking police officers divulged two reasons for the under reporting of pursuits (Falcone et al., 1992). The first reason was the officers' perception that the policy is restrictive and is also in conflict with their ideological beliefs. The second reason is the fear of departmental discipline for participating in unauthorized pursuits.

The fourth survey conducted as part of this study was the Administrative Telephone Survey (Falcone et al., 1992). This section was conducted to elicit organizational and demographic data concerning the participating agencies. Thirty-five agencies participated in this section. The

information developed from this survey was used to complement the Administrative Survey results. This was especially useful when those results could not be accurately measured by the initial Administrative Survey. The results of the Telephone Survey are not separately discussed, but rather were included in the results of the Administrative Survey.

Several weaknesses in the methodology of the Police Pursuit in Pursuit of Policy Study are described by Falcone et al. (1992). One particular deficiency is the sampling method. The Research and Development Division of the Illinois State Police worked with the authors to identify police agencies to include in the study. Large police agencies are over represented. This was done, however, in an effort to sample police agencies who would most likely have well-developed written pursuit policies.

In order to limit the negative effect of any one method, Falcone et al. (1992) implemented a variety of survey methods. In addition, this aided the authors to meet one of the stated purposes of the study, the operationalization of pursuit policy by both administration and line officers.

This study relied upon departmental records of pursuits and upon individual officers' recollections. Relying upon this type of information can be imprudent. As was found during the study, only about half of the police agencies

maintained any type of records from which data could be retrieved. In addition, officer recollection of past pursuits could also be faulty. In examining the Officer Survey and the Administrative Survey, the accuracy of departmental records and officer memory appears somewhat suspect, in comparison. It is not known which contributes more to the large discrepancy which was shown for some factors concerning police pursuits.

Legal Issues of Police Pursuits

Vehicular pursuits, as any other aspect of law enforcement, are ultimately controlled by the rule of law. State statutes, federal codes, local ordinances and departmental policies that apply to police pursuit operations are often vague, thus leaving the bulk of regulation to the implementation of case law that results from trial and appellate decisions. Consequently, any paper that discusses the impact of police pursuits should provide some information on legal decisions affecting vehicular pursuit operations.

Police pursuits generally come under the purview of the courts when an unexpected incident has occurred that has resulted in accidental damage, injury or death to suspects or uninvolved third parties. The pursuing officer is now seen as a defendant in a civil action to seek remedy for the damages that occurred to a plaintiff as a result of the

pursuit. The officer's employing agency and governmental body are often included as co-defendants, primarily under a "deep pockets" theory that suggests the officer's employers will likely have more money to contribute to a settlement than will the officer. It is not unusual to read of out-of-court settlements or trial awards that are in the hundred-thousand or million dollar range.

Obviously, law enforcement agencies and their sponsoring governments wish to avoid being vulnerable to such lawsuits. The purpose of this section is to examine the basic legal premises under which pursuit related lawsuits are litigated, and to examine some means of defense.

General Principles.

Under normal, non-emergency circumstances, police officers operating motor vehicles are responsible to the same standard of liability as other citizens. Consequently, if a police officer who is operating a motor vehicle on normal patrol violates a traffic law, and that action results in a traffic accident, that officer is responsible, the same as a non-sworn civilian who would have committed the same act.

However, a police officer who is operating a motor vehicle in an emergency situation may possess some level of statutory immunity. If that officer is operating under

emergency conditions, and is involved in a traffic accident while violating a traffic law, that officer is not necessarily liable for damages, unless it can be shown that the officer or the agency was negligent. The remainder of this section will discuss the aspects of legal immunity and negligence as they relate to vehicular pursuit lawsuits.

Statutory Immunity.

Many states have statutes that hold police officers immune from obeying various traffic laws when responding to an emergency. A key element necessary for the application of this type of statute is the actual or perceived existence of an emergency. In a Michigan case, *Fiser v. City of Ann Arbor* (1983), the court ruled that the defense must prove the pursuing officer reasonably believed that an emergency existed, in order for statutory immunity to apply. In *Lakoduk v. Cruger* (1956), the court indicated the applicability of the immunity statute depended not upon the actual existence of an emergency, but upon the perception of an emergency situation in the mind of the officer.

Some states interpret the immunity statutes as granting police officers freedom from liability stemming from negligent conduct of pursuits (Kappeler & del Carmen, 1990). Other jurisdictions find that a pursuing officer's violation of a traffic regulation that results in an injury, is not prima facie evidence of negligence. Proof of negligence in

these states must be substantiated by evidence beyond the mere violation of a traffic regulation (Kappeler & del Carmen, 1990).

Some states limit police liability in pursuit accidents by adopting a bifurcated classification of police functions. Schofield (1988) described the two classifications as discretionary and ministerial decisions. In *Rhodes v. Lamar* (1986), the court ruled that the decision to initiate a pursuit is a discretionary decision, and is thus immune from liability. The officer's conduct of the pursuit, however, constitutes ministerial actions, which are not immune from findings of liability.

Negligence.

Negligence is defined in Black's Law Dictionary (Black, 1979, p. 930) as, "The omission to do something which a reasonable man, guided by those ordinary considerations which ordinarily regulate human affairs, would do, or the doing of something which a reasonable and prudent man would not do." Schofield (1988) says negligence is the legal theorem supporting most police pursuit related lawsuits. Schofield states pursuit negligence actions are dependent upon the proof of four elements: 1) the police officer owed the injured party a duty to not engage in a certain conduct; 2) the officer failed to fulfill that duty; 3) the negligent act of the officer was the proximate cause of the injury;

and, 4) the plaintiff or suing party did in fact suffer actual injuries.

Duty of Care.

The courts do not disregard the duty the police have to pursue and capture a criminal suspect. In *Smith v. City of West Point* (1985), the court held that the police had no responsibility to allow suspects a "leisurely" escape. Courts have, however, consistently found police officers operating emergency vehicles owe a duty of care to the public (Kappeler & del Carmen, 1990). This duty requires the officers to perform vehicle operations with due care for the safety of the public. Consequently, officers are not immune from liability when their vehicle operations exhibit recklessness, carelessness, or wanton disregard for other motorists. The specific level of disregard for safety varies depending upon the jurisdiction.

Courts generally determine if the duty of due care is violated by employing a reasonable and prudent man test (Kappeler & del Carmen, 1990). In this test, the conduct of the police officer is compared to that of a normally reasonable and prudent police officer. This test does not presume the officer did everything perfectly, but only as well as a normally reasonable and prudent officer would have. For instance, assume a police officer is pursuing a snowmobile on an ice covered street at 100 miles per hour.

The officer then loses control, striking and killing a pedestrian on the sidewalk. In light of the conditions, the officer's action would likely be seen as unreasonable and negligent.

Reasonableness.

The presence of negligence is established by proving that a person has failed to perform an existing duty. Kappeler and del Carmen (1990) state that courts all accept the duty of care standard of negligence, and apply this duty to all who utilize the highways.

The reasonableness test of the due care standard applies only to the actual operation of a vehicle. It does not apply to the officer's decisions to initiate or terminate a pursuit (Kappeler & del Carmen, 1990). Liability is generally not proven by the existence of one unreasonable act, such as operating a squad car in a pursuit without sounding a siren. Rather, a proof of liability generally depends upon a consideration of the totality of the circumstances, including the officer's conduct and other factors unique to the situation. Kappeler and del Carmen (1990) cite four areas of negligence that might be considered, including: 1) justification for the pursuit; 2) actual vehicle operation; 3) circumstances of operation; and, 4) external factors. External factors could include the disregard of departmental pursuit policies, training,

and mechanical condition of the police vehicle. As the number of proven police negligence factors increase, the likelihood of a finding of liability against the police increases.

Proximate Cause.

Assume that a pursuing police officer was shown to have a duty of care to a party injured in a pursuit, and also was unreasonable in the conduct of the chase. That officer cannot be held liable for the injuries unless it can be proven that the officer's conduct was the proximate cause of the injury. One definition given in Black's Law Dictionary (Black, 1979, p. 1103) for proximate cause is, "That which, in a natural and continuous sequence, unbroken by any efficient intervening cause, produces injury, and without which the result would not have occurred."

There are basically two schools of thought in regard to proximate cause and police pursuits. The first suggests that police cannot be held liable for damages when the police vehicle did not actually collide with the injured party. The courts that follow this doctrine submit police should not be held liable for the collision of a pursued vehicle and an innocent third party. In *Dent v. City of Dallas* (1986), the court held, "Courts will not make police officers the insurers for the conduct of the suspects they pursue."

The second school of thought renders the opinion that police cannot be given blanket immunity for third party damages caused by a pursued driver. This concept allows the officer's conduct to be examined on a case by case basis. If the officer's conduct can be proven to have influenced the third party injury, then this theory holds the officer's conduct may have been a proximate cause. *Thain v. New York* (1971), embodies this concept, saying that the officer's duty of care should not be subjugated to the duty to apprehend, as well as indicating the officer's liability for injury to third parties.

Alpert and Fridell (1992) describe a trend in pursuit litigation, which demonstrates a tendency by the courts to not blame the pursuing officer for the accidents of the pursued, if the officer acted within the bounds of law and policy. Nevertheless, this type of ruling requires the officer to not manufacture a situation in which an accident involving the suspect and a third party is foreseeable.

Negligent Operation Defenses.

If the elements of police negligence have been established, and statutory immunity has been waived, it is still possible for the law enforcement agency to avoid payment of damages. The defenses that can be employed include the establishment of either contributory or

comparative negligence on the part of the plaintiff (injured party).

The concept of contributory negligence is based upon the theory that says if an injured party has in any way contributed to the incident that resulted in his injury, then the injured party has no claim against the defendant, regardless of the defendant's negligence (Kappeler & del Carmen, 1990). For instance, assume a third party was struck by a suspect being chased by the police. If the third party had committed any act of negligence at the time of the incident, such as speeding, the third party would be prevented from recovering any damages. *Maple v. City of Omaha* (1986), barred plaintiff's recovery under this concept, as the plaintiff failed to hear the police siren.

As the contributory negligence defense apparently lacks fairness, many jurisdictions have turned to the comparative negligence defense (Kappeler & del Carmen, 1990). In comparative negligence, as in contributory negligence, the burden is upon the defense to show that the plaintiff's actions were somehow negligent. The difference is that proof of plaintiff negligence does not bar the plaintiff from recovery. The plaintiff's recovery is calculated by the court, reflecting the percentage of fault that accrued to the plaintiff and to the defense.

It should be noted that gross negligence is the standard required to prove negligence under a 1983 type

civil rights case. Gross negligence is manifested by deliberate indifference on the part of the plaintiff. This is important in the State of Michigan, as Michigan State Statute # 1407 mandates that police officers are immune from liability, unless the harmful action they took constituted gross negligence.

Training and Policy.

Although not a direct defense to suits associated with vehicular pursuits, pursuit related training and policies may insulate law enforcement agencies from the occurrence of incidents that lead to such suits. Additionally, effective pursuit policy and training may serve to limit the effect of vehicular pursuit suits that are brought before a court.

Schofield (1988, p. 28) said effective pursuit policies should, "...state the department's objectives, establish some ground rules for the exercise of discretion, and educate officers as to specific factors they should consider when actually conducting a vehicular pursuit." Schofield continues, indicating policies should operationalize terms like reckless and reasonable, and should provide guidance. An additional benefit of policies for police administrators, is that they provide a tool for holding personnel accountable for inappropriate action.

Training is equally important as policy. Koonz and Regan (1985) suggest that the lack of adequate training can

be useful in proving police negligence in a pursuit case. Appropriate training can reduce the occurrence of pursuit related accidents, as well as reducing the amount of negligence that can attach to the police if an accident does occur. Schofield (1988) notes that lack of resources or facilities does not indemnify a police agency from liability arising from a lack of pursuit training.

Summary of Legal Issues.

Police agencies have historically been protected from liability by statutory immunity. The current trend in many courts is towards the abrogation or weakening of this immunity in the arena of police vehicular pursuit lawsuits.

Findings of liability depend upon several factors. Initially, the injured party must show the police are not immune to liability by statute.

Secondly, the negligence of the police must be determined. Negligence itself depends upon establishing that the police had a duty of care to the plaintiff, and that this duty of care was breached. A reasonable and prudent man test is commonly used to determine if a breach of duty occurred. Following a determination of negligent conduct by the police, the plaintiff must then prove that the police actions were a proximate cause of the injury.

Finally, the question of contributory or comparative negligence on the part of the plaintiff arises. If the

plaintiff is found contributorily negligent, the plaintiff then has no claim against the police. If the plaintiff is found to be comparatively negligent, then the plaintiff can only recover a percentage of the awarded damages.

Police agencies and officers can defend themselves against vehicular pursuit lawsuits. Two means available include the design and implementation of adequate pursuit policies and training programs. The lack of these measures leave the department lacking in capability, as well as exposing them to accusations of negligence for failure to provide adequate control and training of officers.

The specter of pursuits and related lawsuits will not likely disappear. It is the role of agency administrators to mitigate the impact of the suits by providing officer education and control, allowing police officers to carry out necessary pursuits as safely as possible.

Summary of Chapter

This chapter has contained a synopsis of the major studies that have been conducted on police pursuits. The Alpert and Dunham (1990) study included a comparison of pursuit-related accidents to general population accidents within the jurisdiction. In that study, pursuit related accidents represented less than one percent of all traffic accidents.

Significant legal issues of police pursuits were also presented. The trend in civil liability seems to indicate that law enforcement agencies will be facing increasing liability for pursuit-related accidents, particularly due to a decrease in the legal popularity of governmental immunity. Nevertheless, law enforcement agencies do have several means available to defend against pursuit liability suits, including appropriate training and policy implementation.

Chapter III

Hypotheses

Introduction

The three research statements designed to direct the analysis of the Michigan Emergency Response Study are specified in this chapter. The chapter includes the hypotheses associated with each research statement, as well as the null statements testing the assertions of the hypotheses.

Research Statements and Related Hypotheses

The analysis of the data generated in the Michigan Emergency Response Study will be directed toward the consideration of several major research statements. Each research statement is associated with supporting hypotheses.

The first research statement contends there is a significant difference between Michigan State Police pursuit accidents and accidents suffered by the general population. The hypotheses in support of this statement are:

1) Injury rates in pursuit accidents are different from those in general population accidents.

Null hypothesis: There is not a difference in injury rates.

2) There is a difference in fatality rates of pursuit and general population accidents.

Null hypothesis: There is no difference in fatality rates.

The second research statement examines the relationship that Michigan State Police pursuit accidents bear to all accidents experienced by Michigan State Police troopers, proposing they are different. The hypotheses in support of this statement are:

1) Pursuit accidents do have a different injury rate than general MSP accidents.

Null hypothesis: No difference exists in the injury rates.

2) There is a difference in fatality rates between MSP accidents and pursuit accidents.

Null hypothesis: No difference exists in fatality rates.

The third research statement says that when traffic accidents are examined in relation to the light conditions at the time of the accident, a difference will exist between pursuit accidents and all other accidents. Hypotheses in support of this research statement are:

1) There will be a difference in pursuit accident injury rates compared to general population accident injury rates, across differing light conditions.

Null hypothesis: No difference in pursuit accident injury rates will exist across differing light conditions, when compared to general population accidents.

2) There will be a difference in pursuit accident injury rates compared to overall MSP accidents, across differing light conditions.

Null hypothesis: No difference in pursuit accident injury rates will exist in comparison with overall MSP accidents, across differing light conditions.

3) There will be a difference in fatality rates in pursuit accidents as compared to general population traffic accidents, as examined across differing light conditions.

Null hypothesis: There will be no difference in fatality rates for pursuit accidents as compared to general population accident rates, as measured across differing light conditions.

4) There will be a difference in fatality rates in pursuit accidents as compared to overall MSP accidents, across differing light conditions.

Null hypothesis: There will be no difference in fatality rates in pursuit accidents, as compared to

overall MSP accidents, across differing light conditions.

5) Pursuit accidents will occur at a different rate than do the accidents of the general population, or the MSP overall, under similar lighting conditions.

Null hypothesis: Pursuit accidents do not occur at a different rate than those of the general population, or the MSP overall, under similar lighting conditions.

Summary

The research statements, hypotheses, and null hypotheses for this thesis have been reported in this chapter. The data analysis will be contained in Chapter V. The next chapter, Methodology, will discuss how the survey instrument was designed, and how the data was collected.

Chapter IV

Methodology

Introduction

This chapter contains a description of the manner in which the data was gathered for this study. The development, distribution and method of analysis of the Michigan Emergency Response Study survey is described.

The Michigan Emergency Response Study

The basis for this thesis is the Michigan Emergency Response Study (MERS). The MERS is the second phase of a two phase study involving the Michigan State Police (MSP), surveying high speed and emergency driving operations of troopers. The first phase involved a general opinion questionnaire. Phase two involved three sections, each conducted concurrently, from June 23, 1991 through May 31, 1992.

This chapter was written with the assistance of Janice Hilson. See Hilson, J. R. (1993). The Michigan Emergency Response Study: Parameters of police pursuits in different population density areas. Unpublished master's thesis, Michigan State University, East Lansing.

Research Site

The MSP is a statewide law enforcement agency, which is mandated to perform a variety of law enforcement and related services throughout the State of Michigan. During the survey period, the MSP employed an average of 1,178 road patrol officers and 115 motor carrier officers. Road patrol personnel are sworn law enforcement officers whose primary function is general police duties, primarily implemented through patrol. The motor carrier officers' primary function is to enforce motor carrier and vehicle equipment laws. These officers were responsible for the completion of the MERS questionnaire.

The MSP is divided into eight districts and each district is subdivided into posts and teams. A total of 65 posts and three teams existed at the time of the study (see Appendix A for a map of the MSP districts).

Sampling Design

The MERS consists of three sections. The first section is a short form questionnaire and consists of 15 questions concerning high speed driving. The purpose of this section was to determine the amount of high speed driving the MSP troopers were involved in, and to measure the amount of injuries and damage that resulted. High speed driving was defined by Payne (1991, p. 1) as:

> ... not a pursuit, but one in which an officer attempts to overtake a vehicle that was observed

> at a speed in excess of the limit or in a manner which requires police to drive at a speed in excess of limit in order to take enforcement action. This may include pacing, closing the gap, or overtaking a vehicle to take enforcement action, but not using emergency equipment until the actual stop is made.

This form was to be completed by each officer any time he/she was involved in high speed driving during that post's assigned reporting weeks. This questionnaire was completed in a time sampling frame. Each post was assigned one week during each of the four quarters of the year (total of four weeks per post) for completion of the survey. The specific week assigned to each post during each quarter varied. For example, Post 23 could have been assigned to complete the questionnaire during the third week of the first quarter, the eleventh week of the second quarter, the eighth week of the third quarter and the sixth week of the fourth quarter. Posts and teams assigned to complete the questionnaire during the same reporting week in the first quarter were grouped together during their assigned reporting weeks in the subsequent quarters. The grouping of posts and teams to a respective reporting week was done in a manner allowing for a cross-section of post sizes, activity rates, geographical sizes and locations (see Appendix B for an assignment schedule and a letter from the director of the MSP to the officers requesting their cooperation). For example, a group of posts assigned to a specific reporting week would include posts of high, medium and low activity

rates, as well as a mix of population sizes served and so forth.

The second section of this study involved the distribution of a longer survey form that was to be completed whenever a road patrol officer was involved in a response to: 1) an alarm; 2) a medical emergency; or, 3) a crime in progress. The sampling method used in this section of the study was the same as that described for the 15 question high speed driving survey. Officers were assigned both surveys during the same reporting weeks.

The long survey form defined the run types as follows (Payne, 1991, p. 1):

> Response to Alarm: Nature of the alarm is such that the officer considered it necessary to drive at speeds in excess of the limit. An example might be responses to silent alarms.
>
> Medical Emergency: Speeds driven in excess of the limit based on a decision of the officer that the nature of call is such that he/she feels it is an emergency requiring speed, lights, and siren. Examples include: A serious injury accident, poisoning, attempted suicide, heart attack, etc.
>
> Crime(s) in Progress: Those crimes or responses to complaints in which officer obtained information leading to his/her conclusion, based on policy or training, that the circumstances require an emergency response utilizing emergency equipment. This category may also include silent-run situations for the latter part of the run or officer in trouble calls.

The third section of the Michigan Emergency Response Study involved police vehicular pursuits. This section utilized the same survey form as was issued in the second section. The third section differed from the other two

sections of the study, in that the survey form was to be completed anytime the officer was involved in a pursuit, whether or not it occurred during the assigned reporting week. In other words, anytime an officer was involved in a pursuit occurring between June 23, 1991 and May 31, 1992, that officer was required to complete a pursuit survey. Pursuit was defined by Payne (1991, p. 1) as:

> Offender was obviously attempting to elude the police by increasing speed and/or taking other evasive action. Those circumstances that require emergency lights and sirens whether you used them or not.

Rationale of Method

Several reasons exist for using this sampling method in sections one and two of this phase of the study. It was not reasonable or practical to survey the section one and two driving practices of all MSP road patrol officers for an entire year. To do so would have yielded a large amount of data, but it may have suffered from inaccuracy due to an increasing lack of participation and interest by the respondents over time. Additionally, it may have been difficult to secure the cooperation of the direct supervisors of the respondents due to the real or imagined competition this project presented to normal law enforcement duties.

It was still desirable to obtain information on the driving incidents that occurred under a variety of road,

weather, and traffic conditions. To attain this goal, it was decided that the sampling method described in the previous section would present an adequate picture of these practices, while buffering the negative effects of a department-wide, year-round survey.

Section three, the portion of the study dealing with police pursuits, was conducted differently. One of the primary goals of the study was to capture pursuit data. Consequently, it was necessary to direct the respondents to complete surveys on every pursuit conducted within the study year. Additionally, previous pursuit studies have yielded a relatively small number of pursuits. Individual respondents should experience a minimal personal impact from a year long study restricted to only pursuits, increasing the likelihood of satisfactory response rates.

Research Design

The MERS was designed and developed by the primary researcher, following a review of literature and relevant court cases. The primary researcher also applied the experience of numerous years in law enforcement. The primary researcher was assisted by a committee which included representatives from the MSP Traffic Services Division, the Executive Division, the Training Division, the Troopers' Association, a Post Commander, a Post Sergeant, and a Ferris State University faculty member.

The purpose of this ten member committee was to assist in the refinement of the variables, and to modify the survey questions to make them more explicit. This committee met on several occasions to consider both surveys, clarifying the wording of questions to conform to contemporary police understanding (see Appendix C for a copy of the long form questionnaire).

Survey Design

This paper will be based upon an analysis of data obtained from the section three survey instrument, which concentrated on police pursuits. This instrument consisted of 58 questions, each having as many as nine possible choices. The 58 questions were divided among three segments. The first segment, consisting of questions numbered 1 through 27, was designed to collect general information about circumstances surrounding the incident and the police-respondent. The second segment of the survey, containing questions numbered 22 through 52, was intended to collect data pertaining only to a police pursuit, if one occurred. The third segment of the survey instrument, questions 53 through 58, recorded data describing accidents that occurred as a consequence of any reportable survey incident.

Only one response was allowed per question. The questionnaire was of a machine readable design.

Consequently, answers to questions were indicated by filling in circles with a pencil, directly on the form.

No specific respondent could be identified at a level more precise than that provided by the district number and demographic data. The survey was designed to make the identification of any specific suspect impossible.

Measures Insuring Compliance and Anonymity

The primary researcher met with several groups within the MSP to discuss the purpose of the survey and to elicit their support. These groups included district commanders, post commanders and representatives of the Michigan State Police Troopers' Association. In a survey project of this type, it is vitally important to obtain the backing of line and administrative leaders. Without this backing, past experience has shown that police officers tend to ignore data gathering surveys.

Anonymity of the respondents was ensured through several procedures. During the personal meetings with district and post commanders, the importance of maintaining the anonymity of the respondents was emphasized. Each post was directed to develop a receptacle for the completed surveys that would allow for the confidentiality of the respondents. The completed surveys were to be sent directly to the primary researcher by the post commanders at the conclusion of each quarter. This allowed officers to

deposit their completed surveys at anytime, with minimal risk of exposing the contents to other personnel of the Michigan State Police. The responding officers were directed to not place their names or other identifying marks on the surveys, in an effort to further protect their anonymity.

Following the pilot survey and subsequent approval of the final survey forms, letters were drafted and sent to all patrol officers by the Director of the Michigan State Police. This letter informed the officers of the study, requested their participation and gave instructions for completing the surveys. In addition, reminder memos were sent to each post one week prior to each scheduled reporting week. Intermittent reminders were sent to each post through the state-wide law enforcement computer system (LEIN). Each of these memorandums stressed the importance of completing the surveys when required.

Pilot Test

A pilot test was conducted at three selected posts of the MSP. The three posts chosen varied from a large, highly active post to a small, low activity post. This test was conducted for one week and involved 57 officers. All officers at each of the three posts were advised to complete the appropriate form of the survey for each conforming incident during the pilot test period. Prior to conducting

the test, a letter was transmitted to each post advising of the pilot test and included instructions for completion of the surveys.

The pilot surveys were collected by the researchers. At the time of collection, researchers interviewed officers at the responding posts about the survey design. Comments regarding survey content, question clarity, and difficulty of completion were solicited. The comments were considered, and changes were made to the final form of the survey as needed.

Limitations of Study

As in any survey, no matter how well designed, certain inherent or unforeseen problems become evident as the survey is implemented, and the data analyzed. In November of 1990, a new administration entered the governor's office of Michigan. Budgets for a number of state agencies were decreased. The Department of State Police initiated a hiring freeze, reassigned personnel to different posts, and reduced some personnel in rank. These economically driven actions may have had an adverse effect on employee morale and survey response rates. This suspicion may be supported by a check of MSP records that revealed 400 fleeing and eluding citations were issued by troopers during the survey period (D. M. Payne, personal communication, July 21, 1993). This type of citation is only issued following a pursuit.

The number of citations is clearly in excess of the 197 pursuits reported in this survey.

Supplemental Data

Not all data necessary for this analysis are available in the survey results. This section will explain where the supplemental data were obtained.

The necessary traffic accident data will be derived from data supplied by the Office of Highway Safety Planning (OHSP), a unit of the Michigan Department of State Police. The OHSP data includes a variety of civilian accident statistics on a state-wide level.

As the latest annual OHSP general population accident statistics available are for 1991, the pursuit survey accident information will be compared to a mean of the OHSP civilian accident statistics covering the five year period from 1987 through 1991. This method should provide reasonable figures for comparison with the survey data, as well as limiting the effect of unusual aberrations.

A mean for the OHSP general population accident statistics will also be determined for the three year period spanning 1988 through 1990. The purpose of this is to allow a more exact comparison with the Michigan State Police general accidents from the same time period.

Information regarding total Michigan State Police accidents will be obtained from the OHSP. This data will

include injury and fatality information for MSP accidents for the three year period from 1988 through 1990. As in the OHSP general population statistics, the three year MSP statistics will be averaged.

Data Analysis

The completed surveys were machine-read by Computer Services of Michigan State University. The raw data was then entered into a computer system and was analyzed using the Statistical Package for the Social Sciences (SPSS).

The intent of this analysis is to determine what differences in accident frequency and severity exist, between accidents suffered as a consequence of police pursuits and all traffic accidents. It is anticipated that analysis will be accomplished primarily through comparing proportionate rates. The statistical significance of any difference in rates will be analyzed using one-tailed *Z* score testing. The statistical tests will be conducted at a 0.05 level of significance, which is equivalent to a one-tailed *Z* score of 1.65.

The analysis will be conducted by examining the number of injury and fatal accidents that occurred, as a proportion of all accidents experienced by the group in question. For example, if a group experienced 20 injury accidents out of 100 total accidents, then the rate would be 20 percent.

When examining injury and fatal accident rates as related to light conditions, the proportion will be computed in a slightly different manner. Here, the proportion will be computed by dividing the number of injury or fatal accidents that occurred under a specific light condition by the total number of accidents for that specific light condition.

A limited number of accident factors in the MERS study and the OHSP accident reports were readily comparable. These included the total number of accidents, number of fatal accidents, number of injury accidents, and accidents occurring under differing natural light conditions. The light condition data included information on total, fatal, and injury accident numbers.

The categories of much of the OHSP data were not readily comparable with the MERS pursuit accident responses, due to a variety of reasons. For example, the MERS selections for "age of primary suspect" were presented in categories that were not readily collapsible to match the OHSP selections for "age of driver".

The OHSP and the MERS selections for "light conditions" did lend themselves to comparison, following the collapsing of some data categories in each. The OHSP data originally provided categories for daylight, dawn/dusk, darkness/lights, and darkness/no lights. The MERS light condition categories were dawn, daylight, dusk, and dark.

The OHSP values for darkness/lights and darkness/no lights were combined into a new value, darkness. The MERS values for dawn and dusk were collapsed into a new value, dawn/dusk. Consequently the new collapsed values were: daylight; darkness; and, dawn/dusk.

Summary

The study is based upon an analysis of the police vehicular pursuits as reported in the MERS survey. The population studied includes all MSP road patrol troopers and motor carrier inspectors. The respondents were to complete a survey anytime they participated in a pursuit during the study period, June 23, 1990 through May 31, 1991.

Application of the survey data to an analysis of the hypotheses will require the use of other data sources. These other sources include general population accident data and MSP officer-involved accident data. This data will be obtained from the OHSP.

Statistical analysis of the data will be discussed in detail in Chapter V. Primarily, data will be analyzed using comparison of proportionate rates, with statistical significance tested by application of *Z* score tests. Statistical tests will be performed at the 0.05 level.

Chapter V

Data Analysis

Introduction

The analysis of the data necessary to test the hypotheses presented earlier in this paper will be discussed in this chapter. The chapter is divided into seven major sections. The injury and fatal accident data for the MSP as a whole, and for the general population of Michigan, will be discussed in the first section. The mean rates derived for the MSP and general population accident data will be listed. The mean rates are utilized to provide a base of comparison for the MERS accident, injury, and fatality data.

The injury and fatal accident rates endured by the entire MSP and the general population of Michigan are compared in section two. The purpose of the second section is not to specifically address the hypotheses, but to determine what differences exist between the traffic accidents of the general population and the more specific population of MSP employees.

The injury and fatal accident rates displayed in the MERS and the general population data are compared in the third section. The comparison examines the MERS data in

relation to both the three and five year means of the general population data.

The difference between the MERS injury and fatal accident rates, and those experienced by MSP employees in general, will be presented in section four. The MSP figures utilized represent the mean of the data from 1988, 1989 and 1990 accidents.

The effect of natural light conditions upon the accident rates experienced in the MERS, will be discussed in the fifth section. The proportion of all MERS pursuit accidents that occur under specific light conditions are compared to respective values for the three and five year general population accident means, and to the three year MSP accident mean.

The MERS fatal and injury pursuit accident data, according to light condition values reported in the survey, will be analyzed in the sixth section. This data will be compared to corresponding values reported in the general Michigan accident data.

The MERS fatal and injury pursuit accident data, in relation to light conditions, will be examined in the seventh section. The MERS data will be compared to corresponding data reported in the three year MSP accident mean.

Comparison of General Population Accidents to MERS Accidents

The general population traffic accident data was not available for the entire time period covered by the MERS. Therefore, three and five year means of general population traffic accident data were calculated and each will be compared with the accident information from the MERS. The general population accident data for the individual years is presented in Table 5.1. The three year mean was calculated to allow comparison with the available MSP data.

Table 5.1

General Population Accident Data by Year

Year	Accidents	Injury accidents	Fatal accidents
1987	397,224	105,797	1,452
1988	410,437	105,066	1,522
1989	417,252	104,183	1,463
1990	387,180	97,479	1,396
1991	364,847	91,479	1,290
1987-1991 mean	395,388.00	100,800.80	1,424.60
1988-1990 mean	404,956.33	102,242.67	1,460.33

Accident data for the entire MSP was available for the three year period spanning 1988 through 1990. The MSP data is displayed in Table 5.2.

Table 5.2

MSP Accident Data by Year

Year	Accidents	Injury accidents	Fatal accidents
1988	326	74	0
1989	335	83	0
1990	346	88	0
1988-1990 mean	335.67	81.67	0

Comparison of General MSP Accidents to General Population Accidents

The rates of injury and fatal accidents experienced by the entire MSP, and, the general population of Michigan, will be compared in this section. The analysis was executed by comparing the three and five year means of general population accident data to the three year mean of the MSP data. Use of both the three and five year general population means was employed to compensate for any differences that may have occurred due to unusual data aberrations.

A comparison of the mean rate of injury accidents experienced in the MSP, to those of the general population for the 1988 through 1990 period, is presented in Table 5.3. The MSP injury accident rate of 24 percent is not significantly different [Z = 0.39, n.s.] from the 25 percent rate in the general population.

Table 5.3

Comparison of MSP and General Population 3 Year Mean Injury Rates

Accidents	MSP	General
Total	335.67	404,956.33
Injury	81.67	102,242.67
Injury % *	24.33	25.25

* Z = 0.39, p > .05

Table 5.4

Comparison of MSP and General Population 5 Year Mean Injury Accident Rates

Accidents	MERS	General
Total	335.67	395,388.00
Injury	81.67	100,800.80
Injury % *	24.33	25.49

* $Z = 0.49$, $p > .05$

The three year MSP injury accident rate is compared to the five year general population injury accident rate, as shown in Table 5.4. Again, the 24 percent MSP rate is not significantly different [$Z = 0.49$, n.s.] than the 25 percent general population injury accident rate.

The fatal accident rates experienced by the MSP and the general population of Michigan, utilizing the three year accident means, are shown in Table 5.5. No significant difference exists [$Z = 1.10$, n.s.] between the zero percent MSP fatal accident rate, and the 0.36 percent general population rate.

Table 5.5

Comparison of MSP and General Population 3 Year Mean Fatal Accident Rates

Accidents	MSP	General
Total	335.67	404,956.33
Fatal	0.00	1,460.33
Fatal % *	0.00	0.36

* $Z = 1.10$, $p > .05$

The mean fatal accident rate of the MSP and the general population, comparing the three year MSP figure with the five year general population mean, is examined in Table 5.6. As shown in Table 5.6, no significant difference exists [$Z = 1.10$, n.s.] between the MSP zero percent fatality rate and the 0.36 percent general population rate.

Table 5.6

Comparison of MSP and General Population 3 Year Mean Fatal Accident Rates

Accidents	MSP	General
Total	335.67	395,388.00
Fatal	0.00	1,424.60
Fatal % *	0.00	0.36

* $Z = 1.10$, $p > .05$

Comparison of MERS Injury and Fatal Accident Rates with the General Population of Michigan

The MERS recorded 65 accidents from a total of 197 reported pursuits, or thirty-three percent. Of these, 30 accidents involved only personal injury and one involved a fatality and personal injury. The rate of injury accidents in the general population will be compared to the rate of injury accidents in the MERS. As shown in Table 5.7, the injury rate in the MERS accidents (46%) is significantly higher [$Z = 4.11$, $p < .05$] than the 25 percent injury rate found in the 1987 to 1991 general population mean. In other words, the MERS pursuit accidents resulted in injuries more often than did accidents of the general population five year mean.

Table 5.7

MERS and 5 Year General Population Mean Injury Rate Comparison

Accidents	MERS	General
Total	65	395,388.00
Injury	30	100,800.80
Injury % *	46.15	25.49

* $Z = 3.82$, $p < .05$

Table 5.8

MERS and 3 Year General Population Mean Injury Rate Comparison

Accidents	MERS	General
Total	65	404,956.33
Injury	30	102,242.67
Injury % *	46.15	25.25

* $Z = 3.88$, $p < .05$

The MERS injury rate was also compared to a three year mean of the general population injury rate. As shown in Table 5.8, the MERS injury rate (46%) is significantly higher [$Z = 4.16$, $p < .05$] than the 25 percent three year general population injury rate. This result shows the

pursuit accidents resulted in injury more often than did the accidents examined in the three year general population mean.

The accident fatality rate of the MERS and the five year general population fatality mean are compared in Table 5.9. The MERS fatality rate (2%) is not significantly different [Z = 1.594, n.s.] than the 0.36 percent fatality rate in the five year general population mean.

Table 5.9

MERS and 5 Year General Population Mean Fatality Rate Comparison

Accidents	MERS	General
Total	65	395,388.00
Fatalities	1	1,424.60
Fatality % *	1.54	0.36

* Z = 1.58, p > .05

The MERS fatality rate was also compared to that of the three year general population fatality mean. As in the five year mean comparison, there was not a significant difference [Z = 1.58, n.s.] in fatality rates. This is shown in Table 5.10.

Table 5.10

Comparison of MERS and 3 Year General Population Mean Fatality Rate

Accidents	MERS	General
Total	65	404,956.33
Fatalities	1	1,460.33
Fatality % *	1.54	0.36

* $Z = 1.58$, $p > .05$

Conclusions Regarding First Research Statement and Hypotheses

The first research statement is that there is a difference between MSP pursuit accidents and accidents experienced by the general population. The first hypothesis in support of this statement is:

1) Injury rates in pursuit accidents are different than those in general population accidents.

This hypothesis is substantiated by the results of the analysis of the MERS data, in relation to the general Michigan population accident data. A significant difference was noted between the MERS injury accident rate, and those of the three and five year Michigan general population accident data.

The second hypothesis in support of this research statement is:

2) There is a difference in fatality rates of pursuit and general population accidents.

This hypothesis is not supported by the data analysis. Though the MERS fatality rate is higher than that of the three and five year general population accident data, it is not significantly higher.

Comparison of MERS Injury and Fatal Accident Rates with those Represented by the Mean of MSP Data from 1988 through 1990

In this section, the rate of injury and fatal accidents, as reported in the MERS data, will be compared to those derived from the mean of the 1988 through 1990 overall MSP accident data. The injury accident rate of the MERS is compared to that of the 1988 through 1990 MSP mean in Table 5.11. The MERS rate of 46 percent is significantly higher [$Z = 3.59$, $p < .05$] than the 24 percent MSP injury accident rate. In other words, the reported MERS pursuit accidents involved injuries more often than did the mean of all accidents involving the Michigan State Police from 1988 through 1990.

Table 5.11

Comparison of MERS and MSP Injury Accident Rates

Accidents	MERS	MSP
Total	65	335.67
Injury	30	81.67
Injury % *	46.15	24.33

* $Z = 3.59$, $p < .05$

The fatal accident rate reported in the MERS is compared to the mean fatal accident rate experienced by the MSP, as shown in Table 5.12. There is a significant difference [$Z = 2.28$, $p < .05$] between the two percent MERS fatal accident rate, and the zero percent fatal accident rate of the MSP three year mean. Simplifying, one MERS pursuit fatality is greater than the zero fatalities reported in the MSP 1988 through 1990 mean.

Table 5.12

MERS and MSP 88-90 Mean Fatal Accident Rate Comparison

Accidents	MERS	MSP
Total	65	335.67
Fatal	1	0.00
Fatal % *	1.54	0.00

* $Z = 2.28$, $p < .05$

Conclusions Regarding Second Research Statement and Hypotheses

The second research statement is that Michigan State Police pursuit accidents are different than those of the Michigan State Police overall. The first hypothesis in support of the second research statement is:

1) MSP pursuit accidents have a different injury rate than do MSP accidents overall.

This hypothesis is supported by the data analysis. The MERS pursuit accidents did have a significantly higher rate of injury accidents than did the MSP overall.

The second hypothesis in support of the second research statement is:

2) There is a difference in fatality rates between pursuit accidents and MSP accidents.

This hypothesis was supported by the data analysis. The MERS fatality accident rate (one fatality) was significantly greater than that of the MSP overall (no fatalities).

Effect of Light Conditions Upon MERS Accidents as Compared to MSP 3 Year Mean, and 3 and 5 Year General Population Means

The proportion of MERS pursuit accidents that occurred during differing light conditions will be examined in this section. The MERS accident data will be compared to information derived from the MSP three year mean accident data, as well as the three and five year general population mean accident data.

As described in Chapter IV, Methodology, the MERS light condition data was collapsed into three values; dawn, darkness, and dawn/dusk. The data from the Michigan accident summaries was collapsed into similar groupings. As before, the MERS data was compared to both three and five year means of the Michigan general population accident summaries.

In Table 5.13, the proportion of MERS daylight accidents is compared to those reported in the 1988 through 1990 MSP mean. There is a significant difference [$Z = 4.10$, $p < .05$] between the MERS daylight accident rate of 31 percent and the MSP rate of sixty percent. This means that 31 percent of the MERS pursuit accidents happened during

daylight hours, where 60 percent of the mean of all accidents involving the MSP (1988 through 1990) happened in daylight.

Table 5.13

Comparison of Daylight Accident Rates Between MERS and MSP 3 Year Mean

Accidents	MERS	MSP
Total	65	335.67
Daylight	20	202.67
Daylight % *	30.77	60.38

* $Z = 4.10$, $p < .05$

The rate of darkness MERS pursuit accidents is compared to the rate of darkness MSP three year mean accidents, in Table 5.14. The MERS darkness accident rate of 60 percent contrasts with an MSP darkness accident rate of thirty-six percent. Analysis reveals a significant difference [$Z = 3.64$, $p < .05$] between the MERS and MSP darkness rates. This means that of all the MERS pursuit accidents, 60 percent happened under conditions of darkness, as compared to 36 percent of all MSP accidents reported in the 1988 through 1990 mean.

Table 5.14

Comparison of Darkness Accident Rates Between MERS and the MSP 3 Year Mean

Accidents	MERS	General
Total	65	335.67
Darkness	39	120.34
Darkness % *	60.00	35.85

* $Z = 3.64$, $p < .05$

The rate of dawn/dusk MERS pursuit accidents is compared to the dawn/dusk accidents of the MSP three year mean, as shown in Table 5.15. A significant difference [$Z = 1.96$, $p < .05$] exists between the MERS dawn/dusk accident rate of nine percent and the MSP three year mean rate of four percent. The figures in this table reveal, that of all the MERS accidents, nine percent occurred during dawn/dusk, as compared to four percent of all the MSP accidents reported in the 1988 through 1990 mean.

Table 5.15

Comparison of Dawn/Dusk Accident Rates Between MERS and MSP 3 Year Mean

Accidents	MERS	MSP
Total	65	335.67
Dawn/Dusk	6	12.34
Dawn/Dusk % *	9.23	3.68

* $Z = 1.96$, $p < .05$

The MERS pursuit accident rate, by light condition, is compared to the rate of the five year Michigan general population mean in Tables 5.16 through 5.18. The MERS daylight pursuit accident rate is compared to that of the five year general population mean in Table 5.16. The MERS rate of 31 percent is significantly less [$Z = 5.15$, $p < .05$] than the five year general rate of sixty-two percent. In other words, 31 percent of the MERS pursuit accidents happened during daylight, compared to 62 percent of the general population accidents (five year mean).

Table 5.16

Comparison of Daylight Accident Rates Between MERS and General Population 5 Year Mean

Accidents	MERS	General
Total	65	395,388.00
Daylight	20	244,288.21
Daylight % *	30.77	61.78

* $Z = 5.15$, $p < .05$

The MERS darkness pursuit accident rate is compared with that of the five year general population in Table 5.17. The MERS rate of 60 percent is significantly higher [$Z = 4.71$, $p < .05$] from the five year general population rate of thirty-three percent. To clarify, 60 percent of the MERS pursuit accidents happened during darkness, while only 33 percent of the general population accidents (five year mean) happened under that lighting condition.

Table 5.17

Comparison of Darkness Accident Rates Between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	65	395,388.00
Darkness	39	128,941.01
Darkness % *	60.00	32.61

* $Z = 4.71$, $p < .05$

The rate of accidents that occur during dawn and dusk is presented in Table 5.18. The MERS dawn/dusk pursuit accident rate of nine percent is not significantly higher [$Z = 1.44$, n.s.] from the five percent rate derived from the five year general population mean.

Table 5.18

Comparison of Dawn/Dusk Accident Rates Between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	65	395,388.00
Dawn/Dusk	6	20,774.21
Dawn/Dusk % *	9.23	5.25

* $Z = 1.44$, $p > .05$

The MERS pursuit accident rate, by light conditions, is compared to the accident rate of the three year general population mean, in Tables 5.19 through 5.21. The daylight pursuit accident rate of the MERS is compared to that of the three year general population mean, in Table 5.19. The MERS daylight accident rate of 31 percent is significantly less [Z = 5.14, $p < .05$] than the three year general population rate of sixty-two percent. This means that a smaller proportion (31%) of the MERS pursuit accidents occurred during daylight hours, than did the three year mean general population accidents (62%).

Table 5.19

Comparison of Daylight Accident Rates Between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	65	404,956.33
Daylight	20	250,153.34
Daylight % *	30.77	61.77

* Z = 5.14, $p < .05$

The MERS and the three year general population darkness accident rates are compared in Table 5.20. The MERS darkness pursuit accident rate of 60 percent is significantly higher [Z = 4.72, $p < .05$] than the three year

general population rate of thirty-three percent. In other words, most of the MERS pursuit accidents happen during darkness, while only 33 percent of the general population accidents (three year mean) occur under that lighting condition.

Table 5.20

Comparison of Darkness Accident Rates Between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	65	404,956.33
Darkness	39	131,827.67
Darkness % *	60.00	32.55

* $Z = 4.72$, $p < .05$

The dawn/dusk accident rate of the MERS is compared to that of the three year general population in Table 5.21. The MERS dawn/dusk pursuit accident rate of nine percent is not significantly higher [$Z = 1.40$, n.s.] from the three year general population rate of five percent.

Table 5.21

Comparison of Dawn/Dusk Accident Rates Between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	65	404,956.33
Dawn/Dusk	6	21,621.34
Dawn/Dusk % *	9.23	5.34

* $Z = 1.40$, $p > .05$

The accident rates of the MERS pursuits, MSP, three year general population, and five year general population are displayed in Figure 5.1. The rates represent the percentage of total accidents for the group that occurred under specific light conditions.

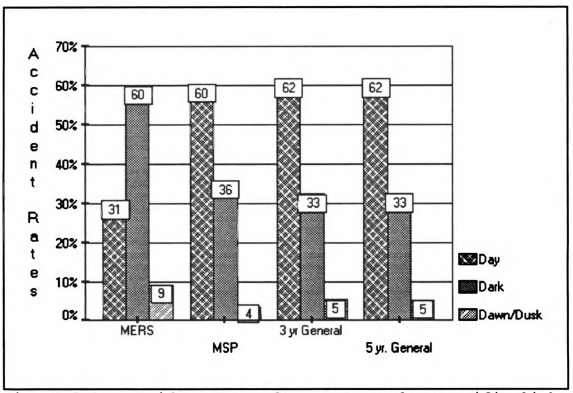

Figure 5.1. Accident rates for groups under specific light conditions.

Effect of Light Conditions Upon MERS Injury and Fatal Accident Rates, As Compared to 3 and 5 Year General Population Means

The effect of light conditions upon the injury and fatality accident rates experienced in MERS pursuits, as compared to the light condition effects upon general population accidents, will be analyzed in this section.

The relationship MERS daylight injury accident rates bear to the injury accident rates of the general population five year mean is examined in Table 5.22. The MERS daylight injury accident rate of 55 percent is significantly higher [$Z = 2.88$, $p < .05$] than the 27 percent rate experienced by the general population during daylight. In other words, when comparing daylight MERS pursuit accidents with daylight accidents of the general population (five year mean), the MERS accidents involved injury 55 percent of the time, while the general population accidents involved injury only 27 percent of the time.

Table 5.22

Comparison of Injury Accidents Rates During Daylight between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	20	244,288.21
Injury	11	64,847.21
Injury % *	55.00	26.55

* $Z = 2.88$, $p < .05$

The daylight injury accident rate of the MERS pursuits is compared to the daylight injury accident rate of the three year general population. This is shown in Table 5.23. The MERS daylight injury accident rate of 55 percent is significantly higher [$Z = 2.92$, $p < .05$] than the 26 percent three year general population daylight injury accident rate. As was the case when comparing the daylight MERS pursuit accidents with those of the five year general population mean, the daylight MERS pursuit accidents incurred a higher rate of injuries (55%) than did the three year general population mean (26%).

Table 5.23

Comparison of Injury Accident Rates During Daylight between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	20	250,153.34
Injury	11	65,622.34
Injury % *	55.00	26.23

* $Z = 2.92$, $p < .05$

The MERS darkness injury accident rate is contrasted with that of the general population of Michigan in Tables 5.24 and 5.25. A significant difference [$Z = 2.81$, $p < .05$] exists between the higher 44 percent MERS injury accident rate, and the lower 24 percent five year general population darkness injury accident rate, as indicated in Table 5.24. Under conditions of darkness, the MERS pursuit accidents involved injury in 44 percent of the cases, while five year mean general population accidents involved injury only 24 percent of the time.

Table 5.24

Comparison of Injury Accident Rates During Darkness between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	39	128,941.01
Injury	17	31,305.61
Injury % *	43.59	24.28

* $Z = 2.81$, $p < .05$

The darkness injury accident rate of the MERS pursuit accidents is compared with that of the three year general population mean in Table 5.25. A significant difference [$Z = 2.84$, $p < .05$] exists between the 44 percent MERS darkness injury accident rate, and the 24 percent three year general population rate. The MERS pursuit accidents that occurred during darkness included injuries in 44 percent of the cases, while general population accidents (three year mean) that happened during darkness involved injuries in only 24 percent of the cases.

Table 5.25

Comparison of Injury Accident Rates During Darkness between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	39	131,827.67
Injury	17	31,808.01
Injury % *	43.59	24.13

* $Z = 2.84$, $p < .05$

The injury accident rate of the MERS and the general population, during both dawn and dusk light conditions, is compared in Tables 5.26 and 5.27. The individual dawn and dusk classifications were collapsed into a combined value to facilitate statistical analysis.

The dawn/dusk injury accident rate of the MERS pursuits, and that of the five year general population mean, is compared in Table 5.26. There is not a significant difference [$Z = 0.71$, n.s.] between the 33 percent MERS injury accident rate, and the 21 percent five year general population rate.

Table 5.26

Comparison of Injury Accident Rates During Dawn/Dusk between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	6	20,774.21
Injury	2	4,465.01
Injury % *	33.33	21.49

* $Z = 0.71$, $p > .05$

The data in Table 5.27 illustrate the comparison of the dawn/dusk injury accident rates of the MERS pursuit accidents and the three year general population accidents. The MERS dawn/dusk injury accident rate of 33 percent is not significantly different [$Z = 0.71$, n.s.] from the 21 percent three year general population rate.

Table 5.27

Comparison of Injury Accident Rates During Dawn/Dusk between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	6	21,621.34
Injury	2	4,630.34
Injury % *	33.33	21.42

* $Z = 0.71$, $p > .05$

The fatal accident rates of the MERS pursuits, and the three and five year means of the fatal accident rates of the general population of Michigan, are compared in Tables 5.28 through 5.33. The MERS fatal accident rate during daylight is compared to that of the general population means in Tables 5.28 and 5.29. The MERS daylight fatal pursuit accident rate shown in Table 5.28 is zero percent, contrasted with a 0.26 percent daylight fatal accident rate for the five year general population mean. Statistical analysis reveals these values are not significantly different [$Z = 0.23$, n.s.].

Table 5.28

Comparison of Fatal Accident Rates During Daylight between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	20	244,288.21
Fatal	0	646.41
Fatal % *	0.00	0.26

* $Z = 0.23$, $p > .05$

The MERS fatal pursuit accident rate is compared to the fatal accident rate of the three year general population mean in Table 5.29. The MERS fatal accident rate of zero percent is not significantly different [$Z = 0.23$, n.s.] from the 0.26 percent three year general population mean rate.

Table 5.29

Comparison of Fatal Accident Rates During Daylight between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	20	250,153.34
Fatal	0	660.67
Fatal % *	0.00	0.26

* $Z = 0.23$, $p > .05$

The darkness fatal accident rate of the MERS pursuits is contrasted with those of the three year and five year general population accident means in Tables 5.30 and 5.31. The data in Table 5.30 indicates that the three percent MERS fatal accident rate is significantly higher [$Z = 1.70$, $p < .05$] than the 0.55 percent five year general population mean. In other words, of the MERS accidents that happened during darkness, three percent (one accident) resulted in fatality. In contrast, only 0.55 percent of the darkness general population accidents (five year mean) ended in fatalities.

Table 5.30

Comparison of Fatal Accident Rates During Darkness between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	39	128,941.01
Fatal	1	708.01
Fatal % *	2.56	0.55

* $Z = 1.70$, $p < .05$

The MERS fatal accident rate during hours of darkness is compared to that of the three year general population mean in Table 5.31. The MERS darkness fatal accident rate of three percent is significantly higher [$Z = 1.70$, $p < .05$]

than the 0.55 percent general population rate. So, under hours of darkness, the MERS pursuit accidents resulted in fatality three percent of the time (one fatality), while the three year general population mean accidents resulted in fatalities 0.55 percent of the time.

Table 5.31

Comparison of Fatal Accident Rates During Darkness between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	39	131,827.67
Fatal	1	724.67
Fatal % *	2.56	0.55

* $Z = 1.70$, $p < .05$

The dawn/dusk fatal accident rate of the MERS, is compared to those of the three and five year general population. This is shown in Tables 5.32 and 5.33. The MERS pursuit fatal accident rate during dawn/dusk is compared to that derived from the five year general population mean in Table 5.32. The MERS dawn/dusk fatal accident rate of zero percent is not significantly different [$Z = 0.14$, n.s.] from the 0.32 percent rate of the five year general population mean.

Table 5.32

Comparison of Fatal Accident Rates During Dawn/Dusk between MERS and 5 Year General Population Mean

Accidents	MERS	General
Total	6	20,774.21
Fatal	0	66.20
Fatal % *	0.00	0.32

* $Z = 0.14$, $p > .05$

The dawn/dusk MERS pursuit fatal accident rate, as revealed in Table 5.33, is zero percent. The five year general population mean has a 0.33 percent dawn/dusk fatal accident rate. Statistical analysis exposed no significant difference [$Z = 0.14$, n.s.] between the two rates.

Table 5.33

Comparison of Fatal Accident Rates During Dawn/Dusk between MERS and 3 Year General Population Mean

Accidents	MERS	General
Total	6	21,621.34
Fatal	0	72.01
Fatal % *	0.00	0.33

* $Z = 0.14$, $p > .05$

Effect of Light Conditions Upon MERS Injury and Fatal Accident Rates, As Compared to 3 Year MSP Mean

The effect of light conditions upon pursuit injury accidents is evaluated by comparing the MERS rate to the rate derived from the three year MSP mean. The results are shown in Tables 5.34 through 5.36.

The MERS daylight injury rate of 55 percent is significantly higher [$Z = 2.78$, $p < .05$] than the three year MSP mean rate of twenty-six percent. This is shown in Table 5.34. So, the MERS pursuit accidents that occurred during daylight resulted in injury 55 percent of the time, compared to the overall Michigan State Police daylight accidents (1988 through 1990 mean), which involved injury 26 percent of the time.

Table 5.34

Comparison of Injury Accident Rates During Daylight Between MERS and MSP 3 Year Mean

Accidents	MERS	MSP
Total	20	202.67
Injury	11	52.01
Injury % *	55.00	25.66

* $Z = 2.78$, $p < .05$

The MERS pursuit injury accident rate during darkness is compared to that of the three year MSP mean, shown in Table 5.35. The MERS darkness injury rate of 44 percent is significantly higher [$Z = 2.65$, $p < .05$] from the 22 percent MSP rate. In other words, during hours of darkness, the MERS pursuit accidents involved injury at a higher rate (44%) than did the overall Michigan State Police accidents (22%).

Table 5.35

Comparison of Injury Accident Rates During Darkness Between MERS and MSP 3 Year Mean

Accidents	MERS	MSP
Total	39	120.34
Injury	17	26.34
Injury % *	43.59	21.89

* $Z = 2.65$, $p < .05$

The MERS injury accident rate during the periods of dawn and dusk is contrasted with that of the MSP, as shown in Table 5.36. The MERS dawn/dusk rate of 33 percent was not significantly higher [$Z = 0.28$, n.s.] than the 27 percent MSP rate.

Table 5.36

Comparison of Injury Accident Rates During Dawn/Dusk Between MERS and MSP 3 Year Mean

Accidents	MERS	MSP
Total	6	12.34
Injury	2	3.34
Injury % *	33.33	27.07

* $Z = 0.28$, $p > .05$

The MERS fatal pursuit accident rate is compared with that of the MSP, considering light conditions. This analysis is displayed in Table 5.37 through Table 5.39.

The daylight fatality rate for the MERS pursuits is compared with the three year MSP accident mean in Table 5.37. As neither group experienced any daylight fatalities, there is no significant difference [$Z = 0.00$, n.s.] in rates.

Table 5.37

Comparison of Fatal Accident Rates During Daylight Between MERS and MSP 3 Year Mean

Accidents	MERS	MSP
Total	20	202.67
Fatal	0	0.00
Fatal % *	0.00	0.00

* $Z = 0.00$, $p > .05$

The rate of fatal accidents during hours of darkness is examined in Table 5.38, comparing MERS pursuit accidents and the three year MSP accident mean. The one reported MERS pursuit fatality occurred during darkness, yielding a three percent rate of fatalities during darkness. The MSP reported no fatalities. Therefore, the MERS darkness fatality rate was significantly greater [$Z = 1.76$, $p < .05$] than the MSP mean rate.

Table 5.38

Comparison of Fatal Accident Rates During Darkness Between MERS and MSP 3 Year Mean

Accidents	MERS	MSP
Total	39	120.34
Fatal	1	0.00
Fatal % *	2.56	0.00

* $Z = 1.76$, $p < .05$

The dawn/dusk fatality rate of the MERS pursuits is compared with the MSP three year mean in Table 5.39. As neither group had reported fatalities under this lighting condition, there is no significant difference [$Z = 0.00$, n.s.] between their respective zero percent fatality rates.

Table 5.39

Comparison of Fatal Accident Rates During Dawn/Dusk Between MERS and 3 Year MSP Mean

Accidents	MERS	MSP
Total	6	12.34
Fatal	0	0.00
Fatal % *	0.00	0.00

* $Z = 0.00$, $p > .05$

Conclusions Regarding Third Research Statement and Hypotheses

The third research statement states that when traffic accidents are examined in relation to light conditions at the time of the accident, a difference will exist between pursuit and all other accidents. The first hypothesis in support of this research statement is:

1) There will be a difference in injury rates when comparing pursuit accidents to general population accidents, across differing light conditions.

This hypothesis is supported by the research data, except under dawn/dusk conditions. The MERS injury accident rates were significantly higher than the three and five year general population rates, under conditions of daylight and darkness. The MERS injury accident rate was not significantly different than the general population rates under dawn/dusk conditions.

The second hypothesis in support of the third research question is:

2) There will be a difference in pursuit accident injury rates compared to overall MSP accidents, across differing light conditions.

This hypothesis is supported by the research data, except under dawn/dusk conditions. The MERS injury accident rate was significantly higher than that of the MSP under conditions of daylight and darkness. A significant

difference did not exist between the MERS and the MSP injury rates during periods of dawn/dusk.

The third hypothesis in support of the third research statement is:

> 3) There will be a difference in pursuit accident fatality rates as compared to the general population, as examined across differing light conditions.

This hypothesis was substantiated by the research data, only under periods of darkness. The MERS fatality rates were not significantly different from those of the three and five year general population, under daylight and dawn/dusk conditions. The MERS fatality rate was significantly higher than that of the general population during periods of darkness.

The fourth hypothesis in support of the third research statement is:

> 4) There will be a difference in fatality rates in pursuit accidents as compared to overall MSP accidents, across differing light conditions.

This hypothesis was substantiated only for fatal accidents occurring under periods of darkness. The MERS fatality rate was not significantly different from the MSP fatality rate under daylight or dawn/dusk conditions. The MERS fatality rate was significantly greater than the MSP rate under conditions of darkness.

The fifth hypothesis in support of the third research statement is:

5) Pursuit accidents will occur at a different rate than do the accidents of the general population, or the MSP overall, under similar lighting conditions.

This hypothesis is supported under periods of daylight and darkness when compared to MSP and the general population. The hypothesis is supported under periods of dawn/dusk when compared to the MSP, but is not supported when compared to the general population. MERS pursuit accidents occur at a significantly lower rate than those of the comparison groups during daylight. MERS pursuit accidents occur at a significantly higher rate than those of the comparison groups under periods of darkness. MERS pursuit accidents occur at a significantly higher rate than MSP accidents during dawn/dusk periods. MERS accidents do not occur at a significantly different rate than the general population during dawn/dusk periods.

Summary

The data analysis that was used to explore the research questions and hypotheses of this paper was explained. Statistical significance was tested using *Z* tests, at a .05 level of significance.

The MERS pursuit accident data was compared to accident data derived from three sample groups. The first sample

group was the accident data reported for on-duty MSP personnel from 1988 through 1990. The second sample group was all traffic accidents reported in Michigan from 1988 through 1990 (three year mean). The third sample group was all traffic accidents reported in Michigan from 1987 through 1991 (five year mean). The accident data by year and mean values was presented in section one of this chapter.

The injury and fatal accident rates of the MSP data were compared with the three and five year general population data in the second section of this chapter. The accident rates are an expression of the proportion of injury or fatality accidents that occurred respective to the total number of accidents declared for that group. No significant difference was found between the MSP and the general population data.

The MERS injury and fatal pursuit accident rates were compared with the rates experienced by the general population of Michigan in the third section of this chapter. The general population rates were expressed as both three year and five year means. The MERS had a 46 percent injury rate, which was significantly greater than the 25 percent five year general rate, and the 25 percent three year general rate. The MERS fatality rate of two percent (one fatality) was not found to be significantly different from the three or five year mean rates.

The MERS injury and fatality rates were compared with those of the MSP in the fourth section of the chapter. The MERS pursuit injury accident rate of 46 percent was shown to be significantly higher than the 24 percent MSP injury rate. The MERS pursuit fatality rate of two percent was also significantly higher than the MSP rate (the MSP reported no fatality accidents during the three years examined in this study).

The light conditions under which accidents occurred were examined in the fifth section of Chapter V. Light condition categories as reported in the MERS, and as reported in the state accident summaries for MSP and general population data, were collapsed to facilitate statistical analysis. The collapsed light condition categories were: 1) daylight; 2) darkness; and, 3) dawn/dusk combined.

The MERS daylight proportion of all pursuit accidents was 31 percent. This was significantly lower than the daylight accident rates for the comparison groups, with the MSP at 60 percent, the three year general population mean at 62 percent, and the five year general mean at sixty-two percent.

The comparison was essentially reversed under conditions of darkness. The MERS darkness accident rate of 60 percent was significantly higher than the MSP rate of 36 percent, the three year general rate of 33 percent, and the five year general rate of thirty-three percent.

The MERS dawn/dusk pursuit accident rate of nine percent was significantly higher than the four percent MSP rate. The MERS dawn/dusk accident rate was not significantly different from the three year and five year general population rates.

Injury and fatality accident rates, as selected by light conditions, were examined in the sixth section of Chapter V. Again, the collapsed light condition categories of daylight, darkness, and dawn/dusk combined were utilized. The groups compared in this section were the MERS pursuit accidents, and the three and five year general population accident means.

When comparing the daylight MERS injury accident rate (55%) with that of the three year general mean (26%) and of the five year general mean (27%), the MERS rate was found to be significantly higher. The comparison of the darkness injury accident rates also found the MERS to be significantly higher at 44 percent, with the three year general mean at 24 percent, and the five year general mean also at twenty-four percent. The dawn/dusk injury accident rates, however, did not yield significant differences, with the MERS rate derived at 33 percent, the three year general population rate at 21 percent, and the five year general population rate also at twenty-one percent.

When comparing fatality rates as selected by light conditions, the only lighting condition to show a

significant difference was darkness. It should be noted that the single MERS pursuit fatality occurred during the darkness period. The MERS darkness fatal accident rate is three percent, compared to the 0.55 percent rates for both the three and five year general population mean accident figures.

The seventh and final section of the data analysis chapter compares the rate of MERS injury and fatal accidents, as selected by lighting conditions, to corresponding data from the MSP three year accident mean. A significant difference exists between the 55 percent daylight MERS pursuit injury accident rate, and the 26 percent MSP daylight injury accident rate. The MERS injury accident rate during darkness also exceeds that of the MSP, with 44 percent compared to twenty-two percent. No significant difference exists between the 33 percent dawn/dusk MERS injury accident rate, and the respective 27 percent MSP rate.

In regard to fatality accident rate comparisons, the only significant difference between MERS and MSP figures occurs during hours of darkness. During daylight and dawn/dusk periods, neither the MERS nor the MSP data revealed any fatalities. During darkness, the lone MERS fatal accident yielded a three percent fatal accident rate, compared to the zero percent fatality rate for the MSP mean (no reported MSP fatalities).

Both three year and five year mean values were calculated for the general population accidents, in order to compensate for any aberrations in the statistics. Analysis and use of both three and five year general population data did not reveal any differences serious enough to affect comparisons with either MERS or MSP overall data.

Chapter VI

Discussion and Recommendations

Introduction

The discussion in this chapter will compare the data analysis findings of Chapter V, to the relevant findings presented in other studies. Finally, recommendations for possible changes in pursuit operations, policies, and training will be suggested.

Comparison of Injury Accident Findings with Other Studies

The California Highway Patrol study (1983) reported 198 accidents for 683 pursuits, resulting in an accident rate of 29 percent, slightly lower than the 33 percent MERS rate. The CHP reported 75 of these accidents involved injuries, for a 38 percent rate, again lower than the MERS injury accident rate of forty-six percent.

The Miami-Metro Dade County study (Alpert & Dunham, 1990) compared pursuit injury accident rates to those of the general population, and the police. Alpert and Dunham (1990) reported that of 952 reported pursuits, 310 resulted in traffic accidents (33%). The Metro-Dade pursuits experienced 160 injury accidents, a 52 percent proportion of

all pursuit accidents, which is lower than the 46 percent figure reported for the MERS.

Of all 1987 traffic accidents in Dade County, 61 percent involved personal injury. This rate is higher than the injury accident rates of the MERS (46%), the MSP overall accident mean (24%), and the Michigan general population accident means (25% for both three and five year values).

Alpert and Dunham (1990) also examined the number of Metro-Dade county injury accidents that involved police officers. In 1986, 78 of 614 (14%) Metro-Dade police accidents involved personal injury. The 1987 Metro-Dade police injury accident rate was 12 percent (67 injury accidents of 602 total). Both rates are lower than the injury accident rates experienced in the MERS (46%), and the MSP overall (24%).

Comparison of Fatal Accident Findings with Other Studies

The CHP (1983) study reported seven fatalities, for a four percent fatal accident rate. This is higher than the two percent rate reported in the MERS.

The Miami-Metro Dade pursuit study (Alpert & Dunham, 1990) revealed seven pursuit-related deaths. It is not clear from the Miami-Metro Dade study if the seven deaths were attributed to seven separate accidents. Assuming the seven deaths are associated with seven accidents, seven out of 310 pursuit accidents would result in a two percent

fatality rate. This is similar to the two percent pursuit fatal accident rate reported in the MERS.

Alpert and Dunham (1990) reported the Metro-Dade police investigated 113 general population fatality accidents out of 10,045 total, for a one percent fatal accident rate. This is lower than the two percent MERS fatal accident rate, but higher than the 0.36 percent rates reported for the Michigan general population means, and the zero percent rate reported for the MSP overall mean. Alpert and Dunham's (1990) discussion did not mention any Metro-Dade police accidents that resulted in fatalities.

Conclusions and Recommendations

The MERS study, and this analysis, can be viewed as being generalizable to other law enforcement agencies, only to the extent those agencies are similar to the Michigan State Police. The Michigan State Police, however, is a fairly broad spectrum law enforcement agency, having general law enforcement responsibilities in large metropolitan areas, as well as in very rural areas. Consequently, the data from this study may be of use to a wide range of law enforcement agencies.

The MERS pursuit accident injury rate, though higher than that of the Michigan general population, and higher than the MSP overall, is similar to that reported by Alpert and Dunham (1990) in their study of the Miami-Metro Dade

Police. The MERS fatal accident rate is higher than that reported for the MSP overall, but is not significantly higher than the general Michigan population. Additionally, the MERS fatal accident rate is similar to that experienced in the Miami-Metro Dade study, and lower than that reported in the CHP (1983) study.

The existence of 400 fleeing and eluding citations issued by MSP troopers during the MERS survey period suggests more than 197 pursuits may have occurred. If 400 or more pursuits actually occurred, the accident rate would be substantially reduced, provided all pursuit related accidents were reported on the MERS surveys.

The 400 fleeing and eluding citations does suggest that the MERS survey did not address the entire picture of MSP pursuits. It is likely the true scope of police pursuits will not be known until some form of mandatory pursuit reporting is instituted. Such a policy would have to be designed to encourage police officers to report pursuits.

If a policy, mandating the reporting of pursuits were instituted, a precise definition of what constitutes a pursuit would be necessary. For example, does a pursuit only occur when warning lights and siren are activated? Does a pursuit exist, when, an officer increases speed beyond the speed limit to catch up to a speeding motorist, who does not flee? These questions, and others, must be

considered when establishing a mandatory pursuit reporting policy.

This study has shown that the majority of pursuit accidents happen during hours of darkness. Pursuit accidents involve personal injury at a higher rate than do traffic accidents in the general population. Law enforcement administrators may wish to view this information as suggesting a need for pursuit training that emphasizes the hazards of pursuit operations during hours of darkness, as well as emphasizing the real dangers that pursuit accidents can pose for the suspect, the police officer, and third parties. This training should be in addition to vehicle operation training for officers, reinforced on a regular basis, and updated when necessary.

Law enforcement administrators should be cognizant of the efforts of courts and legislatures to control police pursuits. Effective policy and training can limit the impact and impetus of such efforts.

If a future researcher would wish to use data that could be compared to state motor vehicle accident reports, some changes in the survey would be preferable. For example, grouped data values for some questions would be more useful if they correspond directly with the categories presented in the state accident summary.

Certain limitations were also imposed on this study by the limited availability of some outside data. Information

on MSP accidents was only available for the years 1988 through 1990.

Finally, more research on pursuits is necessary. The reliability of the results of this particular study, as well as the generalizability, would be enhanced if this study could be repeated on a regular basis. Ideally, this study should be administered to several different types of law enforcement agencies in different locales, to obtain a more accurate image of the vehicular pursuit issue

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APPENDICES

Appendix A

Map of MSP Districts

Appendix B

Assignment Schedule

SCHEDULE 1 (Reporting weeks begin at 12:01 a.m on following Sundays)
June 23, 1991 - Sept. 22, 1991 - Dec. 15, 1991 - Mar. 15, 1992

POSTS

White Pigeon	Coldwater	Flat Rock	West Branch
Detroit	Ionia	Grand Haven	Kalkaska
Sandusky	East Tawas	Bad Axe	Newberry

SCHEDULE 2
July 14, 1991 - Oct. 6, 1991 - Jan. 5, 1992 - Mar 29, 1992

POSTS

Jackson	Northville	Pontiac	Irona River
Hart	Mt. Pleasant	State Capitol	Cheboygan
Houghton Lk.	Gaylord	Alpena	Iron Mountain

SCHEDULE 3
July 28, 1991 - Oct. 20, 1991 - Jan 19, 1992 - April 12, 1992

POSTS

Battle Creek	Lansing	Rockford	Stephenson
Reed City	Petoskey	Traverse City	Sault Ste. Marie
Calumet	Wakefield	Negaunee	

SCHEDULE 4
Aug. 11, 1991 - Oct.27, 1991 - Feb. 2, 1992 - Apr. 26, 1992

POSTS

New Buffalo	Erie	Romeo	Manistee
Lapeer	Flint	Owosso	L'Anse
Wayland	Lakeview	Bay City	

SCHEDULE 5
Aug. 18,1991 - Nov. 17, 1991 - Feb. 16, 1992 - May 3, 1992

POSTS

Paw Paw	Jonesville	Adrian	St. Ignace
South Haven	Hastings	Ypsilanti	Saugatuck Team
St. Clair	Caro	New Baltimore	

SCHEDULE 6
Sept. 8, 1991 - Dec. 1, 1991 - Mar. 1, 1992 - May 17, 1992

POSTS

Niles	St.Joseph	Brighton	Gladwin
Ithaca	Bridgeport	Newaygo	Gladstone
Mansitique	Munsing	Cadillac	

Appendix B

Letter from MSP Director to

Officers Requesting Cooperation

FILE: 14 (2) 1991

MD-44(2/90)

MEMORANDUM

STATE OF MICHIGAN

DEPARTMENT OF STATE POLICE

DATE: January 18, 1991

TO : Departmental Work Units

FROM : Col. R. T. Davis, Director R.T. Davis
Sgt. Richard J. Darling, President, MSPTA R.J. Darling

SUBJECT: Michigan Emergency Response Study

The department, with the active participation of the Michigan State Police Troopers Association, will be conducting an emergency response driving study. This comprehensive research project was initiated by the department and is a cooperative effort between the Michigan State Police, Michigan State University, and Ferris State University. We are jointly requesting and soliciting your cooperation and support in this important endeavor.

Emergency response and pursuit driving by police officers have generated much concern in recent years. They have all too often resulted in mishaps causing property damage, injury, and even death. Enforcement members, guided by their training and departmental policy, must make critical decisions pertaining to initiating, continuing, and terminating a pursuit and what tactics are most appropriate under the circumstances presented to them by those who elude enforcement members. The balancing point for an officer's decision is the most reasonable point between the government's need to apprehend and the public interest to be protected from unreasonable risk of harm. Police attempt to preserve, protect, and defend the public. This action includes apprehending violators or quick response to an emergency. The manner in which an officer apprehends or responds to an emergency often places others at risk. The balancing point in this paradox is the test of reasonableness. It is the policy and training provided to the officer, supported by the officer's experience and judgement, that leads to the decision of what is reasonable at the time.

The department has an obligation to provide its enforcement members with sound, rational policy and informed training in such matters. Policy and training are best when based upon empirical data. This valuable data is currently unavailable. Past research has failed to provide a comprehensive look into this area. We believe this study will provide this much needed data.

This project is a study of police driving behavior with motor vehicles which reflect a correlation between accidents and/or injury and various forms of police response. The data collected should provide insight into environmental, demographic, and judgmental conditions that exist at the time pursuit decisions are made. The results of the study should provide police managers with empirical data and conclusions,

based on analysis of that data, which can be used to produce sound policy, realistic training, and appropriate supervision in matters relating to police emergency responses with a particular emphasis on pursuits.

This study is designed to be implemented in two phases. The first phase is the distribution and completion of a General Opinion Questionnaire to be completed by all enforcement members of the department (includes all ranks/levels). This questionnaire is designed to determine the opinions of enforcement members when making decisions while at work performing police pursuits. It is also designed to see if there are significantly different opinions or attitudes among the various ranks of the department. The questionnaire was constructed after careful analysis of previous research findings, a review of previous pursuit accidents, and a review of the literature. The effort has been supported by input and counsel from a resource committee of departmental members. The results of the first phase will be analyzed and reported in a final report. The questionnaire is anonymous.

The second phase involves the distribution and administration of a survey instrument to be completed anonymously by all enforcement members shortly after each pursuit, medical emergency response, response to a crime in progress, alarm response, and incidents of high-speed driving. Each enforcement member on patrol will be provided with a supply of survey instruments for his/her use, instructions for completion, and collection envelopes for return to the researchers. Both short and long forms will be provided along with instructions for completion. The survey instruments will be used by each enforcement member for a specific period (actual dates will be determined). However, actual pursuits, as specifically defined by the research instrument, will cause a survey instrument to be completed as soon as possible following the pursuit. All enforcement members will complete a survey form for all actual pursuits of this nature each time they occur over the entire one (1) year period of the research project.

After the researchers receive the survey instruments, the data will be analyzed in the aggregate and published in a final report. A pilot test of the survey will soon be conducted at three posts. Following this pilot test, further specific information and direction will be disseminated to actually implement this research process.

We strongly solicit the support and cooperation of all enforcement members in this exciting research project.

Although this project is being coordinated by the Executive Division, any specific questions or concerns regarding the survey instrument or other related research matters should be directed to either of the following researchers at their respective university:

Dennis M. Payne, Ph.D.
School of Criminal Justice
Baker Hall, Room 504
Michigan State University
East Lansing, MI 48823-1118
(517) 355-2197

Terry Nerbornne, Ph.D.
Director, Law Enforcement Programs
Ferris State University
Big Rapids, MI 49307
(616) 592-2836

Appendix C

Copy of Long Form Questionnaire

1

EMERGENCY RESPONSE STUDY 5/91
GENERAL INSTRUCTIONS

CATEGORIES FOR DIFFERENT TYPES OF RESPONSES
For purposes of this survey, in order to classify the type of run you were on, please use the following categories:

1.Pursuit: Offender was obviously attempting to elude the police by increasing speed and/or taking other evasive action. Those circumstances that require emergency lights and sirens whether you used them or not. **USE STANDARD FORM FOR THIS CATEGORY.**

2.Response to Alarm: Nature of the alarm is such that the officer considered it necessary to drive at speeds in excess of the limit. An example might be responses to silent alarms. **USE STANDARD FORM FOR THIS CATEGORY.**

3.Medical Emergency : Speeds driven in excess of the limit based on a decision of the officer that the nature of call is such that he/she feels it is an emergency requiring speed, lights, and siren. Examples include: A serious injury accident, poisoning, attempted suicide, heart attack, etc. **USE STANDARD FORM FOR THIS CATEGORY.**

4.Crime(s) in Progress: Those crimes or responses to complaints in which officer obtained information leading to his/her conclusion, based on policy or training, that the circumstances require an emergency response utilizing emergency equipment. This category may also include silent-run situations for the latter part of the run or officer in trouble calls. **USE STANDARD FORM FOR THIS CATEGORY**

5.High Speed Driving: This category is not a pursuit, but one in which an officer attempts to overtake a vehicle that was observed at a speed in excess of the limit or in a manner which requires police to drive at a speed in excess of limit in order to take enforcement action.This may include pacing, closing the gap, or overtaking a vehicle to take enforcement action, but not using emergency equipment until the actual stop is made. **USE THE SHORT FORM FOR THIS CATEGORY.**

PART I
This part is general demographic information that will assist in determining the depth , scope and nature of such police activities. The questions are constructed to avoid identification of any officer or specific location in Michigan. Michigan State Police districts are used to identify geographical differences, traffic patterns,and general population densities

All respondents answer Questions 1- 27 of this Part unless your report is a Category 5. (Driving in Excess of the Limit) . In those cases only, use the Short Form.

PART II
Pursuits: Answer questions 28-52 if your answer to Question #1 , Part I is Pursuit.

PART III
This part of the survey relates to accidents. Answer questions 53-58 if an accident occurred.

IMPORTANT: USE ONLY # 2 OR # 2.5 PENCIL TO COMPLETE QUESTIONNAIRE.

2

STANDARD SURVEY FORM

PART I: General Information: Categories 1-4

IN RESPONSE TO THE FOLLOWING QUESTIONS FILL IN CIRCLE NEXT TO THE NUMBER OF THE MOST APPROPRIATE ANSWER FOR THE PARTICULAR CATEGORY. **PLEASE FILL IN ONLY ONE CIRCLE.** ANSWER QUESTIONS 1 through 27 FOR ANY OF THE 4 CATEGORIES CHOSEN.

---

1. Type of run
   - ○ 1. Pursuit
   - ○ 2. Response to Alarm
   - ○ 3. Medical Emergency
   - ○ 4. Crime in Progress

2. Type of police
   - ○ 1. State
   - ○ 2. Sheriff
   - ○ 3. Township
   - ○ 4. City
   - ○ 5. Village
   - ○ 6. University
   - ○ 7. Federal
   - ○ 8. Other

3. Region of state (MSP District)
   - ○ 1. 1st
   - ○ 2. 2nd
   - ○ 3. 3rd
   - ○ 4. 4th
   - ○ 5. 5th
   - ○ 6. 6th
   - ○ 7. 7th
   - ○ 8. 8th

4. Day of week
   - ○ 1. Sun
   - ○ 2. Mon
   - ○ 3. Tues
   - ○ 4. Wed
   - ○ 5. Thur
   - ○ 6. Fri
   - ○ 7. Sat

5. Time of day initiated
   - ○ 1. 12:01- 3 am
   - ○ 2. 3:01- 6 am
   - ○ 3. 6:01- 9 am
   - ○ 4. 9:01- 12 noon
   - ○ 5. 12:01-3 pm
   - ○ 6. 3:01- 6 pm
   - ○ 7. 6:01- 9 pm
   - ○ 8. 9:01- 12 midnight

6. Road type: Most of run
   - ○ 1. Freeway
   - ○ 2. State Trunkline
   - ○ 3. County Road
   - ○ 4. Township Road
   - ○ 5. City Street
   - ○ 6. Trail (Two Track)
   - ○ 7. Alley
   - ○ 8. Other

7. Number of lanes: Most of run
   - ○ 1. 2 Lanes
   - ○ 2. 3 Lanes
   - ○ 3. 4 Lanes: Not divided
   - ○ 4. 4 Lanes: With side streets
   - ○ 5. 4 Lanes: Expressway
   - ○ 6. 5 or More Lanes: Expressway
   - ○ 7. Other

8. Road surface : Most of run
   - ○ 1. Concrete
   - ○ 2. Black Top
   - ○ 3. Paved: Other
   - ○ 4. Gravel: Coated
   - ○ 5. Gravel: Not Coated
   - ○ 6. Sand

9. Road level: Most of run
   - ○ 1. Even
   - ○ 2. Rough or Rolling
   - ○ 3. Patched

10. Road direction
    - ○ 1. Straight
    - ○ 2. Winding
    - ○ 3. Few Curves

Next Page Please

11. Type of area
- O 1. Urban
- O 2. Suburban
- O 3. Rural
- O 4. Unpopulated

12. Estimate time of run (in minutes)
- O 1. Less than 1
- O 2. 1-3
- O 3. 4-6
- O 4 7-9
- O 5. 10-12
- O 6. 13-15
- O 7. 15 or more

13. Estimate distance of run (in miles)
- O 1. 1 or less
- O 2. 2
- O 3. 3
- O 4. 4
- O 5. 5
- O 6. 6
- O 7. 7
- O 8. 8
- O 9. 9 or more

14. Highest speed driven (closest)
- O 1. 40 or less
- O 2. 50
- O 3 60
- O 4. 70
- O 5. 80
- O 6. 90
- O 7. 100
- O 8. 105 or more

15. Light conditions
- O 1. Dawn
- O 2. Daylight
- O 3. Dusk
- O 4. Dark

16. Weather
- O 1. Clear
- O 2. Rain
- O 3. Snow
- O 4. Fog
- O 5 Freezing Rain
- O 6. Cloudy

17. Police unit: Type
- O 1. Marked
- O 2. Semi-Marked
- O 3. Unmarked
- O 4. Motor Cycle

18. Overhead light operating?
- O 1. Yes
- O 2. No
- O 3. As needed

19. Siren operating?
- O 1. Yes
- O 2. No
- O 3. As needed

20. Police driver: Age
- O 1. 18-20
- O 2. 21-25
- O 3 26-30
- O 4. 31-35
- O 5 36-40
- O 6. 41-45
- O 7. 46-50
- O 8. 51 or more

21. Police driver. Seniority in years
- O 1. Probation
- O 2. 1-3
- O 3. 4-5
- O 4. 6-10
- O 5. 11-15
- O 6. 16-20
- O 7. 20-24
- O 8. 25 or more

Next Page Please

4

22. Police driver: Gender
O 1. Male
O 2. Female

23. Partner in vehicle?
O 1. Yes
O 2. No

24. Police driver: Race
O 1. White
O 2. Hispanic
O 3. Black
O 4. Asian
O 5. Native American

25. Supervisor's location
O 1. In vehicle with officer
O 2. In general area
O 3. At station
O 4. Other location
O 5. Off duty

26. Highest posted speed during run
O 1. 15
O 2. 25
O 3. 30
O 4. 35
O 5. 40
O 6. 45
O 7. 50
O 8. 55
O 9 65

27. Did an accident occur during run?
O 1. Yes
O 2. No

Part II: Pursuit Questions
IF YOU CHECKED #1 AS PURSUIT(CATEGORY #1) PLEASE ANSWERS QUESTIONS 28-52. IF THERE WAS NO PURSUIT, BUT THERE WAS AN ACCIDENT GO TO QUESTION #53 AND CONTINUE.

---

28. Reason pursuit initiated
O 1. Speed
O 2 Other Traffic Violation
O 3. OUIL
O 4 Misdemeanor: Suspected
O 5. Misdemeanor: Known
O 6. Felony: Suspected
O 7. Felony: Known
O 8 Other

29. Est. distance from suspect at start
O 1. 1-50 ft.
O 2. 100 ft.
O 3. 200 ft.
O 4. 300 ft.
O 5. 500 ft.
O 6. 1/2 mi.
O 7. 3/4 mi.
O 8. More

30. Closest to suspect: During run
O 1. 1-50 ft.
O 2. 100 ft.
O 3. 200 ft.
O 4. 300 ft.
O 5. 500 ft.
O 6. 1/2 mi.
O 7. 3/4 mi.
O 8 More

31. Police unit: Designation
O 1. Primary car
O 2. Back Up car
O 3. Other: In general area

32. Was Dispatch Notified?
O 1. Yes
O 2. No

33. During pursuit was it possible to obtain suspect vehicle license number?
O 1. Yes
O 2. No

Next Page Please

5

34. Number of occupants in suspect's vehicle (including driver)
- O 1. One
- O 2. Two
- O 3. Three or more

35. Could you estimate age of suspect?
- O 1. Yes
- O 2. No

36. Age of primary suspect
- O 1. Less than 15
- O 2. 15-20
- O 3. 21-25
- O 4. 26-30
- O 5. 31-35
- O 6. 36-40
- O 7. 41 or more
- O 8. Unknown

37. Gender of primary suspect
- O 1. Male
- O 2. Female
- O 3. Unknown

38. Was suspect under influence?
- O 1. Yes - alcohol
- O 2. Yes - drugs
- O 3. Unknown
- O 4. No

39. Race of suspect driver
- O 1. White
- O 2. Hispanic
- O 3. Black
- O 4. Asian
- O 5. Native American
- O 6. Unknown

40. Suspect vehicle: Type
- O 1. Passenger
- O 2. Van
- O 3. Wagon
- O 4. Truck (including pick-up)
- O 5. Sport
- O 6. Motor Cycle
- O 7. Tractor/Trailer
- O 8. Other

41. Reason pursuit terminated
- O 1. Officer's decision
- O 2. Supervisor's decision
- O 3. Suspect surrendered
- O 4. Suspect apprehended
- O 5. Suspect escaped
- O 6. Suspect in accident
- O 7. Officer in accident
- O 8. Other

42. Official action taken
- O 1. Arrest: OUIL
- O 2. Citation: Released
- O 3. Arrest: Fleeing & Eluding
- O 4. Arrest: Misdemeanor
- O 5. Arrest: Felony
- O 6. License revoked
- O 7. License suspended
- O 8. No operators license

43. Suspect boxed-in?
- O 1. Yes
- O 2. No

44. Suspect rammed?
- O 1. Yes
- O 2. No

45. Road block used?
- O 1. Yes
- O 2. No

46. Aircraft used?
- O 1. Yes
- O 2. No

Next Page Please

6

47. Number of police vehicles involved.
- O 1. One
- O 2. Two
- O 3. Three or more

48. Number of vehicles pursued
- O 1. One
- O 2. Two
- O 3. More

49. Did suspect run stop sign?
- O 1. Yes
- O 2. No
- O 3. Not applicable

50. Did suspect run red light?
- O 1. Yes
- O 2. No
- O 3. Not applicable

51. Did suspect turn off headlights?
- O 1. Yes
- O 2. No
- O 3. Not applicable: Daylight

52. Did suspect drive wrong way?
- O 1. Yes
- O 2. No

PART III: ACCIDENT QUESTIONS.
IF AN ACCIDENT RESULTED FROM THE RUN YOU ARE REPORTING, PLEASE ANSWERS QUESTIONS 53 THROUGH 58.

---

53. Type of vehicles in accident
- O 1. Police only
- O 2. Suspect only
- O 3. Police and suspect
- O 4. Police, suspect and 3rd party(s)
- O 5. Police and 3rd party (s)
- O 6. Suspect and 3rd party(s)

54. Number of vehicles in accident
- O 1. One
- O 2. Two
- O 3. Three
- O 4. Four
- O 5. Five
- O 6. Six or more

55. Most serious injury to police
- O 1. None
- O 2. Minor
- O 3. Serious
- O 4. Fatal

56. Most serious injury to suspect(s)
- O 1. None
- O 2. Minor
- O 3. Serious
- O 4. Fatal

57. Most serious injury to 3rd party (ies)
- O 1. None
- O 2. Minor
- O 3. Serious
- O 4. Fatal

58. Were pedestrians injured?
- O 1. One
- O 2. Two
- O 3. Three or more
- O 4. No

THANK YOU FOR YOUR COOPERATION

PER INSTRUCTIONS:
PLACE COMPLETED SURVEYS IN COLLECTION CONTAINER
FOR RETURN TO THE RESEARCHER

If you have any questions feel free to contact
Dennis M. Payne (517) 353-5482 or Terry M. Nerbonne (616) 592-2836