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THE MICHIGAN EMERGENCY RESPONSE STUDY:
PARAMETERS OF POLICE PURSUITS
IN DIFFERENT POPULATION DENSITY AREAS

By

Janice Rae Hilson

THESIS

Submitted to
Michigan State University
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ABSTRACT

THE MICHIGAN EMERGENCY RESPONSE STUDY: PARAMETERS OF POLICE PURSUITS IN DIFFERENT POPULATION DENSITY AREAS

By

Janice Rae Hilson

Police pursuits in high population density areas are compared to pursuits in low population density areas. This is done to determine if the characteristics of police pursuits differ from one population density area to another.

This study consisted of a self-report survey that was to be completed after every pursuit, between June 23, 1991 and May 31, 1992, in which the road patrol officers of a state police agency were involved. The purpose of the study was to ascertain the number of police pursuits that occurred and to gather environmental and officer information about those pursuits.

A police pursuit profile was developed for each of two population density areas. In addition, several hypotheses were analyzed. Significant differences were found between population density areas and time period of day, type of roadway, rate of escape, and the rate of accidents.

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Chapter I

Introduction

Statement of Problem

Areas of different population density may have different law enforcement concerns. These concerns can be the result of geographical area, cultural values, crime type, crime rate, staffing needs and the perceived function of the police.

The rate of index crime is often used to determine police staffing needs and the safety of a community. In the United States during 1991, there were 5,897.8 index crimes occurring per 100,000 inhabitants. When separated into population density areas, rural counties experienced a rate of 2,104.9 crimes per 100,000 people and metropolitan statistical areas had a rate of 6,615.5 index crimes per 100,000 citizens (U. S. Department of Justice, 1992).

The style of policing used by law enforcement officers in different population density areas may be a reflection of community values and of the availability of specialized police units. In a study of rural police and their job functions, it was found that rural officers employed a generalist style of policing (Maguire, Faulkner, Mathers,

Rowland and Wozniak, 1991). Rural police officers felt they had more responsibilities than their urban counterparts. The residents served by the rural police echoed this sentiment.

Crank (1990) found environmental and organizational factors influence police style differently in urban and rural areas. In rural areas, higher arrest rates were associated with a city manager style of government, higher per-capita income and a higher percentage of Black residents. Higher arrest rates, in urban areas, were associated with lower per-capita income and with a lower ratio of residents who spoke a foreign language at home (Crank, 1990). In addition, Crank (1990) reports the style of policing which would allow for professionalism of police is better suited for rural police rather than urban law enforcement. Generally, urban police have adopted a legalistic style of policing.

If the problems of law enforcement differ relative to population density areas, then perhaps police pursuits also reflect this difference. Perhaps police pursuits in highly congested, urban areas are different than those occurring in the less populated, rural areas. Police pursuits in different population density areas must be examined separately to identify those characteristics that are different.

Police Pursuit Theories

Babbie (1992, p. 55) defines theory as "a systematic explanation for the observed facts and laws that relate to a particular aspect of life". Police pursuit has become a popular topic among law enforcement officials, researchers and the media. Each expounds their own findings and beliefs as theory, upon which they base their decisions. There is, therefore, no accepted theory concerning police pursuits. There are, however, several philosophies concerning police pursuits that have been adopted by some and rejected by others. Most philosophies and beliefs surround three basic issues and envelop a continuum of positions. These basic issues are:

- 1) Should police engage in pursuits?
- 2) What policy issues should be developed concerning police pursuits?
- 3) What police pursuit training should be provided to officers?

The continuum which surrounds the issue of whether or not police should engage in pursuits, ranges from not allowing pursuits at all, to continuing pursuits at almost any cost. Beckman (1986) concluded no pursuit is particularly safe, regardless of speed, distance or duration. The California Highway Patrol (1983, p. 21) maintains:

Attempted apprehension of motorists in violation of what appear to be minor traffic

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infractions is necessary for the preservation of order on the highways of California. If approximately 700 people will attempt to flee from the officers who participated in this six-month study, knowing full well that the officers would give chase, one can imagine what would happen if the police suddenly banned pursuits.

Others contend pursuits must be restricted in varying degrees. These restrictions may be based upon the type of offense, road condition, weather condition, time of day, vehicle condition, officer experience, geographical location, and the use of emergency equipment (Auten, 1985; Barker, 1984; Schubert, 1988; Territo, 1982). In addition, Alpert and Dunham (1990) and Nugent, Connors, McEwen and Mayo (1989) argue protection of life is the most important consideration in deciding if pursuit is appropriate. Shuman and Kennedy (1989) state the police agency's mission statement must be considered when deciding whether to pursue. Written policy should guide the officers' decision to pursue according to Abbott (1988).

The development of police pursuit policies presents another continuum of positions. Fennessy, Hamilton, Joscelyn, and Merritt (1970) found police agencies which had instituted pursuit policies had adopted one of three models: 1) the officer judgement model, 2) the model with specific restrictions on pursuits, and 3) the model that discourages or prohibits pursuits.

The officer judgement model allows the officer to make all judgements regarding the pursuits. This would include

the decision to pursue, whether to continue the pursuit and how the pursuit is conducted (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). The policy dictates when a pursuit should be initiated, how it will be executed and when it will be terminated.

The last type of police pursuit policy model discussed by Fennessy et al, (1970) is the 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.

Training of law enforcement officers regarding police pursuits has also been an area of struggle. Training is seen as necessary, no matter what philosophy of pursuit and policy adoption one may hold. The type of training that is conducted, however, 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 reflected a concern not only for the officer's safety, but also for the safety of the suspect and the public.

Actual police pursuit driving training was first taught as physical skill development. Driver position, turning, braking, the use of emergency lights and siren, passing vehicles, crash avoidance, and the use of the radio were

some of the techniques taught to police officers during pursuit driving classes (Basham, 1978; Clark, 1976; Dougherty, 1961; International Association of Chiefs of Police [IACP], 1965; IACP, 1968; Schultz, 1979; Traffic Institute, 1981). Later, policy issues, driver limitations, legal issues, and performance techniques were taught in addition to physical skill development (Auten, 1989; Fyfe, 1989; Halloran, 1985; James, 1980; Wisconsin Department of Justice, 1984). Auten (1989) insists that in addition to the basic classroom and skill training, police officers need advanced and refresher training courses in pursuit and emergency driving.

Previous Studies and Legal Issues

Two primary catalysts for changing the philosophy of police pursuits, from freely conducting pursuits to placing restrictions on pursuits, were empirical research and lawsuits. Since 1982, five studies have been published concerning the pursuit issue. These studies were: the California Highway Patrol Pursuit Study of 1982 (California Highway Patrol, 1983); the Michigan State University Study (Beckman, 1986); Police Pursuit Driving: Controlling Responses to Emergency Situations (Alpert & Dunham, 1990); Police Pursuit Driving Operations in Illinois, 1990 (Auten, 1991); and Police Pursuit in Pursuit of Policy: The Pursuit Issue, Legal and Literature Review, and an Empirical Study

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(Charles, Falcone, & Wells, 1992; Falcone, Wells, & Charles, 1992).

The length of these studies ranged from six months to three years, resulting in 286 to 952 pursuits per study. The number of police agencies participating in the individual studies ranged from two to eighty-six. The studies reported that the majority of pursuits were initiated for traffic violations, with the exception of the Charles et al. study. In that study, non-felonies were found to be the most common initiating factor. It was not clear if traffic violations were included under the umbrella of non-felonies. The five studies concurred that most pursuits (68% to 77%) ended in arrest of the suspect. In several of the studies, 18 to 36 percent of the suspects voluntarily terminated the pursuit by stopping and surrendering. These studies found most pursuits are short, both in time and distance. The studies reported 26 to 41 percent of the reported pursuits resulted in accidents. Injuries resulted in nine to seventeen percent of these accidents, and death occurred at a rate of zero to three percent.

Beckman (1987) suggests police agencies should adopt policies restricting police pursuits. Alpert and Dunham (1990) found officer age and gender affect the escape and accident rate. Additionally, they examined the pursuit question utilizing a cost-benefit analysis. Falcone et al.

(1992) found younger, less experienced officers do not suffer from a greater number of pursuit accidents. Falcone et al. (1992) also discovered police agencies generally equate emergency driving training with pursuit driving training.

Pursuit liability lawsuits and the resulting court decisions have focused upon several areas of legal opinion. These include negligence, duty owed, proximate cause and immunity (Alpert & Fridell, 1992; del Carmen, 1991; Kohl, 1990; Koonz & Regan, 1985; Payne & Corley, 1992). The general trend by litigants has been to increase the liability of law enforcement officers and their employing governmental bodies, particularly concerning third party injuries. There has, however, been a fair amount of disagreement between courts on this matter.

Current Study

The Michigan Emergency Response Study (MERS) constitutes 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. All road patrol personnel were requested to complete the survey whenever they participated in a pursuit. This was one section of a three section study conducted during this time.

Purpose of The Michigan Emergency Response Study

The purpose of the MERS was threefold. One purpose of the study was to obtain police pursuit data from Michigan that included environmental information, as well as officer behavior. Another purpose of the study, was to use the data procured to develop a state-wide police pursuit policy which would include a system for recording environmental and officer behavior factors during future pursuits. In addition, the study was to be the springboard of future police pursuit research of Michigan county, city and municipal police agencies. The data would then be used to determine the generality of the MERS.

Purpose of Thesis

The purpose of this thesis is to compare outcomes and characteristics of police pursuits in different population density areas. This will be done using data collected through the MERS. The research question for this thesis is: Do the parameters of police pursuits differ by population density areas?

A police pursuit profile will be described for each of the population density areas using the MERS. Characteristics of pursuits in one population density area will be compared with attributes found in the other population density area. This will allow for a comparison of police pursuit characteristics in the different

population density areas for the purpose of proposing policies and training standards for each area.

Hypotheses

To test this research question several hypotheses have been developed. The hypotheses are:

1) There is a difference in the initiating reason for police pursuits between high and low population density areas.

2) There will be no difference when pursuits occur, considering the period of the week and the time period of the day, between high and low population density areas.

3) There is a difference in the length of the pursuits, measured in minute intervals and mile intervals, between high and low population density areas.

4) There will be no difference in the type of roadway that pursuits are conducted between high and low population density areas.

5) There is a difference in the maximum speed reached during police pursuits between high and low population density areas.

6) There is a difference in the rate of escape by the pursuit suspect between high and low population density areas.

7) There is a difference in police pursuit accident rates between high and low population density areas.

8) There is a difference in the number of vehicles involved in each pursuit related accident between high and low population density areas.

9) There is a difference in the number of pursuit related injuries between high and low population density areas.

10) The type of arrest made after a police pursuit will be different between high and low population density areas.

Definitions

The following definitions are provided to clarify the understanding of terminology used throughout this paper.

Negative outcome: the occurrence of a traffic accident, injury, or the escape of a suspect during the execution of a pursuit.

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.

Population density areas: an area defined by the population per square mile. The data in the MERS is definable by Michigan State Police (MSP) district areas. It is, therefore, necessary to define the population density areas using the same geographical boundaries as the police

districts. To determine the population density for the districts, the total population of each district was divided by the total land mass within that district. Each district was then assigned to a high or low population density classification.

For the purpose of this paper, high population density area is defined as being composed of the MSP districts which have over 250 people per square mile. Low population density area is defined as containing the MSP districts which have less than 250 people per square mile.

Positive outcome: the apprehension of a police pursuit suspect, without the occurrence of traffic accidents.

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

Summary and Overview

The police pursuit issue was introduced in this chapter. A brief synopsis of the research that has been conducted was also included. The Michigan Emergency Response Study, which is the basis for this thesis, was briefly discussed.

Prior research which has been conducted in the area of police pursuits and a brief discussion of the liability issues surrounding police pursuits will be presented in Chapter II. The research question and hypotheses which have

been formulated for this thesis will be presented in Chapter III. The methodology of the Michigan Emergency Response Study is discussed in Chapter IV, while the results of the data analysis will be presented in Chapter V. The summary and conclusion of the findings will be discussed in Chapter VI.

Chapter II

Literature Review

Introduction

The topic of police pursuits has been a subject of speculation and study for many years. Since the late 1950s several studies have been conducted. Some of these studies were scientifically conducted while others were poorly constructed. All, however, have played a role in developing opinions regarding police pursuits.

The literature will be reviewed in two parts. The first part will be an examination of the major studies that have been conducted. In addition to the findings of each study, the strengths and weaknesses of each study's methodology will be discussed.

The second section of the literature review will contain a brief summary of the police pursuit liability issues. The more significant cases will be discussed, as well as the effect of these decisions.

The review of previous studies on police pursuit was accomplished with the assistance of John Fenske. Fenske, J. C. (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. Unpublished master's thesis. Michigan State University, East Lansing.

Prior Studies on Police PursuitMichigan State Police Pursuit Study.

One of the earliest recorded police pursuit studies was conducted by the Michigan State Police in 1958 and 1959. This 18 month study was conducted in response to an increase in the number of high speed pursuits. High speed pursuits were defined as, "...the chase car must be driven in excess of 90 miles per hour" (Frazier, 1961, p. 38).

The study consisted of 885 high speed pursuits. Frazier (1961, p. 39), a reporter for the Lansing State Journal, summarized the findings of the study 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." Speeds up to 130 miles per hour were recorded. The most frequently cited reason (580 cases) for initiating the pursuit was speeding. Eleven pursuits involved fleeing felons. Frazier (1961) stated that one pursued driver was killed in a traffic accident, and another pursued driver drowned while fleeing on foot after exiting his vehicle.

When utilizing the data provided in this study, one must remain cognizant of its definition of pursuit. This study did not consider any pursuit below the speed of 90 miles per hour. This definition may have eliminated many

pursuits that occurred in more populated, urbanized areas, where such high speeds are unlikely to be attained.

Physicians for Automotive Safety.

The Physicians for Automotive Safety released a study of police pursuits in 1968. Though it is historically important for bringing the issue of police pursuits to the attention of the public, caution must be taken when utilizing the results. The Physicians for Automotive Safety (PAS) study was largely based upon a three month sample of newspaper articles spanning the period of April through June, 1967 (Charles et al., 1992).

Charles et al. (1992, p. 92) report the findings of the PAS study as:

- One out of five pursuits end in death.
- Five out of ten pursuits end in serious injury.
- Seven out of ten pursuits end in an accident.
- One out of 25 killed is a policeman.
- More than 500 Americans die each year as a result of rapid pursuit by the police.

As a result of these findings, PAS made six recommendations concerning police pursuits. 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 (Charles et al., 1992, pp. 92-93).

The PAS study was significant in that it was one of the first studies to apply research evaluation methods to the police pursuit issue. There were serious methodological problems. The major flaw in the methodology is the sole reliance upon newspaper accounts for data. It is fairly safe to assume that newspapers report only police pursuits that are newsworthy, ignoring many of those pursuits that may end without accident or fatality (Charles et al., 1992). The California Highway Patrol (1983, p. 9) describes the shortcomings 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.

The credibility and utility of the PAS study has waned over the years as methodologically sound studies of police pursuits have been conducted. Consequently, the PAS study is mainly useful for its historical significance.

North Carolina Highway Patrol Pursuit Study.

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

All 44 police pursuits were initiated because of traffic related violations. Speeding/reckless driving was the reason for initiating 29 (66%) of the pursuits (Fennessy et al., 1970). None of the pursuits were the result of stolen vehicles or other crimes. Five (11.3%) of the pursuits ended in accidents which resulted in injury to three (6.8%) people (Charles et al., 1992). There were no reported fatalities. Four (9%) of the pursued drivers escaped (Fennessy et al., 1970).

An attempt was made to compare the driving records of the 36 North Carolina residents who were apprehended as the result of the pursuits to 36 randomly selected North

Carolina drivers. Fennessy et al. (1970) report the pursued drivers had a total of 44 reported accidents and 130 prior traffic violations. In comparison, the control sample had a total of 20 reported accidents and 49 traffic violations.

Three flaws of the North Carolina study are reported by Fennessy et al (1970). These include the short duration of the study, the small number of cases obtained, and the questionable training of the officers concerning the study. Fennessy et al. (1970) cautions about the chance of acquiring a representative sample during the study period. They also question the statistical reliability of data when subdividing such small numbers.

Study of the Problem of Hot Pursuit by the Police.

Edmund Fennessy, Thomas Hamilton, Kent Joscelyn and John Merritt conducted a study on police pursuits from July, 1969 through June, 1970. The general objective of this study was to "determine the magnitude of the problem involving high speed chases and to prepare guidelines for the police" (Fennessy et al., 1970, p. 1). In their attempt to determine the magnitude of the police pursuit problem, Fennessy et al. (1970) requested statistical data from 178 different police organizations. The researchers found only 15 of these agencies kept any kind of statistical data at all on police pursuits, and this was of limited utility.

Due to inadequate existing data on police pursuit incidents, the researchers decided to conduct a one month field survey involving four different law enforcement agencies. Five agencies were initially selected for participation, however, one agency declined due to an administrative change. All officers of the remaining four agencies were directed to complete the survey any time they were involved in a hot pursuit. Fennessy et al. (1970, p. 5) defined hot pursuit 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.

The data collection period was one month for each of the four agencies. The agencies, however, did not begin their data collection periods at the same time; instead the agencies began collection at varied times from November, 1969 to January, 1970. A total of 58 pursuit forms were returned, accounting for 46 individual pursuit incidents (Fennessy et al., 1970).

Of the reported pursuits, 37 (80.4%) terminated in the capture of the suspect (Fennessy et al., 1970). Collisions ended five pursuits. In another five pursuits, the suspect was able to elude apprehension. Injuries were sustained by four occupants of the suspect vehicle, and by one police officer. All injuries were minor, and no fatalities were

reported. This study found all accidents occurred at a time when traffic density was either non-existent or light.

Although 37 (80.4%) of the pursuits terminated in the capture of the suspect, another four suspects were arrested following a pursuit terminating traffic accident. An additional four suspects were arrested after the driver attempted to escape on foot after the termination of the pursuit. Two drivers were arrested at later dates after warrants had been obtained. A total of 47 arrests were made from the 46 reported pursuits. The reason for this was that one pursuit involved two vehicles which were racing each other and both drivers were apprehended.

The most frequent reason recorded for initiating a pursuit was an officer's observation of a traffic violation. The average pursuit travelled a distance of five miles, ranging from one to seventeen miles. The average speed was 85.4 miles per hour and the range was 30 to over 120 miles per hour (Fennessy et al., 1970).

The weekend period - Friday, Saturday and Sunday - accounted for 32 (69%) of the 46 reported pursuits. Fourteen (30.3%) pursuits occurred on Saturday, which was the most recorded on one day. Fennessy et al. (1970) reported two time periods for the initiation of pursuits. They described them as the hours of darkness (6:00 P.M. to 6:00 A.M.) and as the hours of light (6:00 A.M. to 6:00 P.M.). Fifteen (32.6%) pursuits occurred during the

daylight hours, with the rest (33 or 67.4%) occurring during the hours of darkness.

This study was one of the first to record information concerning location of the pursuit. Fennessy et al. (1970) report 14 (30.4%) pursuits were conducted on city streets, four (8.7%) on county roads and 28 (60.9%) on rural highways. They also report 13 (28.3%) pursuits were in residential areas, three (6.5%) pursuits were in business zones, 21 (45.7%) pursuits were in rural areas and nine (19.6%) occurred in more than one area.

One interesting aspect of the Fennessy et al. study was an estimate of the national dimensions of the police pursuit situation. This estimate was accomplished through a combined analysis based upon an extrapolation of the results from the pursuit survey, police agency visits, mailings and telephone conversations with law enforcement agencies. The estimate also utilized the information developed in the Physicians for Automotive Safety pursuit study. Fennessy et al. (1970), estimated the annual national range of the number of pursuits from 50,000 to 500,000. The researchers estimated police pursuits, in the United States, would annually result in 6,000 to 8,000 accidents, 2,500 to 5,000 injuries, and 300 to 400 fatalities.

Fennessy et al. (1970) developed several recommendations as a result of this study. These included increased legal penalties for drivers who flee the police,

development of technical countermeasures (such as vehicle speed limiting devices, vehicle identification systems, and remote vehicle ignition disabling systems), increased training of the police in pursuit driving, a police pursuit policy database, a nationwide pursuit data collection system, and an analysis of offender characteristics.

This study was initiated with noble goals and intent. The researchers found the pursuit data they sought from various police agencies was simply not available. Consequently, the researchers conducted a one month field study involving four law enforcement agencies. This short study period and its resulting data should not be construed as being representative of all police pursuits that occur, as it cannot account for seasonal variations in driver activity.

One must be cautious when applying the national number of pursuit extrapolation presented by Fennessy et al. As Fennessy et al. (1970, p. 85) state, "Such estimates cannot, of course, be precise." In addition, this estimate is based in part upon the Physicians for Automotive Safety 1968 pursuit study. As shown previously in this literature review, that study is methodologically flawed and thus unreliable. Consequently, data based upon that study must be eyed cautiously.

Several of the recommendations made in the Fennessy et al. study, though valid and reasonable, have not yet been

universally adopted by police agencies in the 1990's. Many of these same recommendations are echoed in more recent pursuit studies.

Phoenix Study.

Phoenix (Arizona) Police Department conducted a survey of pursuits in that agency from February 1, 1980 through April 30, 1980. The purpose of this survey was to determine to what extent high speed pursuits had been a problem in the Phoenix Police Department and to determine what, if any changes in the policy needed to be made (Margolis, 1981).

In this study, patrol officers were directed to answer the survey every time the officer used red lights and siren and/or drove in excess of 55 miles per hour (Margolis, 1981). At the end of each shift the officer was to turn in all completed surveys to the squad sergeant. This culminated in 48 completed surveys during the 90 day period.

The results indicated 27 percent (13) of the pursuits terminated in a collision. There were no injuries or deaths reported as a consequence of these collisions (Margolis, 1981). Eighty-six percent (41) of the pursuits had a duration of five minutes or less. It was also found 88 percent (42) of the pursuits achieved speeds of 50 miles per hour or more. Forty-eight percent (23) of the pursuits took place between 2100 hours and 0459 hours. Twenty-five percent of the pursuits occurred on Monday. Traffic

violations were the initiating factor of 50 percent of the pursuits. In 63 percent of the pursuits, the suspect was apprehended. The majority (88%) of the pursuits were conducted by single officer cars, the remainder were conducted by two officer cars (Margolis, 1981).

There are several methodological problems with the Phoenix study. The study data are based not only on pure pursuits, but also other high speed runs, such as response to hot calls, fights and other emergency situations (Margolis, 1981). The findings do not distinguish between accidents that occurred as a result of pursuits and those occurring during runs of another nature. This is also true of other reported findings in the study, such as time of run and day of week. Consequently, the study may not present an accurate profile of pursuits. The study, however, may have met the stated purpose of the study, that being a review of the Phoenix Police Department policy concerning high speed driving.

Solicitor General's Special Committee on Police Pursuits.

From 1981 through 1984, the Solicitor General's office in the province of Ontario, Canada collected data on 6,757 police vehicular pursuits (Alpert & Dunham, 1990). The data collected over the four year period, represents pursuit

information from all police forces in the province of Ontario, ranging in size from 5 to 5,000 officers.

Of these pursuits, 1,578 (23.4%) terminated in property damage accidents, 642 (9.5%) pursuits ended in personal injury accidents and 26 (0.38%) pursuits resulted in 33 deaths. The total number of injuries was 872 (12.9%) (cited in Alpert & Dunham, 1990).

The initiating reason for 57 percent (3,851) of the pursuits was speeding and other minor traffic offenses. Of the remaining pursuits, 17 percent were initiated for dangerous driving, 9.5 percent for auto theft, 9.5 percent for impaired driver, two percent for suspended driver and five percent for serious criminal offenses (cited in Alpert & Dunham, 1990). The average age of the pursued driver was 22.7 years and all offenders were male.

Based on the conclusion that the majority of pursuits are initiated for violations of minor offenses, it was recommended vehicle pursuits be conducted only when an officer suspects a criminal offense has been committed. It was also recommended vehicle pursuits be prohibited for certain offenses, and a new policy be adopted by all police forces (cited in Alpert & Dunham, 1990).

The committee suggested these greater restrictions on pursuits be accompanied by some alternative means for apprehending violators (cited in Alpert & Dunham, 1990). Suggestions included holding the owner of the vehicle

criminally responsible, vehicle impoundment, camera systems in police vehicles to photograph offending vehicles and license plates, and the use of air support in metropolitan areas.

Little is known about the data related in this report other than the time span and scope of the agencies studied. One must be careful when generalizing the data to the United States, due to cultural and legal differences.

California Highway Patrol Pursuit Study.

The Department of the California Highway Patrol conducted a study of police pursuits from April 1, 1982 through September 30, 1982. The purpose of this 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). In order to meet the stated purpose, seven objectives were established. These were to identify (California Highway Patrol, 1983, p. 2):

1. Pursuit hazards
2. Effect of pursuit officers' actions on pursuit hazards
3. Need for pursuit policy/procedure change
4. Effective pursuit techniques
5. Impact of vehicle types on pursuit outcomes

6. Causes of pursuits

7. Injury causing factors

The California Highway Patrol (CHP) study collected data from ten county and municipal California law enforcement agencies plus the California Highway Patrol. During the six month study, all officers from each agency were directed to complete a questionnaire for each pursuit occurring. Six hundred, eighty-three pursuits were reported. The California Highway Patrol reported 480 pursuits, while 203 pursuits were reported by the other participating agencies.

The CHP study reported the most common reason (63%) for initiating pursuits was vehicle code violations. It was found 68 percent of the pursuits terminated for one of three reasons: the pursued driver voluntarily stopped and surrendered (36%), the pursued vehicle was in a collision and the driver surrendered (19%), or the pursued vehicle out-ran the police vehicle and the pursued driver escaped (14%).

The California Highway Patrol Pursuit Study found 29 percent (198) of the pursuits terminated in accidents; 11 percent (75) ended in injury accidents; one percent (7) resulted in fatal accidents (CHP, 1983). This study suggested these results are much less severe than those reported in the Physicians for Automotive Safety study.

The CHP (1983) reported 525 (76.9%) suspects were arrested. Of all arrests, 355 were for evading a police officer and 245 were for driving while under the influence of alcohol or drugs. These were the only offenses for which arrest numbers were reported. It is unclear if suspect drivers were arrested for offenses other than those above.

This study reported 391 (57%) pursuits occurred on urban roads, 151 (22%) occurred on rural roads, and 141 (20%) occurred on both urban and rural roadways (California Highway Patrol, 1983). The average distance for all pursuits was eight miles. This included pursuits ranging from less than one mile in distance to 230 miles. In urban areas, the average pursuit was 4.5 miles in length, in rural areas the average pursuit went for 11.59 miles, and in mixed areas the average pursuit lasted 14.35 miles. This indicates a significant difference in the length of the pursuits when comparing rural areas, mixed areas and urban areas. "This result would be expected, since urban areas do not have the kind of unobstructed roadways that are present in rural and mixed areas" (California Highway Patrol, 1983, p. 38). This study found no significant difference in locale and the rate of apprehension, rate of accidents or accident severity.

CHP (1983) reported 564 (82.6%) pursuits were less than ten minutes in duration. The average pursuit lasted eight minutes. The range was less than one minute to 175 minutes.

The California Highway Patrol study resulted in the development of a profile of the typical police pursuit. The characteristics of a typical pursuit are (California Highway Patrol, 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 1 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 authors of the study did note the majority of the respondents (CHP officers) had primarily traffic law enforcement responsibilities. They speculate that this may account for the majority of initiating reasons to be vehicle code violations. Had the general police respondents been separated from the CHP respondents, a different reason for

pursuit initiation may have surfaced. Additionally, since the majority of respondents were CHP officers, another problem may be that their pursuits took place mostly on interstate, freeway and state highways. The results of the study, therefore, may not be generalizable to urban streets and traffic problems.

Another limitation of the study is that it took place during the spring and summer months, which, according to the author, is a period of low precipitation. This may have affected the number of pursuits, as well as the number of accidents related to weather conditions.

The California Highway Patrol Pursuit Study is pivotal in the derivation of the true nature of police pursuits. Overall, the study is well defined and the resultant data are statistically well analyzed. Measures of significance were applied to the raw data, rather than relying upon simple percentages and cross-tabulations.

Michigan State University Study.

From April 1, 1984 through September 30, 1984, Erik Beckman conducted a study involving pursuits in 75 law enforcement agencies. This included 40 city police departments and 35 sheriffs' departments from Alabama, Arizona, California, Florida, Georgia, Hawaii, Louisiana, South Carolina, Tennessee, Guam, and the Virgin Islands (Beckman, 1986). The study dictated that each officer who

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participated in a pursuit complete a questionnaire. A total of 424 questionnaires were submitted for analysis.

Beckman (1986) recognized the 1983 California Highway Patrol Study as the first valid study on pursuits. He chose to build on the data supplied by the California Highway Patrol (CHP) project, when developing his study. According to Beckman (1987), a modified version of the CHP questionnaire was utilized.

Beckman (1986) concluded no pursuit is particularly safe. This was based upon his findings that accidents occurred during pursuits of all durations, whether based on time or distance. Overall, he found 14.85 percent of the pursuits resulted in injury accidents, 2.83 percent resulted in fatalities and 22.87 percent resulted in non-injury accidents (Beckman, 1986).

Beckman (1986) found the majority of pursuits were initiated for violations of the vehicle code. When broken down by locale, this remained true. However, the second most common reason in urban and suburban areas was criminal activity. In rural areas the second most common initiating reason was for OUIL (Beckman, 1986). This is similar to the findings of the California Highway Patrol Study.

Seventy-seven percent of the pursuits culminated with the suspect being apprehended, 22 percent ended with the suspect escaping and one percent were continued by another agency (Beckman, 1986). Of all pursuits, 28 percent

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terminated in voluntary suspect stops and seven percent were terminated by ramming/forcible stops. Forcible stops resulted in a capture rate of 96 percent, but subjected suspects to an injury rate of twelve percent. This is greater than the overall suspect injury rate of 9.9 percent.

Beckman (1986) reported 33 percent of the pursuits started between 0001 and 0400 hours and 25 percent began between 2001 and midnight. Twenty-nine percent of the pursuits were reported to have lasted one mile or less, 48 percent lasted between two and five miles, 11 percent were between six and ten miles, while 14 percent were 11 miles or more in distance. Seventeen percent of the pursuits lasted one minute or less, 42 percent lasted two to four minutes, 29 percent lasted five to ten minutes and 13 percent lasted over 11 minutes.

Beckman (1986) separated some characteristics of the reported pursuits into location of the pursuit. He reported 35 percent of all the pursuits occurred in urban areas, 28 percent in suburban areas, 15 percent in rural settings and 21 percent in other or both locations. He found that there was a relationship between the location of the pursuit and the length of the pursuit. In the urban areas 12 percent were over five miles and in suburban areas 16 percent were over five miles in length. In rural areas, 38 percent of the pursuits were over five miles.

In all pursuits, 37 percent reported speeds between 41 and 60 miles per hour (Beckman, 1986). Another 30 percent reached speeds between 61 and 80 miles per hour, and an additional 20 percent reported speeds over 81 miles per hour. Speed during the pursuit did seem to vary according to locale. The average speed, in urban and suburban areas, was 41 to 60 miles per hour. In rural areas, the average speed reported was 61 to 80 miles per hour.

"Police injuries and suspect injuries and deaths occurred throughout the locales, but with suspects having the highest number of injuries in urban areas and deaths in suburban areas" (Beckman, 1986, p. 28). No numbers are given in support of this statement. Beckman goes on to state that other motorists suffered the highest number of injuries and death in suburban areas. Rural areas had the lowest reported injuries and deaths to third parties. Again, no numbers are given.

Beckman (1986) recommended police agencies adopt a policy which places restrictions on pursuits, due to the hazards presented to police, suspects and third parties. Agency policy should balance these hazards against the need for apprehending the suspect. Beckman also suggested officers be trained in pursuit driving techniques and in implementing and observing their agency's policy. This policy should include when and how to pursue, termination of

the pursuit, and the use of forcible intervention (Beckman, 1986).

There are criticisms of Beckman's study. For example, Beckman fails to report how or why the law enforcement agencies were selected for the study. Beckman does not explain why he chose to include territories, such as Guam, instead of additional states. In addition, he does not describe the size of the agencies involved, the number of officers involved and if all officers from the 75 departments participated or if he relied upon a sample from each agency. This omission makes it difficult to determine the accuracy of the study. Replication of the study is also hindered by these oversights.

In the analysis of the data, Beckman relies primarily on percentages, often failing to cite the raw numbers. This can lead to inaccurate perceptions regarding the data. Large percentages do not necessarily indicate large numbers of incidents. Consequently, some measure of significance is needed and he does not present this in the published report.

The Beckman study is useful in that it provides additional data concerning police pursuits at a time when little empirical research had been done. In addition, Beckman enlarged the scope of police pursuit study to previously unexamined geographical regions. Consequently, this study served to expand the general understanding of police pursuits.

Miami-Metro Dade County Pursuit Study.

Geoffrey Alpert and Roger Dunham (1990) conducted a two phase study of police pursuits in Dade County, Florida. This research was conducted to develop information about the role of pursuits in policing and crime control. The first phase involved the analysis of pursuit policies of various law enforcement agencies throughout the country. The policy review began in 1984, and resulted in the development of a model pursuit policy. This policy was then adopted by all police departments in Dade County. One feature of the policy directed that all officers involved in a pursuit incident complete an informational form regarding the incident. The pursuit information form that evolved was a modification of the form utilized in the California Highway Patrol study of 1982.

The second phase of the study took place over a three year span, from 1985 through 1987. This phase of the study was an empirical analysis of police pursuits that involved members of the Metro-Dade Police Department and the Miami Police Department. The study utilized data derived from the phase one pursuit information form. Miami Police Department participated during calendar year 1986, generating 133 pursuits. The Metro-Dade County Police Department contributed data on 819 pursuits over the three year span. This resulted in a total of 952 pursuits.

Alpert and Dunham (1990) reported the majority (54%) of pursuits were initiated for traffic violations. Three hundred and twelve pursuits (33%) were initiated for either felony stops or suspected felons.

Accidents terminated 310 pursuits (33%). Of these, 160 pursuits (17%) resulted in personal injury (Alpert & Dunham, 1990). Of the pursuits ending in injury, 102 ended with the suspect being injured, 17 with police officers injured, and nine to third parties. In addition, nine pursuits injured both the suspect and police officer, and another four pursuits resulted in injury to both the police officer and a third party. Seven pursuit related fatalities occurred and all fatalities were suspects.

Suspects escaped in 298 pursuits (31%) and officers/supervisors terminated pursuits in four percent (40) of the cases. Six hundred and forty-six suspects were arrested.

Of the 18 accidents which were the result of pursuits in rural areas, two (11%) reported injuries. In the urban and suburban areas, the rate of injury accidents was 24 percent. A total of 305 accidents occurred in the urban and suburban areas (Alpert & Dunham, 1990). It is difficult to determine how Alpert and Dunham defined urban, suburban and rural, as the questionnaire requests area location as residential, commercial and rural.

Alpert and Dunham (1990) reported that of those pursuits on which information concerning the duration of the

pursuit was available, 329 (68%) lasted five minutes or less. The authors reported time of day for only those pursuits occurring in 1988 (N = 323). They divided the chases as occurring either during the day or at night. No time periods are given for either. Eighty-nine (27.5%) pursuits occurred during the day. Alpert and Dunham (1990) report 184 (57%) pursuits as occurring at night. It is unknown how they classify the other 15 percent in regards to time of occurrence.

Alpert and Dunham (1990) derived several noteworthy conclusions from their research. These included the application of cost-benefit analysis, the relationship of officer age to negative pursuit outcomes, the gender of the officer and negative pursuit outcomes, and the incorporation of aleatory elements in police pursuits. Negative pursuit outcomes was defined by Alpert and Dunham (1990) as the occurrence of an accident, the escape of a suspect, or injuries to any of the parties involved (including third parties).

Cost-benefit analysis, as used by Alpert and Dunham (1990), involves the determination of the risk of pursuit by comparing negative outcomes to the number of arrests. The authors concluded the "cost" factor of pursuits (accidents and escape of the suspect) is substantially less than one would expect. On the other hand, the "benefit" of pursuits is fairly high, as shown by an arrest rate of approximately

75 percent. Fifty percent of these arrests were for felony charges. The perception of acceptable and unacceptable risk varies from person to person and the administrator responsible for developing pursuit policy must take this perception into account.

The authors of the study concluded officer age was an important 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 likelihood was increased for officers in their twenties. Younger officers were less likely to apprehend suspects. Alpert and Dunham (1990, p. 63) conclude, "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."

Negative outcomes also showed a distinction for officer gender. Female officers demonstrated a lower probability for negative pursuit outcomes than male officers. This did not apply to suspect escapes, where no significant difference existed between the performance of male and female officers. Alpert and Dunham (1990) determined pursuits conducted by female officers were superior on a cost-benefit basis.

Alpert and Dunham (1990) discussed the involvement of aleatory elements in police pursuits. Aleatory element analysis considers the effect of chance events upon the

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outcome of a police pursuit. These chance events can include unintended intervention of pedestrians, uninvolved motorists, offender behavior and so forth. Additionally, the psychological processes of the individual officer may also contribute to the outcome. For example, a more aggressive officer might take more dangerous actions in a pursuit than a more cautious officer. Some officers may see the fleeing offender as an affront to the officer's authority, angering the officer. Pursuit policy should reflect the existence of aleatory factors and attempt to limit their effect. Alpert and Dunham (1990) suggested training of officers incorporate pursuit policy, mechanics of pursuit driving and the psychological processes of pursuit. Alpert and Dunham also noted officers and supervisors must continually compare the need of immediate apprehension of the offender to the risk of the pursuit.

The Alpert and Dunham study was conducted in essentially a metropolitan area. Due to the urban and suburban nature of the locale, one must be cautious when generalizing this study to less populated areas. In addition, the police departments involved in the study had adopted a comprehensive police pursuit policy prior to the study. This may have affected the nature and intensity of the pursuits that took place during the study period. Pursuit policy is certainly a positive development, but the

existence of such a policy may limit the applicability of the study to jurisdictions lacking an effective policy.

Methodologically, the Alpert and Dunham study reflected good practices. The population of pursuits was quite large (952). The data was verified and ten percent was rechecked (Alpert and Dunham, 1990). The accuracy of the data was fortified through checking radio communication records, officer and defendant information, and previous year driving/accident records of the Metro-Dade officers. The frequencies of the data were analyzed for statistical significance.

One apparent flaw in Alpert and Dunham's application of the data involves injuries to the offenders. The authors do not differentiate between injuries occurring as the result of pursuit accidents and those occurring 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." These injuries are included in the authors' analysis of personal injury, and may lead one to believe the injuries are the result of a traffic accident, when they are not.

Chicago Police Department Statistics.

The Chicago Police Department started to collect data concerning police pursuits initiated by their officers in

May, 1984. This collection began at the same time a new policy concerning police pursuits was implemented. According to Patinkin and Bingham (1986), 741 pursuits occurred, resulting in an accident rate of 18 percent. In addition, five percent of the pursuits resulted in injuries, and the fatality rate is given as 0.1 percent. The arrest rate was 76 percent.

Unfortunately, Patinkin and Bingham do not give the time span of this police pursuit data. "However, two years ago the present administration, under Superintendent Fred Rice, realized there was a need to reevaluate the department's pursuit policy." (Patinkin & Bingham, 1986, p. 61) is the closest to a time span given. They do state that collection started in May, 1984. In addition, no other data analysis was performed and the information given above is the only data presented by the authors.

Although the officers were to report other information besides accident information, such as initiating reason, distance traveled, speeds attained and arrests made, (Patinkin & Bingham, 1986) no attempt to depict this information was made by the authors. Chicago Police Department has started to gather information concerning police pursuits that has been lacking in the past. The question remains to be answered concerning the value of this data and the use that will be made of it.

Kentucky State Police Pursuit Study, 1989-90.

Another police agency which collected pursuit data in order to gain insight into the question of police pursuits was the Kentucky State Police Department. This study had two purposes. The first purpose was to gather and analyze police pursuit data from a rural police agency. The second focus of the 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). Data was collected from May 1, 1989 through April 30, 1990. Data was compiled from intra-agency teletypes. It is unclear if all pursuits were included and, if not, under which circumstances pursuits were reported.

A total of 235 police pursuits were reported (Oechsli, 1990). Of these, 174 (74.1%) were initiated for traffic offenses. The suspect was apprehended in 76.4 percent of the pursuits. There were 53 (22.6%) accidents, which resulted in 13 (5.5%) injuries and one death.

Saturday had 72 (30.3%) pursuits, the highest number of any day (Oechsli, 1990). This was followed by Sunday which had 54 (23%) pursuits. Seventy-one percent (167) of the pursuits occurred during the weekend.

Oechsli (1990) reported 114 (48.5%) pursuits occurring between 1801 and 2400 hours. From 0001 to 0600 hours, 68 pursuits (28.9%) occurred.

Pursuits occurred most frequently (182, 77.6%) on two lane roadways. Twenty-eight (11.9%) occurred on four lane roads. The top speed attained by the suspect in 114 pursuits (48.6%) was between 61 and 90 miles per hour. Sixty-eight (28.9%) suspects reached speeds between 91 and 120 miles per hour. Speeds reached by the police officers were not given.

This study was compared to findings from the Miami-Metro Dade County Pursuit Study. Oechsli (1990) believed that Kentucky represented a rural area, whereas the Miami-Metro Dade County area was an urban area. Some of the differences that were examined included: initiating reason, arrest rate, accident injury rate, and length of the pursuit.

Reckless driving/DUI was found to be the initiating reason more often in the rural area than in Miami-Dade County, 32.3 percent versus four percent (Oechsli, 1990). Arrest is more likely to occur in Kentucky (78% to 62%). Personal injury from accidents are more likely to occur in the Miami area (14%) than in Kentucky (6%). In addition, 17 percent of the pursuits reported in Kentucky lasted eleven minutes or more, while only seven percent in the Miami Metro-Dade County area were reported to have lasted that long.

This study continues to add to the knowledge of police pursuits and introduces another dimension to the information

available, which is the rural police department. A better discussion of the method of data collection would aid greatly in determining the reliability and validity of the information discussed by Oechsli.

Police Pursuit Driving Operations in Illinois.

James Auten conducted a study from January 1 through December 31, 1990. This study involved 86 Illinois police agencies. The purpose of this 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 project surveyed 824 Illinois law enforcement agencies, with 296 responding. The purpose of this preliminary survey was to ascertain each agency's concept of a "typical" pursuit. It also served as a field test for the follow-up 1990 study. Responses from this survey were used to modify the instrument for use in the pursuit study of 1990.

In the 1990 study, a survey questionnaire was to be completed following every pursuit in which the responding agency participated. This resulted in 286 pursuits during the study period. Of these, 49 (17%) pursuits occurred in urban areas, 188 (65%) in residential/suburban areas, and 49 (17%) occurred in rural areas.

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Auten found minor traffic violations were the initiating event in 58 percent (166) of the pursuits. The second most frequent initiating event was operating while intoxicated (12%, 34). 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."

Examining the initiating reason by locale, all three locales, rural, urban, and residential/suburban, reported over 50 percent of the pursuits were initiated for minor traffic law violations. The second most frequent initiating reason in rural areas was that the suspect was wanted by another agency (10%). In urban areas, suspected stolen vehicle (14%) was the second most common initiating reason. In residential/suburban areas suspected driving while intoxicated (DUI/DWI) (12%) was the second most frequent initiating reason.

Most pursuits were terminated when the suspect voluntarily stopped and surrendered (34%). The next most frequent terminating event was the involvement of any of the pursuit participants' in a traffic accident (33%). The third most frequent terminating event was forcible stops (15%).

When examining terminating event by locale, the most frequent terminating reason in rural areas was the suspect

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escaping (21%). The second most frequent terminating event in rural areas was the suspect surrendering or stopping (18%). In urban areas, as well as in residential/suburban areas, the most frequent reason for termination of the pursuit was the suspect stopping or surrendering (43% and 35% respectfully). The second most frequent reason for termination, in both urban and residential/suburban locales, was an accident involving the suspect only (18% and 17% respectfully).

Auten (1991) found approximately 41 percent of the pursuits resulted in traffic accidents. Twenty-eight percent of all pursuits involved property damage accidents, while 12 percent were personal injury accidents. Fatalities resulted in 1.4 percent of all pursuits. In property damage accidents, the suspect vehicle alone was involved in 46.25 percent (37) of all the property damage accidents. This was followed by 18 accidents which occurred between the suspect and third party. Suspects alone had 11 personal injury accidents. This was 33.33 percent of all pursuit injury accidents. Police and suspect, and suspect and third party were each involved in 10 personal injury accidents.

When examining the rate of accidents by locale, rural areas had a rate of 35 percent accidents, urban areas reported a rate of 47 percent, and residential/suburban areas experienced a rate of 41 percent. Injuries occurred more often in rural areas (16%) compared to urban (8%) and

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residential/suburban (11%). Rural areas, however, reported less fatalities (2%) than urban (4%), but higher than the residential/suburban areas (0.53%).

Auten found approximately 18 percent of the suspects attempted to escape on foot after the termination of the motor vehicle chase. Nine of ten attempts to escape on foot occurred after the suspect had either voluntarily stopped or after being involved in a traffic accident. Of these, 43 percent were successful in evading apprehension by law enforcement personnel.

In the reported pursuits, 220 (76.92%) arrests were made (Auten, 1991). Felony offenses counted for 27.73 percent (61) of all arrests. Traffic law violations and DUI/DWI arrests totaled 51 percent of all arrests. Traffic related arrests were made in 39 percent of all pursuits.

Of the arrests made in the urban area, 49 percent were for traffic violations. In the suburban area, 48 percent of the arrests were for traffic violations. In the rural area, 68 percent of the arrests made were for traffic violations.

Pursuits took place on two lane roads 72.38 percent (207) of the time. Four lane roadways were the scene of 64 (22.28%) pursuits (Auten, 1991). Only 4.55 percent (14) of the pursuits were reported as occurring on expressways.

Almost 62 percent (176) of the pursuits occurred between 10 P.M. and 3:59 A.M. Auten (1991) reported that in urban areas, 88 percent of the pursuits started between 1800

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to 0600 hours. In both the suburban and rural areas, 86 percent were initiated during that time period.

The weekend period accounted for 58.39 percent (167) of the pursuits. Fifty-eight (20.28%) pursuits occurred on Sunday, which was the most of any day. This was followed closely by Saturday with 57 (19.93%) pursuits. In the urban area, the weekend period - Friday, Saturday and Sunday - accounted for 58 percent of the pursuits. Fifty-nine percent of the pursuits in the rural area occurred during the weekend period.

Pursuits in rural areas lasted an average of 12.45 minutes. In urban areas the average pursuit was 5.51 minutes in duration and in residential/suburban areas the average duration was 6.48 minutes (Auten, 1991). Thirty-six percent of the pursuits in rural areas lasted more than five miles in length. In each of the other locales, 12 percent of the pursuits were over five miles in distance. In urban areas, 12 percent of the pursuits lasted 1 block to $\frac{1}{2}$ mile, residential/suburban area pursuits reported 17 percent of that length and in rural areas two percent of the pursuits were of that length.

Auten (1991) reported the highest speeds attained, by the police unit, during a pursuit was in the rural area, where almost 70 percent of the pursuits recorded speeds over 81 miles per hour, with 27 percent reaching speeds of 101 miles per hour or more. In urban areas, 16 percent of the

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pursuits attained that speed and in residential/suburban areas, 20 percent of the pursuits were conducted at that speed. In addition, the highest speed attained by the suspect vehicle also was in the rural area, where 76 percent of the suspects reached speeds of 81 miles per hour or more. This compares to 24 percent in urban areas and 29 percent in residential/suburban areas.

Auten's study encompassed many of the elements of the previous studies. It did meet its stated purpose of adding to the existing knowledge of police pursuits. Auten broke new ground when he included information on suspects' escaping on foot, after the pursuit had seemingly ended. This study did not include the two largest police agencies in Illinois, the Illinois State Police and the Chicago Police Department. Auten points out that any attempt to generalize the data to the entire State of Illinois must be done with caution. The 86 participating agencies represent approximately ten percent of the state's law enforcement agencies. Once more, care must be exercised when interpreting the results of the data.

Auten did not clearly explain who was responsible for completing the survey. This is potentially a problem in that the party who actually participated in the pursuit incident may not have been the one completing the survey. The data, therefore, may not have been accurate. Auten also did not explain the collection procedure for the completed

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surveys. This omission creates concern regarding the accuracy of the surveys. This concern is based on the possible intentional alteration of data by lower ranking officers to protect themselves from possible disciplinary action by supervisors, if the supervisors had access to the completed surveys.

Police Pursuit in Pursuit of Policy.

David Falcone, Edward Wells and Michael Charles conducted a study of police pursuits from January through December, 1991. In general, this study examined police pursuit attitudes and policies, rather than empirical data on specific pursuits. This study consisted of four separate surveys, the Officer Survey, the Administrative Survey, the Police Field Interview Form and the Administrative Telephone Survey. This study involved 51 law enforcement agencies in 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). The authors state this data base can be the basis for informed debate and for the formation of sound police policies concerning the pursuit issue. In addition, Charles et al. (1992) asserts this study differs from previous studies in that it collects information about the organizational response to the pursuit issue and attempts to understand how

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administrators and police officers operationalize police pursuits.

Thirty-five of the 51 target police agencies responded to the Administrative Survey (Falcone et al., 1992). Of these 35 agencies, 18 had kept records and were able to provide numeric information on pursuits from the previous year. One hundred forty-nine pursuits were reported.

Of the 2,780 Officer Surveys distributed, 784 (28%) questionnaires were returned, representing 44 departments. Falcone et al. (1992) report 339 officers claimed involvement in at least one pursuit during the study period. A total of 875 pursuits were reported, as some officers claimed involvement in more than one pursuit and some were involved in as many as 20 or more pursuits (Falcone et al., 1992).

The median pursuit distance, from the Officer Survey, was 4.4 miles, and 5.1 minutes in duration (Falcone et al., 1992). This is similar to the findings derived from the Administrative Survey of 3.2 miles and five minutes. Sixty-two percent of the respondents of the Officer Survey perceived felonies as the most common initiating event. This perception is echoed by the results of the Administrative Survey, in which two-thirds of the respondents perceived the initiating event was a felony. Officers, however, indicated in the Officer Survey that at least 75 percent of their actual pursuits were initiated for

non-felony offenses. Responses from the Administrative Survey showed 86 percent of the pursuits were initiated for non-felony offenses.

The pursuit accident rate reported from the Officer Survey was 34 percent. This is slightly higher than the rate reported in the Administrative Survey (26%) (Falcone et al., 1992). The Officer Survey found 97 percent of the reported pursuit accidents involved the suspect vehicle, higher than the Administrative Survey rate of 80 percent. Officers reported third parties as victims in 16 percent of the pursuit accidents, identical to the rate reported in the Administrative Survey. The Officer Survey showed injuries occurred in 17 percent of the pursuits, significantly higher than the nine percent rate reported in the Administrative Survey. While the Administrative Survey reported no fatalities, the Officer Survey attributed 15 deaths to pursuit accidents. The cause for the discrepancy in fatality rates between the two surveys is unknown. The authors speculate some telescoping may have occurred, but do not believe this phenomenon would account for all the fatality cases.

Officers reported a 76 percent arrest rate of the suspects. This closely aligns with the 73 percent arrest rate provided by the police administration. The officers indicated that 13 percent of the suspects escaped.

Officers reported different speeds in different locations. In commercial/business areas, the average speed was reported to be 68.1 miles per hour, the median was 61.5. The range varied from 35 miles per hour to 125 miles per hour (Falcone et al., 1992). In residential areas, the mean speed reported was 58.6, while the median speed was reported to be 53.5 miles per hour. The range was from 30 to 130 miles per hour. On freeway/highway/interstate roads the mean (102.8 mph) and the median (100.2 mph) is substantially higher than the other two locations. The top speed reached during these pursuits was reported to be 140 miles per hour and the lowest speed was 45 miles per hour.

The field interview surveys served to validate information derived from the Administrative and Officer Surveys, (Falcone et al., 1992) as well as providing information that was not obtainable through the other format. Interviews with 107 law enforcement officers of all ranks and representing 29 departments were conducted. Several interesting findings were derived from the interviews. Some supervisory and administrative personnel expressed a reluctance to engage in pursuits (Falcone et al., 1992). No specific reason was presented for this reluctance. Additionally, these personnel expressed an awareness of unauthorized pursuits conducted by subordinate officers and the corresponding deceptive behavior regarding these unauthorized pursuits.

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The interviews of the subordinate officers revealed two reasons for under reporting pursuits (Falcone et al., 1992). The first reason was the officers perception that the policy is restrictive and in conflict with their ideological beliefs. The second reason is the officers' fear of departmental retribution for engaging in unauthorized pursuits.

The fourth type of survey conducted as part of this study was the Administrative Telephone Survey (Falcone et al., 1992). This survey was conducted to garner demographic and organizational information concerning the participating agencies. Thirty-five agencies responded. The data from this survey was used to supplement the Administrative Survey results, specifically those results which could not be accurately measured by the Administrative Survey. This data was included in the results, after being added to the data gained from the Administrative Survey. The results of the Telephone Survey are not specifically described.

Falcone et al. (1992) describes several deficiencies in the methodology of the Police Pursuit in Pursuit of Policy Study. In particular this includes the method of sampling. The authors worked with the Research and Development Division of the Illinois State Police to identify police agencies (and thus police officers) to include in the study. These agencies are over-represented by large departments.

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This was done in an effort to sample those agencies most likely to have well-developed written policies.

Falcone et al. (1992) did use a variety of survey methods in order to limit the negative effects of any one method. This also helped them to meet one of the purposes of the study. This purpose was the operationalization of pursuit policy by both administration and line officers.

This survey relied heavily upon department records of pursuits and of individual recollections. It was found only about half of the police agencies maintained records from which data could be retrieved. Judging by the comparison of the Officer Survey to the Administrative Survey, the accuracy of these records is somewhat suspect. On the other hand, officer recollection may have been faulty, causing the large discrepancy in some instances.

Legal Issues of Police Pursuits

A survey of police chiefs, in cities with over 100,000 population, revealed that auto pursuits were the second most frequent cause of lawsuits brought against a police agency (McCoy, 1987). Pursuits were exceeded only by use of force cases. This same survey found most of the police chiefs, agencies and officers had either been sued in the past or expect to be sued in the future. Court cases have forced police agencies to change policy and practices in many areas, including police pursuits. Most court cases

concerning police pursuit litigation have focused upon negligence, duty owed, breach of reasonableness, proximate cause and immunity. These issues will be examined separately as they relate to the pursuit issue.

Negligence.

Negligence is often the premise of pursuit related liability cases. In *DeWald v. State* (1986) the court ruled "negligence must be determined based upon facts as they appeared at the time, not by judgment from actual consequences". Negligence by the officer during a police pursuit can include the violation of the duty of care, breach of reasonableness, and proximate cause (Kappeler & del Carmen, 1990b).

In Michigan, to sue under Section 1983, gross negligence must be proven. The legislature enacted State Statute 14.07, which granted immunity to police except for actions in which gross negligence can be proven. Gross negligence must be manifested by deliberate indifference.

Duty Owed.

Schofield (1988) points out police, as a general matter, have no duty to abstain from chasing a criminal suspect even when the risk of harm arising from the chase is foreseeable, and the suspect is being chased for a misdemeanor offense *Jackson v. Olson* (1985). In *Smith v.*

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City of West Point (1985) the court ruled the police ". . . are under no duty to allow motorized suspects a leisurely escape." Nevertheless, the courts have ruled an officer has a duty to balance the need to apprehend violators with due care to the general public's well being *Lee v. City of Omaha* (1981). The officer has a duty to the public to protect and to preserve order. Sometimes this includes attempting to apprehend criminals, which may, in turn, result in vehicular pursuits. "It is the officer's duty to the public to effectively balance the need for apprehension against the safety of the public" (Payne & Corley, 1992, p. 4). When the danger to the public becomes greater than the need to apprehend, the officer has a duty to terminate the pursuit.

In the past, the courts have determined that they will not hold the police responsible for the actions of the violator, if the police have acted with reasonableness and prudence *Dent v. City of Dallas* (1986) and *Thornton v. Shore* (1983). In *Chambers v. Ideal Pure Milk Company* (1952) the courts ruled that the "police, cannot be made insurers of the conduct of the culprits they chase." In *West Virginia v. Fidelity and Casualty Company of New York* (1967) the court was ". . . not prepared to hold an officer liable for damages inflicted by the driver of a stolen vehicle whom he was lawfully attempting to apprehend. . . ." This attitude may be changing. Charles, et al. (1992, p. 48) comment:

the winds of change do indicate that the due regard criteria might not be limited to incidents

where the police themselves are involved in a pursuit mishap, as was the case in the past. While this issue is yet unsettled by the courts, officers may find that their actions will be judged in totality of the circumstances surrounding the pursuits mishap.

Alpert and Fridell (1992) concur, adding that the driving behavior of the officer, as well as the offender's driving behavior, may be scrutinized for the purpose of determining officers' duty.

Guidelines for police pursuits are found in state statutes, court decisions and department policy. The courts can use these, as well as the reason the officer initiated the pursuit to determine negligence (Alpert & Fridell, 1992).

Breach of Reasonableness.

Once the existence of a duty of care standard is established, then the question before the court becomes, were the actions of the officer reasonable? The burden is to ascertain what any "reasonable, prudent emergency driver would do under all the circumstances, including that of the emergency" *Rutherford v. State* (1979). The court distinguishes between the actual operation of the emergency vehicle and the initial decision-making process of the officer (Kappeler and del Carmen, 1990b). Historically, the decision of an officer to pursue a suspect cannot form the basis of negligence, as the courts have decided that the due care standard and reasonableness test apply to the actual

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operation of the emergency vehicle and not to the decision to pursue (Kappeler & del Carmen, 1990a).

The operation of the emergency vehicle must be assessed in its totality to determine negligence. The court has ruled that an emergency vehicle exceeding the speed limit is not negligent *per se*, *Brown v. City of New Orleans* (1985), *Riggs v. State* (1986), and *Simmen v. State* (1982). Speed combined with other factors, however, may cause the courts to determine the officer's behavior constituted negligence. A variety of factors are considered when determining negligence. These may include: use of emergency equipment, disregard for traffic control devices, speed, road conditions, weather conditions, the need for emergency response, density of traffic, and the presence of pedestrians (Kappeler & del Carmen, 1990b; Payne & Corley, 1992). "The presence of a single factor alone is usually insufficient to establish unreasonable behavior, but as the number of factors increases the probability of a finding of unreasonable behavior also increases" (Kappeler & del Carmen, 1990b, p. 166). If unreasonableness and a breach of duty owed has been established, then proximate cause of the injury or damage must be shown.

Proximate Cause.

The growing trend among state courts is the examination of the situational factors surrounding the conduct that led

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to the injury (Kappeler & del Carmen, 1990b). The courts examine each case individually to determine if third-party injury was the proximate cause of police action, even where contact did not occur between the police vehicle and third party *Duarte v. City of San Jose* (1980), *Fiser v. City of Ann Arbor* (1983), and *Thain v. New York* (1971). This allows the court to examine the extent the officer's behavior and the situational factors contributed to the injury or damage (Kappeler & del Carmen, 1990a).

Immunity.

Koonz and Regan (1985) suggest the abrogation of sovereign immunity for police agencies. In *Ryan v. Arizona* (1982) it was resolved that courts start from the supposition that "liability is the rule and immunity is the exception". Court decisions and state legislation have combined to determine who is immune from civil liability and the circumstances for this immunity. Statutes in many states provide limited sovereign immunity to discretionary rather than ministerial decisions" (Alpert & Fridell, 1992, p. 26). The courts have held that the determination of discretionary versus ministerial function is a distinction upon which immunity is based. Discretionary function is an act which requires personal deliberation and judgment, whereas ministerial function is a performance of duty of which the individual has no choice (del Carmen, 1991). In

Johnson v. State of California (1987) the court ruled that the decision to pursue was discretionary but the actual pursuit was a ministerial function. The officer, therefore, may be liable for the physical operation of the police vehicle, if he/she is found to be negligent, but generally not for the decision to pursue.

With officer and jurisdictional immunity being curtailed, it is becoming important for police agencies to have pursuit policies that reflect and clarify current state statutes and court decisions. For police agencies to reduce the risk and liability which may result from vehicular pursuits, departments must evaluate their pursuit policies, training, supervision and post-incident evaluations (Payne & Corley, 1992; Schofield, 1988).

Summary of the Literature Review

The studies discussed in this literature review contain a number of variables and reach numerous conclusions. Few previous studies contained information about police pursuits in different population density areas or locales. The Study of the Problem of Hot Pursuit by the Police (Fennessy et al, 1970), the California Highway Patrol Study (California Highway Patrol, 1983), the Miami Metro-Dade County Study (Alpert & Dunham, 1990), and the Police Pursuit Driving Operations in Illinois, 1990 (Auten, 1991) each briefly examined pursuits in different locations. The locales are

described as urban, rural, suburban, residential or commercial. No definition is given of any of these areas. Rural in Miami Metro-Dade County could be operationalized differently than in Illinois.

Oechsli (1990) compares the findings from the Kentucky State Police study, which he considers rural, to the findings of the study in Miami Metro-Dade County area (Alpert & Dunham, 1990), which he describes as urban. This magnifies the problem of defining area or locale terms. In order for a comparison of pursuits in different areas to be conducted definitions of the areas must first be agreed upon.

Liability by the police for pursuit related accidents relies upon the legal principles of negligence, duty owed, breach of reasonableness, proximate cause and immunity. To lessen vulnerability to pursuit related lawsuits, law enforcement agencies should institute comprehensive, germane policies, provide good training for officers in police pursuits and provide appropriate supervision. As limited immunity continues to be the trend in the courts, self regulation becomes important for law enforcement agencies.

The need for well written pursuit policies is a recommendation that appears in both the empirical studies and in court decisions. Training of police in pursuit policies and in pursuit driving tactics is also recommended.

Chapter III

Hypotheses

Introduction

The research question for this paper will be discussed in this chapter. In addition, the research and test hypotheses will be presented.

Research Question

The research question for this thesis is: Do the parameters of police pursuits differ in different population density areas?

Using data from the Michigan Emergency Response Study (MERS), a police pursuit profile will be described for each population density area. In addition, characteristics of pursuits in one population density area will be compared with attributes found in the other population density area. This will allow for a comparison of police pursuits in the different population density areas for the purpose of proposing policies and training standards for each area.

Test Hypotheses

As presented earlier, the research question for this thesis is: Do the parameters of police pursuits differ in different population density areas? Several hypotheses have been developed for this research question. To test each hypothesis, a null hypothesis must be developed. The hypotheses and the null hypotheses are:

1) There is a difference in the initiating reason for police pursuits between high and low population density areas. Null: There is no difference in the initiating reason for police pursuits between high and low population density areas.

2) There is no difference when pursuits occur, considering the period of week, and the time period of the day, between high and low population density areas.

3) There is a difference in the length of the pursuits, measured in minute intervals and in mile intervals, between high and low population density areas. Null: There is no difference in the length of the pursuits, measured in minutes and miles, between high and low population density areas.

4) There will be no difference in the type of roadway that pursuits are conducted on, between high and low population density areas.

5) There is a difference in the maximum speed reached during police pursuits between high and low population

density areas. Null: There is no difference in the maximum speed reached during police pursuits between high and low population density areas.

6) There is a difference in the rate of escape by the pursuit suspect between high and low population density areas. Null: There is no difference in the rate of escape by the pursuit suspect between high and low population density areas.

7) There is a difference in police pursuit accident rates between high and low population density areas. Null: There is no difference in police pursuit accident rates between high and low population density areas.

8) There is a difference in the number of vehicles involved in each pursuit related accident between high and low population density areas. Null: There is no difference in the number of vehicles involved in each pursuit related accident between high and low population density areas.

9) There is a difference in the number of pursuit related injuries between high and low population density areas. Null: There is no difference in the number of pursuit related injuries between high and low population density areas.

10) The type of arrest made after a police pursuit will be different between high and low population density areas. Null: There is no difference in the type of arrest

made following a police pursuit between high and low population density areas.

Conclusion

The research question and hypotheses have been presented in this chapter. In order to determine if there are differences in characteristics of police pursuits, statistical analysis will be performed. The results of this analysis will appear in Chapter V.

Chapter IV

Methodology

Introduction

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

Population

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 inspectors. Road patrol personnel are sworn law enforcement officers whose primary duty is general police duties, primarily implemented

This chapter was written with the assistance of John Fenske. Fenske, J. C. (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. Unpublished master's thesis. Michigan State University, East Lansing.

through patrol. Motor carrier inspectors are sworn law enforcement officers whose primary duty is to enforce motor carrier and vehicle equipment violations. 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 (see Appendix A for a map of the MSP districts). A total of 65 posts and three teams existed at the time of the study.

Sampling Design

The MERS contained three sections. The first section was a short form questionnaire and consisted of 15 questions concerning high speed driving. The purpose of this section of the study was to measure the safety, injury and damage rate of MSP officers while involved in high speed driving. 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

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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). 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 an alarm, a medical emergency, or 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 for this section of the study 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 MERS involved police vehicular pursuits. This section utilized the same survey form as was issued in the second section. This, however, differed from the other two sections of the study, in that the survey form was to be completed any time the officer was involved in a pursuit, whether or not it occurred during the assigned reporting week. In other words, any time 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

There were several purposes for using the sampling method in sections one and two during this phase of the study. It was not 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, however, to obtain information on these 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. It was deemed necessary, therefore, 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. The impact on the individual respondents of a year long study on pursuits alone should be minimal.

Research Design

The survey instrument was designed by the primary researcher after a review of the literature and relevant court cases, as well as being supported by several years of law enforcement experience. To assist the primary researcher, a committee was formed consisting of representatives from the MSP Traffic Services Division, the Executive Division, the Training Division, the Troopers' Association, a Post Commander, a Post Sergeant and a faculty member from Ferris State University. The purpose of the committee was to assist in the refinement of the variables and to make the individual survey questions more explicit. Several meetings were held, in which both surveys were discussed and wording of questions clarified for better police understanding. (See Appendix C for a copy of the long form questionnaire.)

Survey Design

This paper is 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 up to nine possible options. The 58

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questions were divided into three parts. The first part, questions 1 through 27, was designed to collect general information about circumstances surrounding the incident and the police-respondent. The second part of the survey, questions 22 through 52, was intended to collect data pertaining only to police pursuits. The third part of the survey instrument, questions 53 through 58, contained questions relevant to accidents which may have occurred as a result 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.

Other than district number and demographic data about the police-respondent, there was no way to identify any specific respondent. There was also no means provided to specifically identify any suspects.

Measures Insuring Compliance and Anonymity

The primary researcher met with several groups within 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. Support from these leaders within MSP was vital, as past history has shown that without their

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support, patrol officers tended to disregard data gathering attempts.

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 stressed. 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 exposure of the contents to other personnel of the MSP. The officers were directed not to put names or other identifying information on the surveys to further ensure anonymity.

Following the pilot survey, letters were drafted and sent to all patrol officers by the Director of the Michigan State Police. This letter explained the study, requested their participation and provided instructions for completion of the surveys (see Appendix for copy of the letter). In addition, memos were sent to each post one week prior to each scheduled reporting week as a reminder. Intermittent reminders were sent to each post through the state-wide computer system known as the Law Enforcement Information

Network (LEIN). Each of these reminders stressed the importance of completing the surveys as 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 test surveys were collected by the researchers. At that time, the researchers were able to interview officers at each post about the content, ease of completion and understandability of the survey instruments. Changes were then made as needed.

Limitations of Study

As in any survey, no matter how well designed, certain inherent or unforeseen problems become evident as the survey was 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 in some cases reduced rank. These actions may have negatively impacted morale and influenced response rates. This suspicion was supported by the fact that a check of MSP records revealed that 400 fleeing and eluding citations were issued by MSP during the survey period. This type of citation is only issued following a pursuit. The number of citations was clearly in excess of the 197 pursuits reported in the survey.

The respondents could choose only one answer per question. In some questions this could create a problem, as more than one action or response may have occurred and the officers could mark only one on the survey form. The question concerning the reason for termination of the pursuit is an example of this. If both an accident occurred and the suspect was apprehended, the officer had to choose which response would be marked. Another example is the question concerning the official action taken. Again, the officer could only mark one response, even though an arrest may have been made for a felony, for fleeing and eluding, and for operating a motor vehicle while under the influence of alcohol or other drugs. The number of suspects arrested, however, can be determined.

Supplemental Data

Not all data needed to complete the analysis was available in the survey results. This section will explain the supplemental data and where it was obtained.

The State of Michigan is divided into eight state police districts. The boundaries of these districts lie primarily along county lines. To determine the population of each state police district, it was first necessary to determine which counties or other governmental units lie within each district. This information was derived from official MSP documents.

The population of each of the eight districts was determined using county population data from the 1990 United States Census. Land area of each district was calculated by tallying the areas of the counties comprising each district. The county land area and population figures was obtained using 1990 Census of Population and Housing: Summary Population and Housing Characteristics Michigan (U. S. Bureau of the Census, 1991). District population was divided by district land area to determine the population density of each district.

Once the population density of each of the eight districts was determined, the districts were grouped into two different population density areas. This was done to allow for the ease of comparison, as well as, presenting adequate numbers for statistical analysis.

Variables Chosen for the Population Density Areas Pursuit Profile

After reviewing the literature and court cases on the topic of police pursuits, the variables chosen for the profile were those that have been examined in previous studies, such as reason for initiating, reason for terminating, the number of accidents, the number of injuries and the length of the pursuit. Other variables were chosen as they have been used in court to determine negligence. These include: speed, driving behavior of the police officer and of the suspect, and the use of emergency equipment.

Some variables were not chosen, even though they may have been examined in previous studies and in court cases. The reason for not choosing some variables, such as gender of police officer, gender of suspect, weather conditions and light conditions, was that the values for the variables were not well represented. For example, in the variable gender of police officer, males represented 93 percent of the respondents. In the variable weather conditions, clear represented 82 percent of the responses. With such skewed numbers, comparisons were not meaningful. Also, with such small numbers, it was not possible to meaningfully analyze the data by population density areas.

Collapsed Data

In order to perform statistical analysis, the original data categories were collapsed. The variable, initiating reason, was collapsed into traffic and criminal reasons for initiating the pursuit. Speed, other traffic violations, and OUIL were included in the traffic category. Suspected misdemeanor, known misdemeanor, suspected felony and known felony constituted the criminal category. The option other, which had five replies, was not included in either category and will not be considered for statistical purposes.

The variable, time of day, was collapsed into two categories. Night included pursuits which started between 6:01 P.M. and 6:00 A.M. Day included those pursuits which occurred between 6:01 A.M. and 6:00 P.M.

The day of week the pursuit was initiated was collapsed into two categories, weekend and weekday. Weekend includes those pursuits that occurred on Friday, Saturday and Sunday. Monday, Tuesday, Wednesday and Thursday comprises the weekday classification.

The length of the pursuit, as measured in minutes, was collapsed into three categories. The categories consist of: up to three minutes, four to nine minutes, and ten or more minutes. The distance of the pursuit, in miles, was also collapsed into three categories: up to three miles, four to eight miles, and nine or more miles.

The variable, type of road, was collapsed into three categories. These included: freeway, city street, and state and county road. The values, town road, alley and other were not included in the statistical analysis, due to the small numbers each represent.

The variable highest speed driven, was collapsed into three categories. These categories were: up to 60 miles per hour; 70 to 90 miles per hour; and 100 or more miles per hour.

The variable number of vehicles in an accident, was collapsed into two categories. The first category includes one vehicle and the other category includes two or more vehicles.

In order to determine if the number of pursuit related injuries was different between the high and low population density areas, all reported injuries were counted in each population density area. The designation between minor injury and serious injury was not be considered.

The variable type of arrest, was condensed into two categories: traffic and criminal. Traffic includes arrests for OUIL, fleeing and eluding, suspended license and having no operators license. Traffic also includes citation issued and suspect released. In Michigan, OUIL and driving a motor vehicle while the operator's license is suspended can result in punishments which could be classified as misdemeanors. As most people associate these offenses with traffic, they

were included in the traffic category. The criminal category includes felony and misdemeanor arrests.

In several questions, the options available to the respondents were such that the respondents had to choose from two choices, when their response fell between two given options. An example of this is the question requesting the highest speed attained during the pursuit. The options were given in increments of 10 miles per hour, i. e. 60, 70, 80 and so forth. If the highest speed attained was actually 75 miles per hour, the respondent had to choose between the given options of 70 and 80 miles per hour. Another example is the question concerning the distance from the suspect at the start of the pursuit. The options given included 200 feet, 300 feet, and 500 feet. If the patrol officer was 400 feet from the suspect at the start of the pursuit, again the officer had to choose between the values given. Instructions were not provided to the officers concerning which value should be marked in these types of situations.

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 analyzed using the Statistical Package for the Social Sciences (SPSS).

The intent of this analysis was to determine differences in police pursuits occurring in different

population density areas. Analysis was accomplished primarily through the use of cross-tabulations, chi-square tests, Z test, Lambda, and Phi. The statistical significance of these tests will be set at the .05 probability level.

The tables in Chapter V may not equal 100 percent due to rounding. For ease of understanding, the discussion of the findings and tables in Chapter V will contain percentages which have been rounded up or down. Those decimal numbers of five and over will be rounded to the next whole number, while decimal numbers of four or less will be rounded down to the whole number.

Conclusion

This thesis is based upon the police vehicular pursuit section of the MERS. The population for the survey was the road patrol officers and motor carrier officers of MSP. The respondents were to record every police pursuit they were involved in between June 23, 1991 and May 31, 1992. The survey instrument contained 58 questions, on a computer readable form.

To determine if police pursuits differ in different populations density areas, the population density for each of the MSP districts was calculated using 1990 U. S. Census Bureau information. The MSP districts were grouped into two population density areas for purposes of statistical

analysis. The high and low population density areas were determined by using the median of the population densities of the eight MSP districts. Analysis will be done using cross-tabulation, chi-square, Z test, Lambda and Phi statistics.

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Chapter V

Data Analysis

Introduction

Data analysis will be presented in this chapter. Population density of each Michigan State Police (MSP) district was calculated (see Appendix A for a map of the MSP district boundaries). The districts were then divided into two population density areas for comparison purposes (see Appendix A for a map of the population density areas). Using data from the Michigan Emergency Response Study (MERS), a police pursuit profile for each population density area was developed. Several characteristics will be compared between the population density areas, to test the hypotheses.

Pursuits by the Michigan State Police

The Michigan State Police (MSP) reported 197 police pursuits between June 23, 1991 and May 31, 1992. The breakdown of police pursuits by MSP district is shown in Table 5.1. District 2 reported the highest number of pursuits (74, 38%) of the pursuits, while District 1 reported the least pursuits (36, 18%).

Table 5.1

Number and Percent of Pursuits by MSP District

MSP District	n	(%)
2	74	37.6
8	36	18.3
3	29	14.7
6	18	9.1
5	16	8.1
4	11	5.6
7	8	4.1
1	5	2.5
Total	197	100.0

Population Density Areas

To calculate the population density for the eight MSP districts, population and land area for each district was first determined. The counties and other governmental entities within each district were determined by using official MSP maps, (see Appendix A for a map of the MSP district boundaries). After determining district boundaries, population was calculated using the 1990 United States Census (U. S. Bureau of the Census, 1991). Land area in square miles was determined for each district using

information from the U. S. Bureau of the Census (1991). After determining the population and land area for each district, population density was calculated by dividing total district population by total district land area. The population, land area, and population density per square mile, for each of the eight MSP districts, are shown in Table 5.2

Table 5.2

Population Density of MSP Districts

District	Population	Land Area (sq. miles)	Density (persons/sq. mile)
1	644,325	3,957.8	162.8
2	4,474,823	3,952.9	1,132.0
3	1,120,048	8,426.5	132.9
4	500,405	3,551.8	140.9
5	701,476	3,988.0	175.9
6	1,092,750	6,797.4	160.8
7	377,785	9,714.4	38.9
8	313,915	16,420.6	19.1
<u>Total</u>	<u>9,225,527</u>	<u>56,809.4</u>	<u>245.4</u>

For the purpose of this paper, the MSP districts were collapsed into two population density areas. The two groups

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were designated as the high population density area and the low population density area. The two areas were determined by calculating the median population density for the eight districts combined. The median was used because the extreme high value skewed the mean calculation. The median lies between the fourth and fifth positions, which are 160.8 and 140.9 people per square mile. Districts 1, 2, 5, and 6 will be in the high population density area and Districts 3, 4, 7, and 8 will comprise the low population density area. The two population density areas are depicted in Table 5.3 (see Appendix A for a map of the population density areas).

Table 5.3

High And Low Population Density Areas

Density Area	Population	Land Area (sq. mi.)	Density (persons/sq. mile)	MSP Districts
High	6,913,374	18,696.1	369.8	1, 2, 5, 6
Low	2,312,153	38,113.3	60.7	3, 4, 7, 8

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Table 5.4

Number and Percent of Pursuits in High and Low Population
Density Areas

Density Area	n	(%)
High	113	57.4
Low	84	42.6

The MERS pursuits by population density area are shown in Table 5.4. The high population density area reported 57 percent of all pursuits. The low population density area reported 43 percent of the pursuits during the study period.

Description of Police Pursuit Parameters by Population
Density Areas

The characteristics of police pursuits by population density areas will be discussed in this section. The frequency distribution of the variables will be presented to develop a pursuit profile for each population density area.

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Table 5.5

Number and Percent of Pursuits by Day of Week and PopulationDensity Area

Day	Density Area			
	High		Low	
	n	(%)	n	(%)
Fri	21	18.8	9	10.7
Sun	17	15.2	14	16.7
Mon	16	14.3	11	13.1
Wed	16	14.3	16	19.0
Thurs	16	14.3	12	14.3
Sat	15	13.4	17	20.2
Tues	11	9.8	5	6.0

As shown in Table 5.5, the largest proportion of the pursuits (19%) occurring in the high population density area were on Friday. The second most frequent day on which pursuits occurred in the high population density area is Sunday (15%). In the low population density area, the largest proportion of the pursuits (20%) occurred on Saturday, while Wednesday (19%) was the second most frequent day.

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Table 5.6

Number and Percent of Pursuits by Starting Time Period and
Population Density Area

Time	Density Area			
	High		Low	
	n	(%)	n	(%)
0001-0300	35	31.0	30	35.7
0301-0600	15	13.3	10	11.9
1201-1500	14	12.4	3	3.6
1501-1800	13	11.5	6	7.1
1801-2100	13	11.5	7	8.3
0901-1200	9	8.0	5	6.0
2101-0000	8	7.1	17	20.2
0601-0900	6	5.3	6	7.1

In both population density areas, the most frequent starting time period was 0001 to 0300 hours, 31 percent in the high population density area and 36 percent in the low population density area. In the high population density area, the second most frequent (13%) time period was the 0301 to 0600 time period. In the low population density area, the second most frequent (20%) starting time period

was the 2101 to midnight time period. This is shown in Table 5.6.

Table 5.7

Number and Percent of Pursuits by Road Type and Population Density Area

Road Type	Density Area			
	High		Low	
	n	(%)	n	(%)
City Street	40	36.0	9	10.7
Freeway	30	27.0	10	11.9
County Trunk	22	19.8	23	27.4
State Trunk	11	9.9	37	44.0
Town Road	6	5.4	4	4.8
Alley	1	0.9	0	0.0
Other	1	0.9	1	1.2

As indicated in Table 5.7, most pursuits occurred on city streets (36%) in the high population density area. Freeways (27%) were the second most frequent road type for pursuits in the high population density area. In the low population density area, 44 percent of the reported pursuits took place on state trunk roadways. County roads (27%) were

the second most frequent road type in the low population density area.

Table 5.8

Number and Percent of Pursuits by Number of Lanes and Population Density Area

Number Lanes	Density Area			
	High		Low	
	n	(%)	n	(%)
2	73	64.6	54	64.3
3	14	12.4	4	4.8
4, expressway	8	7.1	4	4.8
4, not divided	7	6.2	2	2.4
4, side streets	7	6.2	17	20.2
Other	3	2.7	3	3.6
5 or more	1	0.9	0	0.0

Sixty-five percent of the pursuits in the high population density area and 64 percent of the pursuits in the low population density area took place on two lane roadways, as shown in Table 5.8. This is not surprising,

considering 66 percent of the pursuits in high population density area and 82 percent of the pursuits in the low population density area occurred on state roads, county roads or city streets, which traditionally are two lane roadways.

Table 5.9

Number and Percent of Pursuits by Length in Minutes and Population Density Area

Minutes	Density Area			
	High		Low	
	n	(%)	n	(%)
1 - 3	39	34.5	20	23.8
4 - 6	37	32.7	21	25.0
Less than 1	11	9.7	18	21.4
10 - 12	11	9.7	8	9.5
15 or more	6	5.3	10	11.9
7 - 9	5	4.4	6	7.1
13 - 15	4	3.5	1	1.2

As shown in Table 5.9, 35 percent of the pursuits in the high population density area lasted from one to three minutes and 77 percent lasted six minutes or less. In the

low population density area, 25 percent lasted four to six minutes and 70 percent lasted six minutes or less. Twelve percent were reported as lasting 15 minutes or longer in the low population density area.

Table 5.10

Number and Percent of Pursuits by Distance in Miles and Population Density Area

Miles	Density Area			
	High		Low	
	n	(%)	n	(%)
2	25	22.3	9	10.7
1 or less	19	17.0	23	27.4
9 or more	19	17.0	19	22.6
3	17	15.2	9	10.7
5	12	10.7	5	6.0
4	9	8.0	5	6.0
6	6	5.4	7	8.3
7	3	2.7	3	3.6
8	2	1.8	4	4.8

In the high population density area, 22 percent of the pursuits lasted two miles, whereas 17 percent were one mile or less in length. Seventy-three percent lasted five miles or less. Seventeen percent, however, lasted nine or more miles.

In the low population density area, as shown in Table 5.10, 27 percent of the pursuits lasted one mile or less. Pursuits lasting nine miles or more (23%) were the second most frequent. Sixty-one percent of the pursuits were five miles or less in length, in the low population density area.

Table 5.11

Number and Percent of Pursuits by Highest Speed Attained and
Population Density Area

Speed (mph)	Density Area			
	High		Low	
	n	(%)	n	(%)
105 or more	27	23.9	22	26.2
70	21	18.6	2	2.4
80	20	17.7	12	14.3
60	12	10.6	6	7.1
90	12	10.6	21	25.0
100	10	8.8	17	20.2
50	7	6.2	2	2.4
40 or less	4	3.5	2	2.4

As shown in Table 5.11, in both population density areas, the most frequent highest speed attained was 105 miles per hour or more. In the high population density area, 24 percent attained this speed, while in the low population density area, 26 percent reached this speed. The next most frequent speed attained, in the high population density area, was 70 miles per hour (19%). In the low

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population density area, the second most frequent speed attained was 90 miles per hour. In the high population density area, 20 percent were at speeds of 60 miles per hour or less. In the low population density area, 12 percent of the pursuits were conducted at speeds of 60 miles per hour or less.

Table 5.12

Number and Percent of Pursuits in Posted Speed Zones and Population Density Area

Posted Speed Limit (mph)	Density Area			
	High		Low	
	n	(%)	n	(%)
55	48	42.5	54	64.3
65	16	14.2	12	14.3
25	12	10.6	6	7.1
35	12	10.6	3	3.6
45	8	7.1	4	4.8
30	7	6.2	0	0.0
50	7	6.2	2	2.4
40	3	2.7	2	2.4
15	0	0.0	1	1.2

As shown in Table 5.12, the most frequent posted speed during the pursuits, in both population density areas, was 55 miles per hour. Forty-three percent in the high population density area and 64 percent in the low population density area. The second most frequent posted speed, in both areas, was 65 miles per hour.

Table 5.13

Number and Percent of Pursuits Using Emergency Lights and Siren by Population Density Area

Emergency Equipment	Density Area			
	High		Low	
	n	(%)	n	(%)
Light & siren	96	84.9	40	48.2
Light, no siren	8	7.0	10	12.0
Light, siren as needed	3	2.7	6	7.2
Light as needed, no siren	2	1.8	2	2.4
No light, siren	2	1.8	0	0.0
No light, no siren	2	1.8	23	27.8
Light as needed, siren as needed	0	0.0	2	2.4

As displayed in Table 5.13, lights and siren were used in 85 percent of the pursuits in the high population density area and in 48 percent of the pursuits in the low population density area. In 28 percent of the pursuits in the low population density area, no emergency equipment was used.

Table 5.14

Number and Percent of Pursuits by Officer Age Group and Population Density Area

Age Group	Density Area			
	High		Low	
	n	(%)	n	(%)
26 - 30	44	38.9	21	25.0
31 - 35	27	23.9	11	13.1
21 - 25	13	11.5	5	6.0
41 - 45	12	10.6	25	29.8
36 - 40	9	8.0	19	22.6
46 - 50	6	5.3	2	2.4
18 - 20	1	0.9	0	0.0
51 or more	1	0.9	1	1.2

In the high population density area, 39 percent of the officers were 26 to 30 years old and 24 percent were 31 to

35 years old. In the low population density area, 30 percent of the officers were 41 to 45 years old. The second most frequent age group, in the low population density area, was the 26 to 30 year old group. This is shown in Table 5.14.

Table 5.15

Number and Percent of Pursuits by Years of Police Seniority and Population Density Area

Years Seniority	Density Area			
	High		Low	
	n	(%)	n	(%)
1 - 3	33	29.2	18	21.4
4 - 5	28	24.8	16	19.0
6 - 10	18	15.9	6	7.1
11 - 15	17	15.0	14	16.7
20 -24	8	7.1	9	10.7
16 - 20	6	5.3	21	25.0
25 or more	3	2.7	0	0.0

In the high population density area, the largest percentage of officers had one to three years of police seniority. The second most frequent was four to five years

of police seniority. This is depicted in Table 5.15. In the low population density area, 25 percent of the officers had 16 to 20 years of police seniority. The second most frequent seniority group, in the low population density area, was one to three years seniority. This is not surprising, when one considers the age of the officers as portrayed in Table 5.14.

Table 5.16

Number and Percent of Pursuits by Initiating Reason and Population Density Area

Initiating Reason	Density Area			
	High		Low	
	n	(%)	n	(%)
Other Traffic	31	27.7	12	20.7
Speed	30	26.8	23	39.7
Felony, Known	18	16.1	8	13.8
OUIL	11	9.8	3	5.2
Felony, Suspected	10	8.9	4	6.9
Misdemeanor, Known	6	5.4	3	5.2
Other	4	3.6	1	1.7
Misdemeanor, Suspected	2	1.8	4	6.9

In the high population density area, other traffic violations, not speeding or operating under the influence of liquor (OUIL), were the most frequent reason for initiating the pursuit (28%). Speeding was the second most frequent reason (27%) for initiating pursuits in the high population density area. The most frequent reason the pursuit was initiated in the low population density area was for speeding (40%). The next most frequent initiating reason, 21 percent, was for traffic violations, which were not speeding or OUIL violations. Known felonies were the initiating reason for 16 percent of the pursuits in the high population density area and for 14 percent of the pursuits in the low population density area.

Table 5.17

Number and Percent of Pursuits by Distance from Suspect at Start and Population Density Area

Distance	Density Area			
	High		Low	
	n	(%)	n	(%)
1 - 50 feet	61	54.5	12	20.3
100 feet	15	13.4	6	10.2
500 feet	14	12.5	13	22.0
300 feet	10	8.9	3	5.1
¼ mile	5	4.5	12	20.3
More ¼ mile	4	3.6	4	6.8
200 feet	3	2.7	7	11.9
½ mile	0	0.0	2	3.4

As shown in Table 5.17, the most frequent distance the police officer was from the suspect at the beginning of the pursuit, in the high population density area, was 1 to 50 feet (55%). In the low population density area, 500 feet (22%) was the most frequent distance the police officer was from the suspect at the beginning of the pursuit.

Table 5.18

Number and Percent of Pursuits by Suspects' Age and
Population Density Area

Age (years)	Density Area			
	High		Low	
	n	(%)	n	(%)
21 - 25	36	31.9	18	30.5
15 - 20	31	27.4	9	15.3
26 - 30	24	21.2	13	22.0
Unknown	8	7.1	6	10.2
36 - 40	7	6.2	4	6.8
31 - 35	4	3.5	6	10.2
41 or more	2	1.8	1	1.7
Less than 15	1	0.9	2	3.4

Suspects between 21 and 25 years old represented the most frequent suspect age group in both population density areas. This is shown in Table 5.18. In the high population density area, this age group represented 32 percent of the suspects and in the low population density area, it represented 31 percent of the suspects. In the high population density area, the second most frequent suspect

age group was 15 through 20 years old (27%). In the low population density area, the second most frequent suspect age group was 26 through 30 years old (22%).

Table 5.19

Number and Percent of Pursuits by Suspects' Race and Population Density Area

Race	Density Area			
	High		Low	
	n	(%)	n	(%)
White	60	54.1	49	83.1
Black	49	44.1	4	6.8
Unknown	2	1.8	3	5.1
Hispanic	0	0.0	3	5.1

In the high population density area, 54 percent of the suspects were white and 44 percent of the suspects were black. In the low population density area, 83 percent of the suspects were white. This is depicted in Table 5.19.

Table 5.20

Number and Percent of Pursuits by Terminating Reason and
Population Density Area

Terminating Reason	Density Area			
	High		Low	
	n	(%)	n	(%)
Suspect apprehended	49	45.8	26	45.6
Suspect accident	26	24.3	9	15.8
Suspect escapes	11	10.3	13	22.8
Officer decision	7	6.5	0	0.0
Suspect surrenders	5	4.7	6	10.5
Officer accident	4	3.7	0	0.0
Other	4	3.7	3	5.3
Supervisor decision	1	0.9	0	0.0

As shown in Table 5.20, both population density areas reported 46 percent of the pursuits ending with the apprehension of the suspect. The next most frequent reason for termination of the pursuit, in the high population density area, was the involvement of the suspect in an accident (24%). In the low population density area, the second most common reason for the termination of the pursuit was the escape of the suspect (23%).

Table 5.21

Number and Percent of Pursuits by Official Action/Arrest by
the Police and Population Density Area

Arrest	Density Area			
	High		Low	
	n	(%)	n	(%)
Felony	34	37.8	13	28.3
Fleeing & eluding	33	36.7	13	28.3
OUIL	12	13.3	8	17.4
Citation & release	6	6.7	6	13.0
Misdemeanor	3	3.3	4	8.7
Suspended license	1	1.1	2	4.3
No driver's license	1	1.1	0	0.0

In the high population density area, felony arrests accounted for almost 38 percent of the arrests made. This is closely followed by fleeing and eluding arrests (almost 37%). As shown in Table 5.21, felony arrests and fleeing and eluding arrests each accounted for 28 percent of the arrests made in the low population density area.

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Table 5.22

Number and Percent of Pursuits Using Police Offensive
Actions and Population Density Area

Police Action	Density Area			
	High		Low	
	n	(%)	n	(%)
Boxed-in suspect	31	27.4	17	28.8
Rammed suspect	3	2.7	3	5.1
Road block	2	1.8	8	13.6

Methods that the police may use against a suspect in an attempt to terminate a pursuit are shown in Table 5.22. Twenty-seven percent of the pursuits in the high population density area involved boxing-in the suspect. In the low population density area, almost 29 percent of the pursuits utilized such a technique.

In the high population density area, almost three percent of the pursuits involved the police ramming the suspect. Five percent of the pursuits in the low population density area employed ramming.

In almost two percent of the pursuits occurring in the high population density area, a road block was used. A road block was implemented in almost 14 percent of the pursuits which occurred in the low population density area.

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Table 5.23

Number and Percent of Pursuits by Defensive Driving Actions
by the Suspect and Population Density Area

Suspect Action	Density Area			
	High		Low	
	n	(%) ^a	n	(%) ^b
Run stop sign	70	61.9	33	56.9
Run red light	48	42.5	11	19.3
Drive wrong way	29	25.9	12	20.7
Turn off headlight	8	7.2	10	17.2

^aColumn may total more than 100, as a suspect could have participated in more than one action. ^bColumn may total more than 100, as a suspect could have participated in more than one action.

In the high population density area, 62 percent of the suspects ran a stop sign and 43 percent ran a red light in order to evade the police. As shown in Table 5.23, seven percent of the suspects turned off the vehicle headlights to escape the police, while 26 percent drove the wrong way on a one way road.

In the low population density area, 57 percent failed to stop at a stop sign and 19 percent failed to stop at a red light while fleeing the police. Turning off the

vehicles' headlights was used by 17 percent of the suspects in order to avoid the police. Twenty-one percent of the suspects drove the wrong way on a one way road while eluding the police in the low population density area.

Table 5.24

Number and Percent of Pursuits by Accidents and Population Density Area

Accidents	Density Area			
	High		Low	
	n	(%)	n	(%)
No accident	63	55.8	69	82.1
Accident	50	44.2	15	17.9

Forty-four percent of all pursuits in the high population density area resulted in an accident, as portrayed in Table 5.24. In the low population density area, 18 percent of the pursuits resulted in an accident.

Table 5.25

Number and Percent of Pursuits by Who Was Involved in the
Accident and Population Density Area

Who Involved	Density Area			
	High		Low	
	n	(%)	n	(%)
Suspect only	24	48.0	7	46.7
Police & suspect	10	20.0	7	46.7
Suspect & third party	8	16.0	1	6.7
Police only	4	8.0	0	0.0
Police, suspect & third party	4	8.0	0	0.0

In the high population area, the suspect alone was involved in 48 percent of the accidents. In 20 percent of the accidents, the police and suspect were both involved in the accident. As shown in Table 5.25, in the low population density area, the suspect alone was involved in 47 percent of the accidents. This is the same percentage for the accidents in which both the police and suspect were involved.

Table 5.26

Number and Percent of Pursuits by Number of Vehicles in Each
Accident and Population Density Area

# Vehicles	Density Area			
	High		Low	
	n	(%)	n	(%)
1	25	50.0	8	53.3
2	17	34.0	6	40.0
3	4	8.0	1	6.7
4	2	4.0	0	0.0
5	1	2.0	0	0.0
6 or more	1	2.0	0	0.0

As shown in Table 5.26, in the high population density area, 50 percent of the accidents involved one vehicle and 34 percent involved two vehicles. In the low population density area, 53 percent of the accidents involved one vehicle and 40 percent involved two vehicles.

Table 5.27

Number and Percent of Pursuits by Parties Injured in
Accidents and Population Density Area

Who Injured	Density Area			
	High		Low	
	n	(%)	n	(%)
Suspect	13	52.0	7	63.6
Third Party	6	24.0	1	9.1
Police	4	16.0	1	9.1
Pedestrians	2	8.0	2	18.2

There were 31 reported injury accidents, in which 36 people were injured. There was one fatality as the result of the reported pursuits. The fatality was to a third party, who was not directly involved in the pursuit.

In the high population density area, as shown in Table 5.27, 52 percent of the injured persons were suspects and 24 percent were third party persons. In the low population density area, 64 percent of the injured people were suspects.

Summary of the Police Pursuit Profile in the High and Low Population Density Areas.

Analysis of the data, described in Table 5.5 through Table 5.27, reveals a profile of the MERS police pursuit in each of the population density areas. A summary of the profile is provided in Table 5.28. For each population density area, this table includes the mode for each of the variables discussed in Table 5.5 through Table 5.27. If there is more than one mode, all are included. As only the mode is represented, one must be cautious when interpreting the data, as other values may be very similar to the mode value.

Table 5.28

Police Pursuit Profile Summary in High and Low Population
Density Areas

Variable	Population Density Area	
	High	Low
Day of week	Friday	Saturday
Time of day	0001-0300	0001-0300
Road type	City street	State trunk
Number lanes	2	2
Length (minutes)	1 - 3	4 - 6
Distance (miles)	2	1 or less
Maximum speed (mph)	105 or more	105 or more
Posted speed (mph)	55	55
Emergency equipment	Light & siren	Light & siren
Officer age (years)	26 - 30	41 - 45
Officer seniority	1 - 3 years	16 - 20 years
Initiating reason	Other traffic violations	Speeding
Distance from suspect at start	1 - 50 feet	500 feet

(table continues)

Table 5.28 (cont'd).

Variable	Population Density Area	
	High	Low
Suspect age (years)	21 - 25	21 - 25
Suspect race	White	White
Terminating reason	Suspect apprehended	Suspect apprehended
Action taken	Felony arrest	Felony arrest; Fleeing & Eluding arrest
Police driving action	Boxed-in suspect	Boxed-in suspect
Suspect action	Ran stop sign	Ran stop sign
Who involved in accidents	Suspect only	Suspect only; Police & suspect
Number vehicles in accidents	1	1
Who injured in accidents	Suspect	Suspect

As shown in Table 5.28, many variables are the same between population density areas. Some differences between the population density areas do exist. The variables that are different include: 1) length of pursuit in minutes; 2) distance of the pursuit in miles; 3) age of the officer; 4) years of police seniority of the officer; 5) the initiating

reason; and 6) the officer's distance from the suspect at the start of the pursuit.

The most frequent length of the pursuit in the high population density area, was one to three minutes, whereas in the low population density area, the length was four to six minutes. Surprisingly, the most frequent recorded distance in the high population density area was two miles, compared to one mile or less reported in the low population density area. This is confusing, until one remembers that the mode is being used to compile the typical pursuit profile for each population density area. As the mode is being used, the frequencies could be very similar and may not show a significant difference when analyzed.

Differences between the high and low population density areas were reported in the age of the officer and the years of police seniority. In the high population density area, the officer was reported to be 26 to 30 years old, with three years police seniority. In the low population density area, the most frequent recorded officer age was 41 to 45 years old, with 16 to 20 years police seniority.

The initiating reason was also reported as different between the two population density areas. Both report traffic reasons as the most frequent reason to pursue a suspect; however, in the high population density area, traffic violations other than speeding and OUIL is the most frequent reason. In the low population density area,

speeding was the most frequently cited reason for initiating the pursuit.

In the high population density area, officers reported being 1 to 50 feet from the suspect at the start of the pursuit. In the low population density area, the officer was 500 feet from the suspect at the beginning of the pursuit.

In the next section of this chapter, the hypotheses will be tested. This is being done to determine if significant differences exist between the two population density areas.

Comparison of Characteristics of High and Low Population Density Areas

Several variables from the MERS will be compared between the two different population density areas. The variables that will be analyzed include: 1) pursuit initiation reasons; 2) period in week; 3) time period of day; 4) length of pursuits, both in minute intervals and in mile intervals; 5) the type of roads on which the pursuits occur; 6) maximum speed attained; 7) rate of suspect escape; 8) accident rates; 9) number of vehicles involved in each accident; 10) rate of pursuit related accident injuries; and 11) type of arrest made.

Due to small numbers of responses for some values, it is necessary to collapse the variables for statistical

analysis. Such variable transformation can allow the data to be described in a more meaningful way.

Table 5.29

Initiating Reason for Pursuit by Population Density Area

Reason	Density Area	
	High	Low*
	n	n
Traffic	72	38
Criminal	36	19

* $\chi^2 (1) = .000, p > .05$

The initiating reason for pursuits by population density area is presented in Table 5.29. The collapsed category, traffic includes speeding, OUIL, and other traffic violations. The category, criminal includes suspected misdemeanor, known misdemeanor, suspected felony and known felony. There is no significant difference [$\chi^2 (1) = .000, p > .05$] between population density area and the reason the pursuit was initiated. The hypothesis stating a difference exists between population density area and initiating reason is not substantiated.

Table 5.30

Period in Week of Incident Occurrence by Population Density Area

Week Period	Density Area	
	High	Low*
	n	n
Weekday	59	44
Weekend	53	40

* $\chi^2 (1) = .002, p > .05$

There is no significant difference [$\chi^2 (1) = .002, p > .05$] between the period in the week that the pursuit is initiated and population density area, as shown in Table 5.30. The weekday variable includes Monday, Tuesday, Wednesday, and Thursday. The weekend variable includes Friday, Saturday, and Sunday. The hypothesis that stated that no difference existed between population density area and period of week is substantiated.

Table 5.31

Time Period of Pursuit by Population Density Area

Time Period	Density Area	
	High	Low*
	n	n
1801 - 0600	71	64
0601 - 1800	42	20

* $\chi^2 (1) = 3.987, p < .05, \Phi = .142$

The time period in which the pursuits were initiated is shown in Table 5.31. There is a significant difference [$\chi^2 (1) = 3.987, p < .05, \Phi = .142$] between the high and low population density areas and the time period in which the pursuit occurs. The strength of the relationship between time period and population density area is not strong, as revealed by the Phi value of .142. The hypothesis stating that no difference exists between time period of day and population density area is not substantiated. In the high population density area, more pursuits will occur during the 0601 to 1800 hour period than will occur during that same time period in the low population density area.

Table 5.32

Duration of Pursuit in Minute Interval Groups by Population
Density Area

Minute Intervals	Density Area	
	High	Low*
	n	n
Up to 3	50	38
4 - 9	42	27
10 or more	21	19

* $\chi^2 (2) = .744, p > .05$

The length of the pursuit in minute interval groupings is shown in Table 5.32. There is no significant difference [$\chi^2 (2) = .744, p > .05$] between the high and low population density areas and the length of the pursuit in minute intervals. The hypothesis stating that a difference exists between duration of pursuits in minutes and population density area is not substantiated.

Table 5.33

Duration of Pursuit in Mile Interval Groupings by Population Density Area

Mile Intervals	Density Area	
	High	Low*
	n	n
Up to 3	61	41
4 - 8	32	24
9 or more	19	19

* $\chi^2 (2) = 1.087, p > .05$

The duration of the pursuit in mile interval groupings is shown in Table 5.33. There is no significant difference [$\chi^2 (2) = 1.087, p > .05$] between the high and low population density areas and the duration of the pursuit in mile intervals. The hypothesis that stated that a difference exists between the length of the pursuit in miles and population density area is not substantiated.

Table 5.34

Type of Roadway During the Pursuit by Population Density Area

Type of Road	Density Area	
	High	Low*
	n	n
Freeway	30	10
City street	40	9
State & county roads	33	60

* $\chi^2 (2) = 34.893$, $p < .05$, $\lambda = .079$

The type of roadway on which the pursuit occurred, is shown in Table 5.34. There is a significant difference [$\chi^2 (2) = 34.893$, $p < .05$, $\lambda = .079$] between population density area and the type of roadway upon which the pursuit is conducted. The strength of the association is not very strong as shown by the Lambda value of .079. The hypothesis stating no difference exists between the type of roadway on which the pursuit occurs and population density area is not substantiated. In the high population density area, more pursuits will occur on city streets than in the low population area where pursuits occur on state and county roads.

Table 5.35

Grouped Highest Speed Attained by Population Density Area

Speed Group (mph)	Density Area	
	High	Low*
	n	n
Up to 60	23	10
70 - 90	53	35
100 or more	37	39

* $\chi^2 (2) = 4.688, p > .05$

The highest speed attained, in collapsed categories, is shown in Table 5.35. There is no significant difference [$\chi^2 (2) = 4.688, p > .05$] in the highest speed attained and population density area. The hypothesis stating that a difference exists between the maximum speed reached during a police pursuit and population density area is not substantiated.

Table 5.36

Rate of Escape of Suspects by Population Density Area

Escapes	Density Area	
	High	Low*
	n	n
# Escapes	11	13
# pursuits ^a	107	57
Escape %	10.28	22.81

^aNot all respondents answered this question, N = 164.

* $Z = 2.16$, $p < .05$

The rate of the escape of the suspect is shown in Table 5.36. There is a significant difference [$Z = 2.16$, $p < .05$] between the rate of escape of suspects and population density area. The hypothesis stating a difference exists between the rate of escape by the suspect and population density area is substantiated. There are substantially more escapes in the low population density area than in the high population density area.

Table 5.37

Police Pursuit Accident Rate by Population Density Area

Accident	Density Area	
	High	Low*
	n	n
Accident Occurred	50	15
Total pursuits	113	84
Accident %	44.25	17.86

* $Z = 3.90$, $p < .05$

The rate of accidents in high and low population density areas is shown in Table 5.37. There is a significant difference [$Z = 3.90$, $p < .05$] between accident rate and population density area. The hypothesis stating a difference exists between accident rate and population density area is substantiated. There are substantially more pursuit related accidents occurring in the high population density area than in the low population density area.

Table 5.38

Number of Vehicles Involved in Accidents by Population
Density Area

# Vehicles	Density Area	
	High	Low*
	n	n
1	25	8
2 or more	25	7

* $\chi^2 (1) = .051, p > .05$

The number of vehicles which are involved in police pursuit accidents in different population density areas is shown in Table 5.38. There is no significant difference [$\chi^2 (1) = .051, p > .05$] between the number of vehicles in pursuit related accidents and population density area. The hypothesis stating a difference exists between the number of vehicles involved in each pursuit related accident and population density area is not supported.

Table 5.39

Rate of Injuries in Pursuit Related Accidents by Population
Density Area

Injuries	Density Area	
	High	Low*
	n	n
Total injuries	25	11
Total accidents	50	15
Injury %	50.00	73.33

* $Z = 1.59$, $p > .05$

The rate of personal injury in the total number of accidents in each population density area is shown in Table 5.39. There is no significant difference [$Z = 1.59$, $p > .05$] between the rate of injuries in pursuit related accidents and population density area. The hypothesis stating a difference exists between the number of pursuit related injuries and population density area is not supported.

Table 5.40

Classification of Arrest Made by Population Density Area

Arrest Type	Density Area	
	High	Low*
	n	n
Traffic	53	29
Criminal	37	17

* $\chi^2 (1) = .22, p > .05$

The type of arrest made, in each population density area, by the classification of traffic and criminal, is shown in Table 5.40. The traffic category includes arrests for OUIL, fleeing and eluding a police officer, driving with a suspended license, and driving with no drivers' license. This category also includes those suspects who were cited and released by the officer. The criminal category includes misdemeanor and felony arrests. As shown in Table 5.40, there is no significant difference [$\chi^2 (1) = .22, p > .05$] between the type of arrest and population density area. The hypothesis stating a difference exists between the type of arrest made and population density area is not supported.

Summary of Data Analysis

Data analysis, using data from the MERS, was presented in this chapter. It was found that very few variables

differ between the high and low population density areas in the pursuit profile. The profile differences between population density areas were found in: length of the pursuit in minutes, duration of the pursuit in miles, age of the officer, officers' police seniority, and distance from the suspect at the start of the pursuit.

Statistical analysis was performed to determine if any significant differences exist between the high and low population density areas. It was found that there are significant differences between population density area and the following categories: time period of occurrence, type of roadway on which the pursuit occurs, the rate of the suspect escaping, and the rate of pursuit related accidents.

Discussion of the findings will occur in Chapter VI. Recommendations will also be addressed in Chapter VI.

Chapter VI

Summary, Conclusions and Recommendations

Introduction

An attempt to answer the research question will be made in this chapter. The research question is: Do the parameters of police pursuits differ in different population density areas? In order to answer this question, the data analysis will be discussed, conclusions drawn and recommendations made concerning police pursuit policy and training.

Summarizing the Police Pursuit Profile

The police pursuit profile developed for each of the population density areas was similar in many ways. When comparing the profiles developed in this study to the profile developed by the California Highway Patrol (CHP), some similarities and some differences are found. CHP reported that most of the pursuits occurred toward the end of the week. This corresponds to Friday and Saturday, which were the mode for the high and low population density areas, respectively.

CHP found that the pursuit will occur between 1500 and 0300 hours. This time period, encompasses the time period in which most of the pursuits occurred in both population density areas, 0001 to 0300 hours.

It was found in the MERS, the duration of the pursuit in minutes was different between the high and low population density areas. The high population density area, reported most pursuits lasting one to three minutes, which is closer to the CHP finding of two minutes. In the low population density area, most pursuits lasted four to six minutes.

The distance the pursuit lasted was different between population density areas. The low population density area, reported most pursuits lasting one mile or less. This corresponds to the one mile distance reported by CHP. Most pursuits in the high population density area lasted two miles.

Traffic violations are the resounding reason for initiating a pursuit. CHP's profile listed this as the reason for pursuits and both MERS population density areas echoed it. The high population density area, reported traffic violations, other than speeding and OUIL, as the most frequent cause of pursuits, while the low population density area, recorded speeding as the most frequent reason for initiating a pursuit.

The suspects in the MERS study, in both population density areas, were reported to be 21 to 25 years of age.

In the CHP profile, the suspects were slightly younger, 20 years of age.

The terminating reason for both MERS population density areas, was the apprehension of the suspect. The CHP profile listed the pursuit being terminated because the pursued driver voluntarily surrendered, was involved in an accident, or outran the police.

Concluding the Police Pursuit Profile in Different Population Density Areas.

The police pursuit profiles in the high and low population density areas have many similarities. Some differences, however, do exist between the police pursuit profile of the different population density areas. These differences include: 1) length of pursuit in minutes; 2) distance of the pursuit in miles; 3) age of the officer; 4) years of police seniority of the officer; 5) the initiating reason; and 6) the officer's distance from the suspect at the start of the pursuit. When the MERS population density area pursuit profiles are compared to the profile developed by the CHP, many similarities exist. Two differences are noted. These are the age of the suspect and the reason the pursuit was terminated.

Discussion of the Results from the Hypotheses Testing

Each hypothesis will be presented, along with the findings from the data analysis. Some discussion will occur comparing the findings of this study to previous police pursuit research. When this comparison occurs, one must remember that previous studies used terms, such as rural, urban, and suburban, to describe the locale. The previous studies did not define the terms used to describe locales nor were the locales defined by population density.

A few of the previous studies presented only raw numbers and/or percentages. Consequently, no statistical analysis is available to determine if differences are significant. Any comparison, therefore, between the current study and previous studies may be conjecture.

Beckman (1986) reported that traffic violations was the most common initiating reason in urban, suburban and rural areas. He did find that the second most common reason in the rural area was OUIL, while in the urban and suburban areas it was criminal activity.

Oechsli (1990) compared pursuits that occurred in Kentucky, which he considered a rural area, to the findings from the Alpert and Dunham study of Metro-Dade County Police Department, which Oechsli considered an urban area. Oechsli reported 74 percent of the pursuits in the rural area were initiated for traffic reasons, compared to 65 percent in the urban area. In the urban area, nine percent were initiated

for felony reasons, compared to six percent in the rural area. No data analysis was done to determine if this difference is significant.

Auten (1991) reported over 50 percent of the pursuits, in each locale were initiated for traffic violations. Auten classified his locales as urban, residential/suburban, and rural.

The findings of the current study, reflect the findings of prior studies that examined initiating reason by locale. It has been found that no difference exists between population density area or locale and the initiating reason for the pursuit.

Fifty-eight percent of the urban pursuits occurred during the weekend period (Auten, 1991). In the rural area, 59 percent of the pursuits occurred on Friday, Saturday or Sunday.

Auten (1991) reported that in urban areas, 88 percent of the pursuits were started between 1800 to 0600 hours. In both the suburban and rural areas, 86 percent were initiated during that time period. No substantial difference is apparent between the time the pursuit was started and locale.

The current study and Auten (1991) found that there is no difference between the period in the week that the pursuit occurs and population density area or locale.

Disagreement, however, exists between the current study and Auten's study concerning the time of day of the pursuit. This study found a difference between time of day and population density area. Auten did not find a difference between time of day and locale.

The CHP found the average distance, in miles, of a pursuit is significantly different between rural, urban and mixed areas. Auten (1991) reported approximately 70 percent of the pursuits in the rural areas were three miles or more in length, whereas in the urban and residential/suburban areas, over 50 percent lasted two miles or less.

Beckman (1986) reported most pursuits in urban and suburban areas lasted one mile, while in rural areas, most pursuits lasted six to ten miles. Pursuits occurring in other areas or in more than one area, lasted 11 to 20 miles.

Oechsli (1990) reported that 78 percent of the pursuits in the urban Florida area were zero to five minutes in length. This is compared to 66 percent of the pursuits in rural Kentucky lasting that long.

The average duration of pursuits in the rural area (12.45 minutes) was substantially longer than the 5.51 minutes in the urban area or the 6.48 minutes in the suburban area (Auten, 1991).

This study found the length of the pursuit, in both minutes and miles, is different between population density areas. This echoes the findings of the CHP, Beckman,

Oechsli, and Auten studies. These studies found a difference in the length of the pursuit and locale.

In urban and suburban areas the majority of pursuits were conducted at speeds ranging from 41 to 60 miles per hour (Beckman, 1986). In rural areas the most common range of speed reached was 61 to 80 miles per hour.

Auten (1991) found higher speeds were reached in rural areas, where 76 percent of all pursuits reached speeds in excess of 80 miles per hour and 27 percent reached speeds in excess of 101 miles per hour. In the urban and the suburban locales, the most common pursuit speed attained was from 41 to 60 miles per hour.

The MERS reported no difference between maximum speed reached and population density area. This is contrary to the findings by Beckman and Auten, who both report a difference between speed and locale.

Oechsli (1990) reported an escape rate in rural Kentucky of twenty-two percent. This is compared to 37 percent escape rate in urban Florida.

Auten (1991) found 21 percent of the suspects escaping in the rural areas, compared to eight percent in suburban areas and none in the urban area.

The MERS findings regarding escape of the suspect is similar to the findings by Oechsli and Auten, who both report a difference between the escape of the suspect and locale. The findings by Oechsli and Auten, however, are

opposite. Oechsli reports a higher urban escape percentage (37%), than rural escape percentage (22%). Auten reports more escapes in rural areas (21%), than in the suburban area (8%) and the urban area (0%). The MERS reports ten percent escape rate in the high density area and 23 percent escape rate in the low density area.

The CHP (1983) reported no significant difference between locale - rural, urban and mixed - and accident rate. Kentucky, seen by Oechsli (1990) as rural, reported an accident rate of twenty-nine percent. He compared this to a rate of 34 percent for Metro-Dade County, which he describes as urban.

Auten (1991) found that rural areas had a 35 percent accident rate, urban areas reported an accident rate of 47 percent and the suburban area reported had an accident rate of forty-one percent. Auten did not perform data analysis, therefore, it is not known if these rates are significantly different.

It was found in the MERS that there is a difference between population density area and accident rate. This finding differs from the finding of the CHP study, which reports no difference between locale and accident rate. Oechsli reported percentages of accidents, that were somewhat similar between locales, however, no statistical test was done to determine the significance. The findings of the MERS does, however, correspond with Auten's findings

concerning accident rate. No statistical test was performed by Auten to determine if a real difference existed.

No previous research examined the number of vehicles involved in each pursuit related accident by locale. No comparison, therefore, can be made between the findings of the MERS and previous research.

The CHP (1983) found no significant difference between locale and accident severity. Beckman (1986) reported injuries were highest in the suburban areas. Rural areas reported the least number of injuries. Beckman, however, does not provide numbers, percentages, or analysis.

Alpert and Dunham (1990) reported an injury rate of 24 percent in urban or suburban areas. In rural areas, the injury rate was eleven percent.

Oechsli (1990) reporting the difference between rural Kentucky and urban Metro-Dade County, Florida, found that the rate of injuries was different. The rate in Kentucky was 5.5 percent, while in Florida the injury rate was fourteen percent.

Auten (1991) reported that eight percent of the pursuits in the urban area, 11 percent of the pursuits in the suburban area and 16 percent of the pursuits in the rural area resulted in personal injury. Again, Auten did not perform statistical analysis to determine if the differences are significant.

In the current study, no difference was found between the number of pursuit related accident injuries and population density areas. This finding is similar to the CHP finding of no difference between accident injury and locale.

Several other findings reported percentage differences between locale and accident injury rate. Beckman (1986), Alpert and Dunham (1990), Oechsli (1990), and Auten (1991) all report differences between injuries and locale. No statistical analysis, however, was performed in these studies to determine the significance.

Beckman (1986) reported that in urban areas, arrests for traffic violations occurred most often. In suburban areas, reckless driving arrests were the most frequent, followed equally by arrests for violent felonies and OUIL. In rural areas, reckless driving was the most frequent arrest, followed by arrests for violent felonies. Beckman does not provide numbers, percentages, or data analysis.

Auten (1991) reported 49 percent of the arrests were for traffic violations in the urban area. In the suburban area, 48 percent of the arrests were for traffic violations. In the rural area, 68 percent of the arrests made were for traffic violations. No analysis was performed to determine if the differences were significant.

The current study found no difference between the type of arrest made following a pursuit and population density

area. This finding corresponds to the findings reported by Beckman and Auten, who both report no difference between the type of arrest and locale.

Conclusion of Hypotheses Testing Summary.

The findings from the discussion of the analysis of the hypotheses revealed several differences. The following differences were found between the high and low population density areas:

- 1) The time period of the day in which the pursuits occurred. In the high population density area, more pursuits will occur during the 0601 to 1800 hour period than will occur during that same time period in the low population density area. This differs from the one previous study, (Auten, 1991), that examined period of day and locale.

- 2) The type of roadway on which the pursuits occurred. In the high population density area, more pursuits will occur on city streets than in the low population area where pursuits occur on state and county roads. No previous study reported findings concerning this variable and locale.

- 3) The rate of escape. There are substantially more escapes in the low population density area than in the high population density area. This finding is supported by the findings of Oechsli (1990) and Auten (1991) who examined escape rate and locale.

4) The rate of accidents. There are substantially more pursuit related accidents occurring in the high population density area than in the low population density area. This finding is supported by Oechsli (1990) and Auten (1991). California Highway Patrol (1983) differs from the MERS finding.

Summarized above, are the findings of the MERS study, as it relates to the hypotheses and is compared to previous studies. There is some agreement and some disagreement between the findings of the current study and those of previous studies. Further research needs to be undertaken concerning population density area and police pursuits. This will allow additional data to be available for analysis and comparison.

Conclusion

Two caveats must be made at this time. The caveats are: 1) the definition given to the high and low population density areas; and 2) the generalizability of the findings.

The population density areas were defined by the total population of an area divided by the total square miles of land in that same area. This process may have allowed some low density segments, such as farm land, to be included in the high population density area and some high population density segments, such as a medium sized city, to be included in the low population density area. The study did

not allow for a separation of these portions from the surrounding area. An example of this is the inclusion of a county with a population of 430,459 (U. S. Bureau of the Census, 1991) in the low population density area. This county is included in a MSP district which encompasses predominately rural areas. The MSP district population density, for this particular MSP district, is below the median of the eight MSP districts, therefore this district was included in the low population density area.

The second caveat is that generalizing the findings from the MERS to the full population of police pursuits must be done cautiously, if at all. The MERS was administered to one police agency, which may not be representative of other law enforcement agencies. On the other hand, Michigan State Police do have full police powers throughout the State of Michigan. Michigan is a state which encompasses a variety of weather conditions, population areas, crime rates, road types, and cultures. This diversity may allow for more generalization, than a study of police pursuits involving a local, municipal police agency.

The research question for this thesis is: Do the parameters of police pursuits differ in different population density areas? The answer to this question, according to the MERS, is yes and no. Two analyses of variables from the MERS were completed. The first analysis was the defining of

a police pursuit profile for each of the population density areas. The second analysis involved hypothesis testing.

For the establishment of the police pursuit profile, the mode of each of 22 variables was used. In doing so, the following variables were found to be different: 1) length of the pursuit in minutes; 2) distance of the pursuit in miles; 3) age of the officer; 4) years of police seniority of the officer; 5) the initiating reason; and 6) the officer's distance from the suspect at the start of the pursuit. No statistical analysis was completed concerning these six variables, therefore, it is not known if the difference is significant.

Hypothesis testing was performed on ten hypotheses, which contained 12 variables. Testing was accomplished through the use of chi square, Phi, Lambda, and Z scores. The following variables were found to be significantly different between high and low density areas: time period in day, type of roadway, escape rate, and accident rate.

Some differences do exist between the high and low population density areas. As many, if not more, similarities exist. The next section will review recommendations concerning police pursuits in different population density areas.

Recommendations

The purpose of this study was to determine if police pursuits that occur in high population density areas differ from police pursuits occurring in low population density areas. It was found that police pursuits in the high population density area and low population density area are more similar than different.

Based upon the findings in this study, police pursuit training should be uniform for all population density areas. The differences that do exist between population density areas should be incorporated into the training. By doing this, officers from each population density area will benefit. This is especially important concerning the reduction of accidents and accident injuries.

Another purpose of training uniformity, especially of officers in a statewide agency, such as the MSP, officers can easily be transferred from one area to another without further training. In addition, training such as this will allow for jurisdictional uniformity among local police officers and agencies.

Based upon the findings of this study, police pursuit policy should be the same between population density areas. This recommendation is based upon the findings that many variables of pursuits were similar between the population density areas. The differences that were found, should be

examined further to determine if each should be addressed separately in future police pursuit policy.

One difference that needs further analysis and study is the rate of accidents between the two areas. A pursuit in the high population density area is almost two and one-half times more likely to involve an accident than the low population density area. The circumstances surrounding the accidents, both in the high population density area and the low population density area, need to be examined to determine how policy and training can be changed so that the likelihood of an accident occurring is decreased.

The low population density area may have had less accidents, however, the rate of injuries was not significantly different than the rate of injuries in the high population density area. In fact, the percentage of injuries in the low population density area was higher than in the high population density area. This, also, needs closer examination.

One variable that requires further study is the speed attained during the pursuit. Both population density areas reported mode speeds of 105 miles per hour or more. In data analysis, it was found that no difference between speed and population density area existed. The question on the survey asked the officers to record the highest speed attained. It is not known at which point in the pursuit the highest speed was attained or for how long this speed was maintained. The

circumstances surrounding such high speeds need to be explored further. This study should examine the relationship between speed and the distance from suspect at the start of the pursuit, the reason for terminating the pursuit, accident rate and the resulting fatalities and injuries.

The MERS should be expanded to include county and municipal law enforcement agencies. By doing this, the MERS will become more generalizable. In addition, other policy and training needs may surface. In addition, the MERS should be periodically administered to the Michigan State Police to determine if changes occur over time. This is particularly important if changes in policy and training are instituted. Periodical administration of the MERS, will allow police and other governmental agencies to determine how the breakdown of the infrastructure and the consequent road construction or repair affect police pursuits.

One problem that surfaced while completing this study, was the lack of uniform definition of police pursuit and of the locales that were used, i.e. urban, rural, suburban, and residential. A uniform definition of police pursuits will ensure that researchers, police agencies and the courts are discussing the same concept. Uniform definitions of urban, suburban, rural and other locales, will allow for easier comparison between research.

Overall, it can be said that not many differences exist between the high and low population density areas, as defined by this study. The differences that do exist must be further explored to determine the consequences of the differences and to lessen the adverse effects of the variables.

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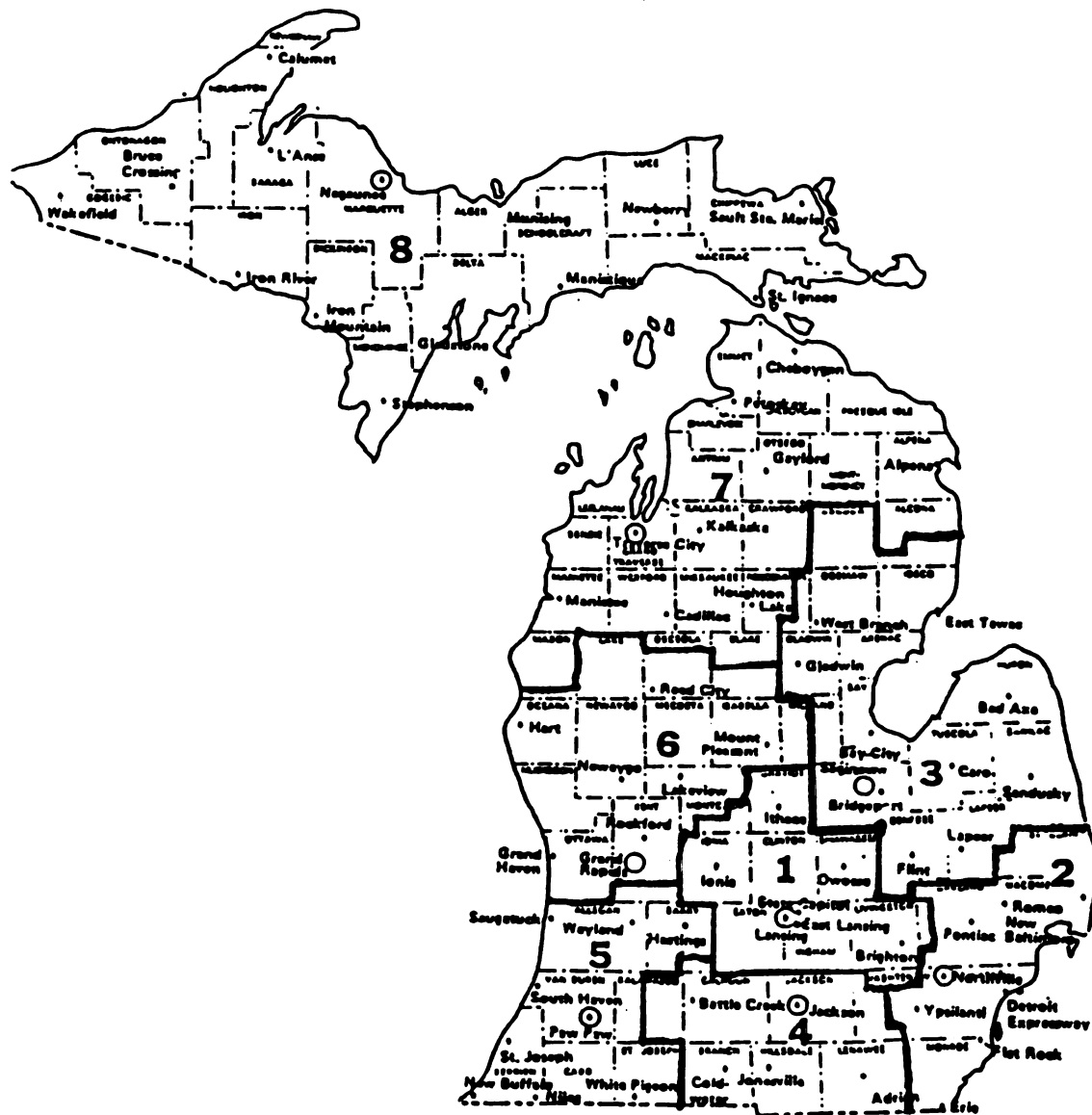
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APPENDICES

Appendix A Map of MSP Districts



Map Showing Population Density Areas



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
Mansitque	Munsing	Cadillac	

Appendix B

Letter from MSP Director
to Officers Requesting Cooperation

FILE: 14 (2) 1991

98-48(2/98)

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,

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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
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Ferris State University
Big Rapids, MI 49307
(616) 592-2836

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Appendix C

Copy of Long Form Questionnaire

1

EMERGENCY RESPONSE STUDY GENERAL INSTRUCTIONS

3/91

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.

-
- | | |
|--|--|
| <p>1. Type of run</p> <p>☐ 1. Pursuit</p> <p>☐ 2. Response to Alarm</p> <p>☐ 3. Medical Emergency</p> <p>☐ 4. Crime in Progress</p> | <p>2. Type of police</p> <p>☐ 1. State</p> <p>☐ 2. Sheriff</p> <p>☐ 3. Township</p> <p>☐ 4. City</p> <p>☐ 5. Village</p> <p>☐ 6. University</p> <p>☐ 7. Federal</p> <p>☐ 8. Other</p> |
| <p>3. Region of state (MSP District)</p> <p>☐ 1. 1st</p> <p>☐ 2. 2nd</p> <p>☐ 3. 3rd</p> <p>☐ 4. 4th</p> <p>☐ 5. 5th</p> <p>☐ 6. 6th</p> <p>☐ 7. 7th</p> <p>☐ 8. 8th</p> | <p>4. Day of week</p> <p>☐ 1. Sun</p> <p>☐ 2. Mon</p> <p>☐ 3. Tues</p> <p>☐ 4. Wed</p> <p>☐ 5. Thur</p> <p>☐ 6. Fri</p> <p>☐ 7. Sat</p> |
| <p>5. Time of day initiated</p> <p>☐ 1. 12:01- 3 am</p> <p>☐ 2. 3:01- 6 am</p> <p>☐ 3. 6:01- 9 am</p> <p>☐ 4. 9:01- 12 noon</p> <p>☐ 5. 12:01-3 pm</p> <p>☐ 6. 3:01- 6 pm</p> <p>☐ 7. 6:01- 9 pm</p> <p>☐ 8. 9:01- 12 midnight</p> | <p>6. Road type: Most of run</p> <p>☐ 1. Freeway</p> <p>☐ 2. State Trunkline</p> <p>☐ 3. County Road</p> <p>☐ 4. Township Road</p> <p>☐ 5. City Street</p> <p>☐ 6. Trail (Two Track)</p> <p>☐ 7. Alley</p> <p>☐ 8. Other</p> |
| <p>7. Number of lanes: Most of run</p> <p>☐ 1. 2 Lanes</p> <p>☐ 2. 3 Lanes</p> <p>☐ 3. 4 Lanes: Not divided</p> <p>☐ 4. 4 Lanes: With side streets</p> <p>☐ 5. 4 Lanes: Expressway</p> <p>☐ 6. 5 or More Lanes: Expressway</p> <p>☐ 7. Other</p> | <p>8. Road surface : Most of run</p> <p>☐ 1. Concrete</p> <p>☐ 2. Black Top</p> <p>☐ 3. Paved: Other</p> <p>☐ 4. Gravel: Coated</p> <p>☐ 5. Gravel: Not Coated</p> <p>☐ 6. Sand</p> |
| <p>9. Road level: Most of run</p> <p>☐ 1. Even</p> <p>☐ 2. Rough or Rolling</p> <p>☐ 3. Patched</p> | <p>10. Road direction</p> <p>☐ 1. Straight</p> <p>☐ 2. Winding</p> <p>☐ 3. Few Curves</p> |

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11. Type of area
☐ 1. Urban
☐ 2. Suburban
☐ 3. Rural
☐ 4. Unpopulated
12. Estimate time of run (in minutes)
☐ 1. Less than 1
☐ 2. 1-3
☐ 3. 4-6
☐ 4. 7-9
☐ 5. 10-12
☐ 6. 13-15
☐ 7. 15 or more
13. Estimate distance of run (in miles)
☐ 1. 1 or less
☐ 2. 2
☐ 3. 3
☐ 4. 4
☐ 5. 5
☐ 6. 6
☐ 7. 7
☐ 8. 8
☐ 9. 9 or more
14. Highest speed driven (closest)
☐ 1. 40 or less
☐ 2. 50
☐ 3. 60
☐ 4. 70
☐ 5. 80
☐ 6. 90
☐ 7. 100
☐ 8. 105 or more
15. Light conditions
☐ 1. Dawn
☐ 2. Daylight
☐ 3. Dusk
☐ 4. Dark
16. Weather
☐ 1. Clear
☐ 2. Rain
☐ 3. Snow
☐ 4. Fog
☐ 5. Freezing Rain
☐ 6. Cloudy
17. Police unit: Type
☐ 1. Marked
☐ 2. Semi-Marked
☐ 3. Unmarked
☐ 4. Motor Cycle
18. Overhead light operating?
☐ 1. Yes
☐ 2. No
☐ 3. As needed
19. Siren operating?
☐ 1. Yes
☐ 2. No
☐ 3. As needed
20. Police driver: Age
☐ 1. 18-20
☐ 2. 21-25
☐ 3. 26-30
☐ 4. 31-35
☐ 5. 36-40
☐ 6. 41-45
☐ 7. 46-50
☐ 8. 51 or more
21. Police driver: Seniority in years
☐ 1. Probation
☐ 2. 1-3
☐ 3. 4-5
☐ 4. 6-10
☐ 5. 11-15
☐ 6. 16-20
☐ 7. 20-24
☐ 8. 25 or more

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22. Police driver: Gender
☐ 1. Male
☐ 2. Female
23. Partner in vehicle?
☐ 1. Yes
☐ 2. No
24. Police driver: Race
☐ 1. White
☐ 2. Hispanic
☐ 3. Black
☐ 4. Asian
☐ 5. Native American
25. Supervisor's location
☐ 1. In vehicle with officer
☐ 2. In general area
☐ 3. At station
☐ 4. Other location
☐ 5. Off duty
26. Highest posted speed during run
☐ 1. 15
☐ 2. 25
☐ 3. 30
☐ 4. 35
☐ 5. 40
☐ 6. 45
☐ 7. 50
☐ 8. 55
☐ 9. 65
27. Did an accident occur during run?
☐ 1. Yes
☐ 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
☐ 1. Speed
☐ 2. Other Traffic Violation
☐ 3. OUIL
☐ 4. Misdemeanor: Suspected
☐ 5. Misdemeanor: Known
☐ 6. Felony: Suspected
☐ 7. Felony: Known
☐ 8. Other
29. Est. distance from suspect at start
☐ 1. 1-50 ft.
☐ 2. 100 ft.
☐ 3. 200 ft.
☐ 4. 300 ft.
☐ 5. 500 ft.
☐ 6. 1/2 mi.
☐ 7. 3/4 mi.
☐ 8. More
30. Closest to suspect: During run
☐ 1. 1-50 ft.
☐ 2. 100 ft.
☐ 3. 200 ft.
☐ 4. 300 ft.
☐ 5. 500 ft.
☐ 6. 1/2 mi.
☐ 7. 3/4 mi.
☐ 8. More
31. Police unit: Designation
☐ 1. Primary car
☐ 2. Rack Up car
☐ 3. Other: In general area
32. Was Dispatch Notified?
☐ 1. Yes
☐ 2. No
33. During pursuit was it possible to obtain suspect vehicle license number?
☐ 1. Yes
☐ 2. No

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34. Number of occupants in suspect's vehicle (including driver)
☐ 1. One
☐ 2. Two
☐ 3. Three or more
35. Could you estimate age of suspect?
☐ 1. Yes
☐ 2. No
36. Age of primary suspect
☐ 1. Less than 15
☐ 2. 15-20
☐ 3. 21-25
☐ 4. 26-30
☐ 5. 31-35
☐ 6. 36-40
☐ 7. 41 or more
☐ 8. Unknown
37. Gender of primary suspect
☐ 1. Male
☐ 2. Female
☐ 3. Unknown
38. Was suspect under influence?
☐ 1. Yes - alcohol
☐ 2. Yes - drugs
☐ 3. Unknown
☐ 4. No
39. Race of suspect driver
☐ 1. White
☐ 2. Hispanic
☐ 3. Black
☐ 4. Asian
☐ 5. Native American
☐ 6. Unknown
40. Suspect vehicle: Type
☐ 1. Passenger
☐ 2. Van
☐ 3. Wagon
☐ 4. Truck (including pick-up)
☐ 5. Sport
☐ 6. Motor Cycle
☐ 7. Tractor/Trailer
☐ 8. Other
41. Reason pursuit terminated
☐ 1. Officer's decision
☐ 2. Supervisor's decision
☐ 3. Suspect surrendered
☐ 4. Suspect apprehended
☐ 5. Suspect escaped
☐ 6. Suspect in accident
☐ 7. Officer in accident
☐ 8. Other
42. Official action taken
☐ 1. Arrest: OUIL
☐ 2. Citation: Released
☐ 3. Arrest: Fleeing & Eluding
☐ 4. Arrest: Misdemeanor
☐ 5. Arrest: Felony
☐ 6. License revoked
☐ 7. License suspended
☐ 8. No operators license
43. Suspect boxed-in?
☐ 1. Yes
☐ 2. No
44. Suspect rammed?
☐ 1. Yes
☐ 2. No
45. Road block used?
☐ 1. Yes
☐ 2. No
46. Aircraft used?
☐ 1. Yes
☐ 2. No

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47. Number of police vehicles involved.
☐ 1. One
☐ 2. Two
☐ 3. Three or more
48. Number of vehicles pursued
☐ 1. One
☐ 2. Two
☐ 3. More
49. Did suspect run stop sign?
☐ 1. Yes
☐ 2. No
☐ 3. Not applicable
50. Did suspect run red light?
☐ 1. Yes
☐ 2. No
☐ 3. Not applicable
51. Did suspect turn off headlights?
☐ 1. Yes
☐ 2. No
☐ 3. Not applicable: Daylight
52. Did suspect drive wrong way?
☐ 1. Yes
☐ 2. No

PART III: ACCIDENT QUESTIONS.

IF AN ACCIDENT RESULTED FROM THE RUN YOU ARE REPORTING, PLEASE ANSWER QUESTIONS 53 THROUGH 58.

-
53. Type of vehicles in accident
☐ 1. Police only
☐ 2. Suspect only
☐ 3. Police and suspect
☐ 4. Police, suspect and 3rd party(s)
☐ 5. Police and 3rd party(s)
☐ 6. Suspect and 3rd party(s)
54. Number of vehicles in accident
☐ 1. One
☐ 2. Two
☐ 3. Three
☐ 4. Four
☐ 5. Five
☐ 6. Six or more
55. Most serious injury to police
☐ 1. None
☐ 2. Minor
☐ 3. Serious
☐ 4. Fatal
56. Most serious injury to suspect(s)
☐ 1. None
☐ 2. Minor
☐ 3. Serious
☐ 4. Fatal
57. Most serious injury to 3rd party (ies)
☐ 1. None
☐ 2. Minor
☐ 3. Serious
☐ 4. Fatal
58. Were pedestrians injured?
☐ 1. One
☐ 2. Two
☐ 3. Three or more
☐ 4. No

THANK YOU FOR YOUR COOPERATION

PER INSTRUCTIONS:
 PLACE COMPLETED SURVEYS IN COLLECTION CONTAINER
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If you have any questions feel free to contact
 Dennis M. Payne (517) 353-5482 or Terry M. Nerbonne (616) 592-2836

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