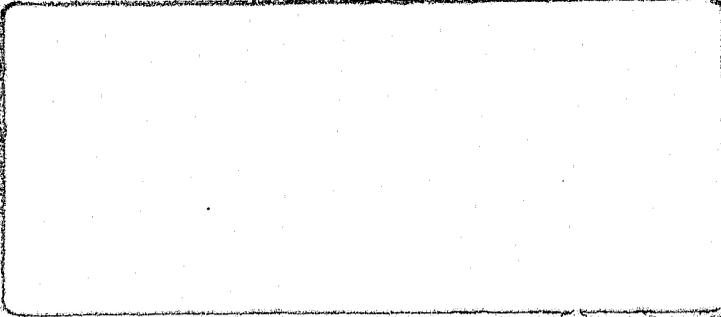


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KENTUCKY STATE POLICE
RESEARCH AND DEVELOPMENT SECTION

KENTUCKY STATE POLICE

PURSUIT STUDY, 1989-90

By

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* * * * *

Captain Randy Overstreet, Commander

June 1990

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KENTUCKY STATE POLICE PURSUIT STUDY, 1989-90

Statistical analyses of police pursuit driving have typically been approached from a largely urban or suburban service population perspective. The California Highway Patrol study (1983) is perhaps the most widely-known of these studies, followed by the Alpert-Dunham studies examining pursuit driving data from the Metro-Dade County Police Department in Miami, Florida (1985-87). Other recent pursuit driving studies have focused on Mesa, Arizona; Nassau County, New York; Phoenix, Arizona; and St. Petersburg, Florida.

The Kentucky State Police is the primary and, in some cases, the only police department serving the smaller cities and the rural areas of Kentucky. Thinking that a statistical analysis of police pursuit driving from a rural police department perspective could prove insightful, this agency began compiling pursuit driving data from intra-agency teletypes in 1989. Now, with the first twelve months of data assembled, it is possible to state the contrasts and similarities apparent between urban and rural police pursuit driving.

DEFINITION

For the purposes of this study, a "PURSUIT" is defined as: "AN ACTIVE ATTEMPT BY A LAW ENFORCEMENT OFFICER ON DUTY IN A PATROL CAR TO APPREHEND ONE OR MORE OCCUPANTS OF A MOVING MOTOR VEHICLE, PROVIDING THE DRIVER OF SUCH VEHICLE IS AWARE OF THE ATTEMPT AND IS RESISTING APPREHENSION BY MAINTAINING OR INCREASING HIS SPEED OR BY IGNORING THE LAW ENFORCEMENT OFFICER'S ATTEMPT TO STOP HIM."

COMPARISON OF URBAN AND RURAL POLICE DEPARTMENT RESULTS

As an overview to the 1989-90 Kentucky State Police pursuit driving data, a direct comparison with the 1985-86 Metro-Dade County Police Department is useful. Table I shows, in the category "DURATION IN MINUTES," a tendency in the urban police department towards more short-duration pursuits and fewer long-duration pursuits than the rural police department. 77.7% of the urban agency pursuits lasted 0-5 minutes, versus 65.5% of the rural agency pursuits. More significantly, only 6.5% of the urban agency pursuits extended 11 or more minutes, while 17.5% of the rural agency pursuits lasted that long.

In the "REASON FOR PURSUIT" category, the urban agency pursuit is shown to be instigated more often for Traffic offenses, a BOLO, a Felony offense or Other (such as equipment violations) than a pursuit in its rural agency counterpart. Conversely, by a margin of 4.0% to 32.3%, the urban agency pursuit is much less likely than a rural agency pursuit to be instigated by Reckless Driving/DUI.

In the "OUTCOME OF PURSUIT" category, the urban agency pursuit is less likely, by 61.8% to 77.9%, to result in an arrest; is more likely, by 37.2% to 21.7% to result in an escape; and is more likely, by 1.0% to 0.4%, to result in a death than a rural agency pursuit. Also, while 14.3% of urban agency pursuits result in personal injury, only 5.5% of rural agency pursuits result in same.

A "FORCIBLE STOP" is less likely to be utilized in the urban agency pursuit than the rural agency pursuit by a margin of 7.0% to 11.5%, yet, the likelihood of accident illustrated by "TOTAL ACCIDENTS/TOTAL PURSUITS" is more probable in the urban agency pursuit by a margin of one (1) accident per 2.9 pursuits to

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE I

	METRO-DADE CO. P.D. 8/1/85 - 7/31/86		KENTUCKY STATE POLICE 5/1/89 - 4/30/90	
NUMBER OF PURSUITS	398	(100.0%)	235	(100.0%)
DURATION IN MINUTES				
- 0-5	309	(77.7)	154	(65.5)
- 6-10	63	(15.8)	40	(17.0)
- 11+	26	(6.5)	41	(17.5)
REASON FOR PURSUIT				
- Traffic	241	(60.5)	98	(41.8)
- BOLO	52	(13.1)	20	(8.5)
- Felony	35	(8.8)	13	(5.5)
- Reckless/DUI	16	(4.0)	76	(32.3)
- Other	54	(13.6)	28	(11.9)
OUTCOME OF PURSUIT				
- Arrest	246	(61.8)	183	(77.9)
- Escape	148	(37.2)	51	(21.7)
- Death*	4	(1.0)	1	(0.4)
- Accident	N.A.	N.A.	53	(22.6)
- No Accident	N.A.	N.A.	182	(77.4)
- Injury	57	(14.3)	13	(5.5)
- No Injury	341	(85.7)	235	(94.5)
FORCIBLE STOPS				
- Yes	28	(7.0)	27	(11.5)
- No	370	(93.0)	208	(88.5)
TOTAL ACCIDENTS/TOTAL PURSUITS	135/398	(1/2.9)	68/235	(1/3.5)
TOTAL INJURIES/TOTAL PURSUITS	N.A.	---	17/235	(1/13.8)

*Excluded from Arrest count.

one (1) accident per 3.5 pursuits.

COMPARISON OF RURAL POLICE DEPARTMENT PURSUITS - WITHOUT AND WITH ACCIDENT

Beyond the comparison of urban and rural police department pursuit driving data, a second focus of the Kentucky State Police study was a comparative analysis of what types of pursuits lend themselves to an incidence of accident and, hence, injury, and what types don't. Table II shows, in the category "MONTH OF YEAR," that the plurality of pursuits without accident occurs in April, while the plurality of pursuits with accident occurs in December. Saturday is the "DAY OF WEEK" that any pursuit is most likely to occur - without or with accident. The 6-hour period from 18:01 to 24:00 is the "TIME OF DAY" that any pursuit is most likely to occur.

77.6% of pursuits without accident take place on a 2-lane "TYPE OF ROADWAY" while a virtually-identical 77.4% of pursuits with accident also occur on 2-lane roadway. A 46.2% plurality of pursuits without accident and a 56.6% majority of pursuits with accident range in the 61-90 MPH "TOP SPEED (SUSPECT)." Interestingly, among the 235 reported pursuits in this study, only one involved an estimated suspect vehicle speed in excess of 120 MPH; this pursuit did not involve an accident. Conversely, 23.6% of pursuits without accident and 17.0% of pursuits with accident range in the 0-60 MPH "TOP SPEED (SUSPECT)."

Under "POLICE UNITS INVOLVED," 60.0% of pursuits without accident and 49.0% of pursuits with accident involve only one police unit. A clearer difference emerges when four or more police units are involved: then, 13.7% of pursuits without accident are found in this category versus 30.2% of pursuits with

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE II

	TOTAL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
PURSUIITS WITHOUT ACCIDENT	182 (100.0%)	19 (10.4)	14 (7.7)	22 (12.2)	26 <u>(14.3)</u>	16 (8.8)	10 (5.5)	19 (10.4)	10 (5.5)	5 (2.7)	13 (7.1)	18 (9.9)	10 (5.5)
PURSUIITS WITH ACCIDENT	53 (100.0%)	3 (5.7)	7 (13.2)	5 (9.4)	7 (13.2)	3 (5.7)	5 (9.4)	5 (9.4)	2 (3.8)	4 (7.5)	1 (1.9)	3 (5.7)	8 <u>(15.1)</u>
ALL PURSUIITS	235 (100.0%)	22 (9.4)	21 (8.9)	27 (11.5)	33 <u>(14.0)</u>	19 (8.1)	15 (6.4)	24 (10.2)	12 (5.1)	9 (3.8)	14 (6.0)	21 (8.9)	18 (7.7)

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE II (cont.)

	TOTAL	DAY OF WEEK						
		SU	M	T	W	TH	F	SA
PURSUIT WITHOUT ACCIDENT	182 (100.0%)	44 (24.2)	14 (7.7)	18 (9.9)	11 (6.0)	12 (6.6)	29 (15.9)	64 (29.7)
PURSUIT WITH ACCIDENT	53 (100.0%)	10 (18.9)	2 (3.8)	2 (3.8)	3 (5.7)	6 (11.3)	12 (22.6)	18 (33.9)
ALL PURSUITS	235 (100.0%)	54 (23.0)	16 (6.8)	20 (8.5)	14 (6.0)	18 (7.7)	41 (17.4)	72 (30.3)

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE II (cont.)

	TOTAL	TIME OF DAY			
		00:01-06:00	06:01-12:00	12:01-18:00	18:01-24:00
PURSUIITS WITHOUT ACCIDENT	182 (100.0%)	50 (27.5)	11 (6.0)	31 (17.0)	90 (49.5)
PURSUIITS WITH ACCIDENT	53 (100.0%)	18 (33.9)	4 (7.5)	7 (13.2)	24 (45.4)
ALL PURSUIITS	235 (100.0%)	68 (28.9)	15 (6.4)	38 (16.2)	114 (48.5)

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE II (cont.)

	TOTAL	TYPE OF ROADWAY				TOP SPEED (SUSPECT)			
		1&2 LN	2 LN	2&4LN	4 LN	0-60	61-90	91-120	121+
PURSUIITS WITHOUT ACCIDENT	182 (100.0%)	9 (4.9)	141 (<u>77.6</u>)	9 (4.9)	23 (12.6)	43 (23.6)	84 (<u>46.2</u>)	53 (29.7)	1 (0.5)
PURSUIITS WITH ACCIDENT	53 (100.0%)	3 (5.7)	41 (<u>77.4</u>)	4 (7.5)	5 (9.4)	9 (17.0)	30 (<u>56.6</u>)	14 (26.4)	0 (0.0)
ALL PURSUIITS	235 (100.0%)	12 (5.0)	182 (<u>77.6</u>)	13 (5.5)	28 (11.9)	52 (22.1)	114 (<u>48.6</u>)	68 (28.9)	1 (0.4)

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE II (cont.)

	TOTAL	POLICE UNITS INVOLVED						DURATION IN MINUTES				
		ONE	TWO	THREE	FOUR+	RANGE	AVG.	0-5	6-10	11+	RANGE	AVG.
PURSUIT WITHOUT ACCIDENT	182 (100.0%)	109 (60.0)	29 (15.9)	19 (10.4)	25 (13.7)	1-17 --	2.2 -	125 (68.7)	30 (16.5)	27 (14.8)	.5-62 --	6.2 -
PURSUIT WITH ACCIDENT	53 (100.0%)	26 (49.0)	8 (15.1)	3 (5.7)	16 (30.2)	1-17 --	3.2 -	29 (54.7)	10 (18.9)	14 (26.4)	1-48 --	9.8 -
ALL PURSUITS	235 (100.0%)	135 (57.4)	37 (15.7)	22 (9.4)	41 (17.5)	1-17 --	2.4 -	154 (65.5)	40 (17.0)	41 (17.5)	.5-62 --	7.0 -

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE II (cont.)

	TOTAL	REASON FOR PURSUIT				
		TRAFFIC	BOLO	FELONY	RECKLESS/DUI	OTHER
PURSUIITS WITHOUT ACCIDENT	182 (100.0%)	81 (<u>44.5</u>)	13 (7.1)	9 (4.9)	57 (31.3)	22 (12.2)
PURSUIITS WITH ACCIDENT	53 (100.0%)	17 (32.2)	7 (13.2)	4 (7.5)	19 (<u>35.8</u>)	6 (11.3)
ALL PURSUIITS	235 (100.0%)	98 (<u>41.8</u>)	20 (8.5)	13 (5.5)	76 (32.3)	28 (11.9)

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE II (cont.)

	TOTAL	OUTCOME OF PURSUIT			FORCIBLE STOP		ALCOHOL OR DRUGS	
		ARREST	ESCAPE	DEATH*	YES	NO	YES	NO
PURSUIT WITHOUT ACCIDENT	182 (100.0%)	139 (76.4)	43 (23.6)	0 (0.0)	13 (7.1)	169 (92.9)	83 (45.6)	99 (54.4)
PURSUIT WITH ACCIDENT	53 (100.0%)	44 (83.0)	8 (15.1)	1 (1.9)	14 (26.4)	39 (73.6)	32 (60.4)	21 (39.6)
ALL PURSUITS	235 (100.0%)	183 (77.9)	51 (21.7)	1 (0.4)	27 (11.5)	208 (88.5)	115 (48.9)	120 (51.1)

*Excluded from Arrest count.

accident. The average pursuit without accident involved 2.2 police units versus 3.2 units for the average pursuit with accident.

The majority of all pursuits, as shown under "DURATION IN MINUTES," lasts 0-5 minutes. There is an inclination for pursuits without accidents to be shorter in duration than pursuits with accidents; this is most plainly evidenced by a comparison of the 14.8% of pursuits without accident extending 11 or more minutes versus the 26.4% of pursuits with accident extending into the same range. The average pursuit without accident lasted 6.2 minutes versus 9.8 minutes for the average pursuit with accident.

A Traffic violation was the "REASON FOR PURSUIT" for the plurality of pursuits without accident, while Reckless Driving/DUI was the instigating incident for the plurality of pursuits with accident. In the same "REASON FOR PURSUIT" category, pursuits with accidents are more likely to ensue from a BGL0, a Felony offense, or Reckless Driving/DUI than pursuits without accidents, and less likely to ensue from Traffic offenses or Other (such as equipment violations).

Regarding the "OUTCOME OF PURSUIT," the driver of the suspect vehicle was arrested in 76.4% of the pursuits without accident and in 83.0% of the pursuits with accident. A darker way of looking at this is that, if the goal of a pursuit is immediate apprehension, 23.6% of pursuits without accident and 17.0% of pursuits with accidents accomplish nothing. The ultimate in futility occurs when the suspect vehicle crashes and the suspect still manages to flee the scene on foot; this scenario plays out in 9.4% of pursuits with accidents. Overall, a "FORCIBLE STOP" had to be employed in 7.7% of the pursuits without accidents and in 28.3% of the pursuits with accidents.

Nearly half - 45.6% - of the pursuits without accidents were related to

"ALCOHOL OR DRUGS," i.e., the suspect was either initially pursued on suspicion of an alcohol or drug offense and escaped or was apprehended and charged with an alcohol or drug offense. Over half - 60.4% - of the pursuits with accidents were related to "ALCOHOL OR DRUGS."

A composite profile of a typical pursuit with accident can be drawn to emphasize its differences from a typical pursuit without accident. It would look like this: A typical pursuit with accident is more likely, in comparison to a typical pursuit without accident, to occur in February, June, September, or December; to occur on a Thursday, Friday, or Saturday; to occur between 00:01 and 06:00 or 06:01 and 12:00, to occur on a mix of 1 and 2-lane roadways or a mix of 2 and 4-lane roadways (as opposed to 1-lane, 2-lane, or 4-lane-only roadways); to incur a suspect's top speed of from 61-90 MPH; to result in the involvement of four or more police units; to last 6-10 minutes or 11 or more minutes; to be instigated by a BOLO, a Felony offense, or Reckless Driving/DUI; to lead to the suspect's apprehension or death; to require a forcible stop; and to be alcohol or drug-related.

INCIDENCE OF ACCIDENT, INJURY, OR DEATH IN RURAL POLICE DEPARTMENT PURSUITS

A third focus of the Kentucky State Police study was an examination of the critical circumstances involved in accidents, injuries, or deaths stemming from pursuits. Table III shows that the greatest likelihood of a pursuit-engendered accident is when "SUSPECT VEHICLE OVERTURNS OR HITS BARRIER;" such an accident occurs in 1/7.1 pursuits. The second-greatest likelihood is a collision between "POLICE VEHICLE/SUSPECT VEHICLE;" this occurs in 1/11.2 pursuits. The remaining likelihoods of accidents are much more remote: "POLICE VEHICLE

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE III

	INCIDENCE OF ACCIDENT	
	ACCIDENTS/PURSUIT	INCIDENCE
POLICE VEHICLE/SUSPECT VEHICLE	21/235	1/11.2
POLICE VEHICLE/POLICE VEHICLE	3/235	1/78.3
POLICE VEHICLE/CIVILIAN VEHICLE	3/235	1/78.3
POLICE VEHICLE OVERTURNS OR HITS BARRIER	4/235	1/58.8
SUSPECT VEHICLE/CIVILIAN VEHICLE	4/235	1/58.8
SUSPECT VEHICLE OVERTURNS OR HITS BARRIER	33/235	1/7.1
ALL ACCIDENTS	68/235	1/3.5

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE III (cont.)

	INCIDENCE OF INJURY			
	INJURIES/ACCIDENTS	INCIDENCE	INJURIES/PURSUIT	INCIDENCE
POLICE VEHICLE/SUSPECT VEHICLE	0/21	0	0/235	0
POLICE VEHICLE/POLICE VEHICLE	0/3	0	0/235	0
POLICE VEHICLE/CIVILIAN VEHICLE	2/3	1/1.5	2/235	1/117.5
POLICE VEHICLE OVERTURNS OR HITS BARRIER	1/4	1/4.0	1/235	1/235.0
SUSPECT VEHICLE/CIVILIAN VEHICLE	0/4	0	0/235	0
SUSPECT VEHICLE OVERTURNS OR HITS BARRIER	14/33	1/2.4	14/235	1/16.8
ALL ACCIDENTS	17/68	1/4.0	17/235	1/13.8

KENTUCKY STATE POLICE PURSUITS

5/1/89 - 4/30/90

TABLE III (cont.)

	INCIDENCE OF DEATH			
	DEATHS/ACCIDENTS	INCIDENCE	DEATHS/PURSUIT	INCIDENCE
POLICE VEHICLE/SUSPECT VEHICLE	0/21	0	0/235	0
POLICE VEHICLE/POLICE VEHICLE	0/3	0	0/235	0
POLICE VEHICLE/CIVILIAN VEHICLE	0/3	0	0/235	0
POLICE VEHICLE OVERTURNS OR HITS BARRIER	0/4	0	0/235	0
SUSPECT VEHICLE/CIVILIAN VEHICLE	0/4	0	0/235	0
SUSPECT VEHICLE OVERTURNS OR HITS BARRIER	1/33	1/33.0	1/235	1/235.0
ALL ACCIDENTS	1/68	1/68.0	1/235	1/235.0

OVERTURNS OR HITS BARRIER" in 1/58.8 pursuits, "SUSPECT VEHICLE/CIVILIAN VEHICLE" collision in 1/58.8 pursuits, "POLICE VEHICLE/POLICE VEHICLE" collision in 1/78.3 pursuits and "POLICE VEHICLE/CIVILIAN VEHICLE" collision in 1/78.3 pursuits.

The greatest risk of personal injury in a pursuit-engendered accident is when a collision occurs between "POLICE VEHICLE/CIVILIAN VEHICLE;" the rate of injury here is 1/1.5 accidents. The second-greatest risk of injury is when "SUSPECT VEHICLE OVERTURNS OR HITS BARRIER;" the rate of injury is 1/2.4 accidents. The third-greatest risk is when "POLICE VEHICLE OVERTURNS OR HITS BARRIER;" the rate of injury is 1/4.0 accidents. No other categories of accident resulted in injury in this study.

Regarding the risk of death in a pursuit-engendered accident, only one death was attributable to pursuits in this study. That one death occurred when "SUSPECT VEHICLE OVERTURNS OR HITS BARRIER," yielding an incidence of death of 1/33.0 such accidents.

CONCLUSION

To bring this analysis of the 5/1/89 - 4/30/90 Kentucky State Police pursuit driving data to both a close and a summation, a quick comparison to the findings of previous pursuit studies follows:

CENTER FOR ENVIRONMENT
AND MAN STUDY, 1969-70

1. Finding: Majority of pursuit-related fatalities are incurred by the fleeing driver, passengers, or uninvolved bystanders.

KENTUCKY STATE POLICE
STUDY, 1989-90

1. Finding: Only pursuit-related fatality was incurred by passenger.

2. Finding: Event that triggers pursuit is traffic violation in more than 90% of cases.
3. Finding: Alcohol plays a role in more than half the cases in which driver attempts to evade apprehension.
4. Finding: A significant number of known offenders (roughly 15%) driving without valid license at time of pursuit.
5. Finding: Only a relatively small number (3 to 8%) of pursuits involve stolen vehicles.
6. The majority of pursuits occur at night or on weekends.

CALIFORNIA HIGHWAY
PATROL STUDY, 1983

1. Finding: Contrary to a 1968 study by Physicians for Automotive Safety that reported 70% of police pursuits to result in accident, this study found that only 29% result in accident.
2. Finding: Contrary to past studies that claimed up to 20% of pursuits resulted in death, this study found that only 1% result in death.
3. Finding: Contrary to past studies that claimed up to 50% of pursuits resulted in serious injury, this study found that only 11% result in injury of any kind, including minor injury.
4. Finding: Pursuits result in an apprehension rate of approximately 77%.

2. Finding: Event that triggers pursuit is traffic violation in only 41.8% of cases.
3. Finding: Slightly less than half (48.9%) of the pursuits are alcohol or drug-related.
4. Finding: 25.1% of known offenders are driving without valid license at time of pursuit.
5. Finding: Only 1.7% of pursuits involve stolen vehicles.
6. Finding: 77.4% of pursuits occur between 18:01 and 06:00 and 53.3% of pursuits occur on either Saturday or Sunday.

KENTUCKY STATE POLICE
STUDY, 1989-90

1. Finding: 22.6% of pursuits result in accident.
2. Finding: 0.4% of pursuits result in death.
3. Finding: 5.5% of pursuits result in injury of any kind, including minor injury.
4. Finding: Pursuits result in an overall apprehension rate of 77.9%.

5. Finding: Most pursuits last 10 minutes or less.

THE BECKMAN
REPORT, 1985

1. Finding: When an officer does not have a back-up unit, the chance of the suspect's escaping is increased.
2. Finding: Use of roadblocks and ramming by police increases the apprehension rate while reducing the overall injury rate.

5. Finding: 82.5% of pursuits last 10 minutes or less.

KENTUCKY STATE POLICE
STUDY, 1989-90

1. Finding: Multiple-unit pursuits result in a 13.8% escape rate while single-unit pursuits result in a 25.9% escape rate.
1. Finding: Use of a forcible stop increases the apprehension rate from 75.5% to 96.3%; no injuries were incurred in the 21 collisions between a police vehicle and a suspect vehicle, while 17 injuries were incurred in the 47 other collisions recorded in this study.

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