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**National Highway
Traffic Safety
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Technical Report

Geo-Demographic Analysis of Fatal Motorcycle Crashes

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LIST OF EXHIBITS

1. EXECUTIVE SUMMARY

This report makes an attempt to identify the efficient and cost effective media to communicate safety message to the drivers involved in fatal motorcycle crashes. The report is not making any attempt to characterize any group of people or any individual. It is a process to identify the drivers involved in fatal motorcycle crashes with their lifestyle cluster. It is used as a tool to identify clusters for the purposes of marketing safety messages.

The Fatality Analysis Reporting System (FARS) database designed and compiled by the National Highway Traffic Safety Administration (NHTSA) consists of a census of all fatal crashes that occur on a public roadway. The database contains crashes that are of the highest injury severity on US roadways. Fatalities that occur within thirty days of the crash are included in FARS.

The FARS data provides information relating to the demographic variables of the crash like the location and circumstances of the crash, the types of vehicles, and the people involved. The data also provides information about the drivers involved in fatal crashes. The driver data are limited to information found on Police Accident Reports and Motor Vehicle Records, such as age, sex, previous violations charged and home zipcodes. This system provides a basis to evaluate the effectiveness of motor vehicle safety standards and highway safety programs. However, FARS does not provide information on the interests, educational level and habits of drivers. This type of additional information needs to be obtained in order to effectively communicate safety programs to motorcycle drivers.

Claritas, a Geo-demographic database, partitions the population of the United States into 62 distinct clusters of individuals based on similar lifestyle. The data relating to the clusters are obtained from the US Census data, Claritas clients and third party sources. These data are then analyzed and the Geo-demographic segmentation is done. The relevant neighborhood data are statistically examined for statistical variance between neighborhoods.

Zipcodes also partition the country into small geographic regions. Although interests, educational level and habits of individuals vary within a zipcode, the size of the population within a zipcode is large enough that it approximates a normal distribution. Claritas analyzes the population of each zipcode and assigns the zipcode to one of its 62 clusters. The definitions of the clusters are regularly changed to reflect societal changes. It is important to realize that although individuals may differ from the norm on one attribute within his/her cluster, they can share many similarities with other attributes that define the cluster.

The data relating to drivers involved in fatal motorcycle crashes can be used to link the FARS demographic information with the lifestyle data of geographic units at zipcode levels of the driver.

This combined data will provide a better understanding from the perspective of the driver's lifestyle. This approach will provide a better tool for NHTSA to identify the associations between the two datasets, which will help design and target effective crash prevention programs specifically tailored to the identified segments of the population.

1.1 Purpose

The purpose of this project is to:

- Combine the fatal motorcycle crash data from the FARS database with the Claritas Geo-demographic database;
- Analyze these combined data from the lifestyle perspective; and,
- Identify cost-effective media to use in promoting crash prevention programs.

1.2 Analytical Approach

The analytical approach for the project involved several steps. A review of the data sources, FARS and Claritas Geo-demographic system was undertaken to determine the data elements of interest; and the linkage between the two databases. Hypotheses were formulated about the incidence of fatal motorcycle crashes and related factors, such as driver age and drug or alcohol involvement, that may vary among diverse lifestyle clusters. Percentages and indices were calculated to analyze the variation of the crash-related factors, to identify clusters that would be primary targets of a crash prevention program, and to determine the media most likely to reach these target populations.

1.3 Findings and Conclusions

The analysis described in this report supports a variety of conclusions about the targets for motorcycle crash prevention programs and the utility of Geo-demographic analysis for traffic safety.

1.4 Targeting Motorcycle Crash Prevention Programs

The cluster numbers referenced in this report match with the cluster numbers assigned by Claritas. The clusters that exhibit the highest propensity for fatal motorcycle crashes (primary targets) based on the drivers involved in fatal motorcycle crashes include:

Cluster 19;
Cluster 21;
Cluster 25;

Cluster 32;
Cluster 34;
Cluster 35;
Cluster 39;
Cluster 52;
Cluster 53; and,
Cluster 60

Appendix B provides a brief description of these clusters.

The following findings from FARS and Claritas provide insight into the possible design of the prevention programs:

- Age is a key determinant in the occurrence of fatal motorcycle crashes as seen from the FARS data. In general, messages targeted at drivers under the age of 40 are recommended. However, lifestyle clusters that show a higher propensity for fatal motorcycle crashes seem to have a bimodal age factor -- younger suburban riders and older town/rural riders;

- Alcohol is involved in two out of five fatal crashes as seen from FARS data and should become a major topic of any campaign developed by NHTSA;

- Male drivers account for almost all of the fatal crashes as seen from FARS data and are therefore the sole target for a campaign against motorcycle fatalities;

- There are key urban and ethnic clusters that can be targeted with the appropriate message regarding drug use and motorcycle fatalities;

- Helmet use, license status and weather do not seem to be factors that can be affected using a lifestyle analysis;

- The types of collisions involving one or more vehicles and other objects do not show a propensity to vary by cluster;

- While license suspension was highly correlated with the incidence of fatal crashes, the factor appeared to be a reflection of more rigorous enforcement in urban areas than rural areas; and,

- The Claritas analysis based on lifestyle suggest that the productive media for reaching the primary target clusters are country radio, country music TV, motorcycle and fishing/hunting magazines.

2. INTRODUCTION

The National Center for Statistics and Analysis (NCSA) collects and analyzes data, conducts research, and disseminates statistical information to support efforts by the National Highway Traffic Safety Administration (NHTSA) and the highway safety community aimed at reducing deaths, injuries and economic losses resulting from motor vehicle crashes.

NCSA designed and developed the Fatality Analysis Reporting System (FARS), a national census of police-reported motor vehicle crashes resulting in fatal injuries. FARS compiles data from various sources on the location and circumstances of the crash, the types of vehicles, and the people involved. This system generates overall measures of highway safety, helps identify traffic safety problems, and provides a basis to evaluate the effectiveness of motor vehicle safety standards and highway safety programs. In order to better target prevention programs, however, NHTSA needs more insights on the population segments most affected by fatal crashes than FARS alone can provide. Claritas, a Geo-demographic database that links demographic and lifestyle data with geographic units for marketing commercial products and services, provides data about the lifestyle of households at the zipcode level. Even though Claritas data can be analyzed below the zipcode level, this report has been evaluated based on the driver zipcode which is the lowest level of data available about the driver within FARS.

The purpose of this project is to:

- Combine motor vehicle crash data from NHTSA's Fatality Analysis Reporting System (FARS) with population lifestyle data from the Claritas Geo-demographic database to identify target segments of the U.S. population; and,

- Analyze the lifestyle data to identify the productive media to use in developing crash prevention programs.

This effort focuses on motorcycle drivers involved in fatal crashes to illustrate the approach for identifying relationships between crash data and diverse lifestyle information. According to FARS, more than 100,000 motorcyclists have died in traffic crashes since the enactment of the Highway Safety Act of 1966 and The National Traffic and Motor Vehicle Safety Act of 1966. In 1996, motorcyclists were involved in only one percent of all police reported traffic crashes, but accounted for five percent of total traffic fatalities, six percent of all occupant fatalities, and two percent of all occupants injured.

The following sections detail the two databases used in the analysis, describe the methodology to analyze the combined crash data and lifestyle data, highlight the findings, and summarize the implications of the results for crash prevention programs.

3. ANALYTICAL APPROACH

The analytical approach for the project involved the following steps:

- Reviewing the data sources, FARS and Claritas Geo-demographic system, to determine the data elements of interest and the linkage between the two databases;
- Formulating hypotheses about factors in motorcycle drivers involved in fatal crashes that may vary by lifestyle;
- Calculating percentages and indices to analyze population segments or clusters based on the hypotheses; and,
- Calculating measures to identify the media most likely to reach the target populations.

3.1 Data Sources

Two data sources have been used in this analysis:

- Fatality Analysis Reporting System (FARS) relating to traffic crashes; and
- Claritas Geo-demographic data relating to population lifestyle.

3.1.1 Fatality Analysis Reporting System (FARS)

NHTSA's Fatality Analysis Reporting System (FARS) became operational in 1975. It contains a census of fatal motor vehicle traffic crashes within the 50 states and the District of Columbia and Puerto Rico. This Geo-demographic analysis does not include the data from Puerto Rico.

A motor vehicle crash is a transport incident that involves a motor vehicle in transport, is not an aircraft incident or water craft incident, and does not include any harmful event involving a railway train in transport prior to involvement of a motor vehicle in transport.

To be included in FARS, a crash must involve a motor vehicle traveling on a traffic way customarily open to the public, and result in the death of a person (either an occupant of a vehicle or a non-motorist) within 30 days of the crash.

NHTSA has a contract with an agency in each state to provide information on fatal crashes. Data on fatal motor vehicle traffic crashes are gathered from the state's own source documents and are coded on standard FARS forms. The analyst or analysts from

the contract agency in each state obtain the documents needed to complete the FARS forms, which generally include some or all of the following:

Police Accident Reports (PARS);
State vehicle registration files;
State driver-licensing files;
State Highway Department data;
Vital Statistics;
Death certificates;
Coroner/Medical examiner reports;
Hospital medical records; and,
Emergency medical service reports

The FARS file contains descriptions of each fatal crash reported. Each case has more than 100 coded data elements that characterize the crash, the vehicles, and the people involved. The specific data elements may be modified slightly at times, in response to users' needs and highway safety emphasis areas. A listing of the FARS data elements used in this analysis are provided in Appendix A.

All data elements are reported on one of the following forms:

The Accident Form: This form records information on the time and location of the crash, the first harmful event in the crash, whether it is a hit-and-run crash, whether a school bus was involved and the number of vehicles and people involved. Information on the weather conditions, roadway surface conditions, geometric profiles of the highways, the geographic location of the crash including the route-information as well as the presence of traffic control devices is also recorded in this form. Roadway information such as the functional classification, route, National Highway System (NHS) relation, land use, the number of lanes and the flow of traffic at the site of the crash is recorded on this form.

The Vehicle and Driver Forms: These forms include the data for each vehicle and driver involved in the fatal crash. The data include the vehicle type, the initial and principal points of impact, the most harmful event and the driver's license status.

The Person Form: This form contains data on each person involved in the fatal crash. The data include the age, gender, role (driver, passenger, non-motorist), the severity of the injuries sustained and the restraint usage characteristics.

FARS data can be used to answer a myriad of questions on the safety of vehicles, drivers, pedestrians, traffic situations, roadways and environmental conditions. But the

data can not throw any light between the relationship of fatalities to the population lifestyle. For example, FARS could be used in evaluating the following:

Speed limit as a factor in fatal crashes;
Fatalities by zipcode, region, county or state;
Fatal crashes by land use categories (urban or rural);
Fatalities by type of roadway;
Pedestrian fatalities by zipcode, region, county or state;
Fatalities by vehicle type;
Fatalities by age group; and,
Fatalities in various weather or road surface conditions

NCSA has developed a variety of reports and fact sheets using the information from FARS. Some are produced annually. Examples of the fact sheets and reports include:
Traffic Safety Facts: An annual compilation of data on fatal motor vehicle crashes;

Benefits of Safety Belts and Motorcycle Helmets, 1996: A report that provides information on the benefits of protective devices in motor vehicle crashes; and,

Drivers in Fatal Crashes by Blood Alcohol Concentration and Vehicle Type 1982-1996: A fact sheet which gives the numbers and percentages for the total crashes for each of the years.

Additional information on traffic safety facts, FARS and other publications can be obtained from the NHTSA's website at:

www.nhtsa.dot.gov

3.1.2 Claritas Geo-demographic System

NHTSA subscribes to a commercially available market research tool, Claritas, which utilizes Geo-demographics to characterize different population segments. Geo-demographics link demographic and lifestyle data at the zipcode level. Starting in 1987, driver zipcode was added to the data collected by the Fatality Analysis Reporting System. Therefore, driver zipcodes link the data from FARS with the information from Claritas. This Geo-demographic report is analyzed using Claritas Version 3.3. All the group numbers and cluster numbers referenced throughout this report relate and match with the group numbers and cluster numbers assigned by Claritas.

The Claritas system uses U.S. Census data to classify zipcodes in terms of socio-economic and demographic clusters. The database is built by analyzing the wealth of

information contained in the U.S. Census. With the cooperation of Claritas clients and third-party data sources, millions of individual records are processed to evaluate, optimize and provide a system that can identify print and broadcast media of general interest to each cluster. New census data can identify the opportunity to analyze changes in the demographic fabric of our society and ensure that the new Claritas segmentation products provide the Geo-demographic tools for targeting specific segments of the population.

Claritas classifies the more than 35,000 zipcodes in the United States into one of 62 cluster or neighborhood types. Each cluster represents a unique set of demographic, socio-economic and lifestyle characteristics. Each cluster is assigned a numeric code and a unique nickname that is intended to convey its essential characteristics unique to that cluster.

Factors that determine the cluster assignment include:

- *Predominant Area Type*

  Suburban;
  Urban;
  Rural;
  Town; and,
  Second City

- *Predominant Family Type*

  Married Couples with Children;
  Married Couples, Few Children;
  Families with Singles Elements;
  Singles, Couples, Few Children; and,
  Solo-Parent Families & Singles

- *Ethnic Diversity*

  Dominant Ethnic Group; and,
  Mixed Ethnic Groups

- *Education Level*

  College Graduate & Above;
  Some College;

High School Graduate; and,
Grade School

· *Housing Type*

Single Unit;
2-9 Units; and,
10+ Units

· *Predominant Employment*

White Collar;
Blue Collar; and,
Mixed

Descriptions of each social group and each of the 62 individual clusters are provided in Appendix B. These descriptions typically define all the essential details about the cluster. The population of each cluster as a number and as a percentage of the total US population is given in Appendix C.

The Claritas system also includes the syndicated surveys from Mediamark Research (MRI) in their database. The survey information identifies users of specific products, services, participants, activities and other lifestyle related information by the cluster type. These data are combined with FARS to where motorcycle drivers live, what they read, which television programs they watch and their consumer habits.

3.2 Hypotheses

Data from the FARS provide information about fatal motorcycle crashes that are a starting point in formulating hypotheses for the geo-demographic analysis. For example:

- Almost half (43 percent) of all motorcycle fatalities in 1996 resulted from crashes in seven states, 232 in California, 160 in Florida, 117 in Ohio, 115 in Texas, 109 in Illinois, 98 in Pennsylvania, and 95 in New York;

- In 1996, 42 percent of all motorcyclists involved in fatal crashes were speeding, nearly twice the rate for drivers of passenger cars or light trucks. The percentage of alcohol involvement was 50 percent higher for motorcyclists than for drivers of passenger vehicles;

- One out of five motorcycle operators involved in fatal crashes in 1996 were operating the vehicle with an invalid license at the time of the collision, while only 12 percent of drivers of passenger vehicles in fatal crashes did not have a valid license;

- More than one-half of all motorcycles involved in fatal crashes in 1996 collided with another vehicle in transport. In two-vehicle crashes, 76 percent of the motorcycles involved were impacted in the front. Only 5 percent were struck in the rear; and,

- Motorcycles are more likely to be involved in a fatal crash with a fixed object than are other vehicles. In 1996, 28 percent of the reported fatal crashes involving motorcycles were fixed object crashes, compared to 23 percent for passenger cars, 18 percent for light trucks, and 6 percent for large trucks.

The above statistics and other FARS data on motorcycle fatalities indicate a number of factors in a profile of the motorcycle drivers who are likely to be involved in a fatal crash. Based on the data, the following hypotheses were formulated for testing in the geo-demographic data analysis:

- Motorcycle ownership varies among lifestyle clusters;

- Fatal motorcycle crashes are more likely to occur in some lifestyle clusters;

- Younger drivers are more likely to be involved in fatal motorcycle crashes;

- Younger drivers are likely to be found in a select group of clusters;

- Drivers who wear helmets are less likely to be involved in fatal motorcycle crashes;

- Drivers in fatal motorcycle crashes due to alcohol can be found in a select group of clusters;

- Drivers involved in crashes due to drugs can be found in a select group of clusters;

- Majority of the drivers involved in fatal motorcycle crashes are male drivers; and,

- Inclement weather is a major factor in fatal motorcycle crashes.

3.3 Analytical Tools

The two primary tools for analyzing geo-demographic cluster systems are Percentage and Index.

Percentage is used to determine if a variable is an important factor overall or if particular clusters

account for/exhibit more of a variable than other clusters. For example, in evaluating the number of vehicles involved in crashes, are crashes involving single vehicles a high percentage of all crashes? At the same time, does cluster #1 account for a sizeable percentage of the crashes involving single vehicles? With 62 clusters, the overall average percentage will be just under 2%. If a cluster percentage is over 2% for a variable or variable value, the percentage is considered high.

An index compares the propensity of a cluster to have a specific variable relative to the base. The index is calculated by dividing the percentage of a cluster having a specific variable or variable value (e.g., people age 16-18) by the percentage for the base population and then multiplying the result by 100. For example:

Cluster Code	Base Count (All Ages)	Base Percent (All Ages)	Age 16-18 Count	Age 16-18 Percent	Index
2	310	1.02%	24	1.17%	115
3	363	1.20%	29	1.42%	119
4	422	1.39%	27	1.32%	95
Total	30,348	100.00%	2,040	100.00%	

The resulting index will be equal to 100 if the proportion of the variable in the cluster is the same as the base proportion. An index over 100 indicates that the cluster has a higher propensity for a specific variable. An index below 100 indicates that the cluster is less likely to exhibit the presence of a specific variable. Clusters that have either an index above 120 or percentage above 2% or both are necessary to be considered in targeting the cluster performance behavior analysis.

Cluster behavior is analyzed by reviewing the percentage and index together for a specific variable. Clusters can then be classified as follows based on percentage and index:

Classification	Percentage		Index
Primary Target	High (>2%)	**and**	High (>120)
Secondary Target	High (>2%)	**and**	Low (<120)
Secondary Target	Low (<2%)	**and**	High (>120)
Non-Target	Low (<2%)	**and**	Low (<120)

Using this classification, each cluster can be assigned to one of the above categories for the variables tested in the hypotheses. The analysis based on the percentage and index can show if a specific cluster is considered a primary target cluster for the behavior being considered. For example, for the incidence of fatal motorcycle crashes, Cluster 35 has a percentage of 3.36% and

an index of 214. This cluster is an important target for attempting to influence the incidence of fatal motorcycle crashes. At the same time, Cluster 1 has a percentage of 0.24% and an index of 18. This segment does not have a problem with fatal motorcycle crashes and should not be considered influential.

The Secondary Target classification is given to clusters that do not exhibit all of the Primary Target characteristics, i.e., have either a high percentage or high index, but not both. These clusters have a lower priority than the Primary Targets in terms of a program's allocation of resources. At minimum, the Secondary Targets should be monitored to determine their potential to move into the Primary Target category, affecting fatal motorcycle crashes in the future.

Since the incidence of motorcycle fatalities is the factor for the study, total motorcycle drivers involved in fatal motorcycle crashes are used as a base for the calculation of indexes for all the FARS-related variables. These variables include:

Incidence of drivers in fatal motorcycle crashes;
Age of motorcycle driver in fatal crashes;
Presence of alcohol or drugs;
Gender of motorcycle driver;
Crashes in urban versus rural areas;
Motorcycle driver license status;
Use of helmets;
Single versus multi-vehicle crashes;
Collisions with vehicles or other objects; and,
Weather conditions at time of crash

Percentages and indices for motorcycle ownership were also calculated for all the 62 clusters using information from a Mediamark Research Inc. (MRI) survey of American households, which is part of the Claritas database. These indicators were used to examine the relationship between the motorcycle ownership and drivers involved in fatal motorcycle crashes.

Data from the Claritas database were also used to evaluate the market potential for media advertising by calculating the percentage penetration and index for various media related products for each cluster. For this purpose, the penetration (percentage) and index show which media groups provide the greatest potential for reaching the target clusters, in this case for safety-related messages pertaining to motorcycle drivers.

The market potential for media advertising is based on the following four variables:

- Performance Index: This represents the relative likelihood of each cluster, or the primary customers as a whole to use a particular media;

- Percentage of the Particular Media Audience: This represents the percentage of the audience for the particular media that falls within a given cluster;

- Percentage of Households: This represents the percentage of all US households reached by a particular media; and,

- Percentage of Primary Target Clusters: By combining the Percentage of the Particular Audience and Percentage of Households, we can calculate the percentage of the primary target cluster households reached by a given media. Combined with media costs, this would give the cost of reaching a target household.

3.4 Media Analysis

Looking at Country radio stations as an example of how the media evaluation was calculated helps define the process and the terms. First, a calculation of the percentage of all U.S. Households falling into the defined Primary target clusters was determined to be 16.61%, using Claritas data. Then, using the MRI data, the cluster profile for Country radio listeners was obtained for all 62 clusters. From this information, the percentage of the country music audience falling into the core target clusters was calculated to be 18.85%. This represents the percentage of this audience that can be expected to fall into the core target clusters.

Second, a comparison of the two percentages reveals the Performance Index. This Index is calculated by dividing the percentage of core consumers listening to Country music by their percentage in the total U.S. household population and multiplying by 100 (18.85/16.61 x 100). This results in a Performance Index for Country music stations of 113.49.

Claritas also has a database of syndicated consumer surveys and marketing data from Simmons Market Research Bureau, MRI, Scarborough, Polk, and more. To calculate the reach of Country music into the core target clusters, the audience rating is multiplied by the percentage of core cluster listeners. Simmons data provides an overall rating for country music stations of 20.4%. This is the percentage of households listening to country music. When multiplied by the core percentage of the audience (18.85%), a net reach of 3.85% of the core target clusters can be reached through advertising on country music stations. This net reach can then be compared to the pricing of this and other media to determine effective means of reaching the core target households.

4. FINDINGS

Detailed results are presented for the incidence of motorcycle ownership and the incidence of fatal motorcycle crashes to illustrate the methodology. Also, determining whether the same clusters which are more likely to own motorcycles also have a propensity to experience fatal motorcycle crashes is particularly important for identifying primary targets for crash prevention programs. Results of the other variables are summarized in subsequent sections.

4.1 Incidence of Motorcycle Ownership

Motorcycle ownership is a starting point to target motorcycle safety messages. Motorcycle ownership does not distribute equally across all lifestyle clusters. Based on the Geo-demographic analysis, the clusters most likely to own motorcycles (see cluster classification criteria) are presented in Table 1. Table 2 represents the clusters most likely to have motorcycle drivers involved in fatal crashes based on the Geo-demographic analysis (see classification criteria).

Based on the cluster descriptions, the suburban clusters seem to represent the younger clusters. Presence of young adults under the age of 30 is significant in these clusters. Even neighborhoods with industrial rust belt have a bi-modal age distribution of both young and old households, as is usually found in areas in transition. The percentage and index of motorcycle ownership for all 62 clusters is included in Appendix D. Charts 1 and 2 indicate the primary target clusters that own motorcycle as a percentage and as index. Charts 3 and 4 indicate the primary target clusters for motorcycle drivers involved in fatal crashes as a percentage and as index.

Table 1: Clusters with A High Percentage of Motorcycles Owned

Cluster Code	**Own Motorcycle (thousands)**	**Own Motorcycle Percent**	**Own Motorcycle Index**	**Cluster Classification**
02	220	2.14	92	Secondary Target
04	241	2.34	125	***Primary Target***
05	375	3.65	107	Secondary Target
11	212	2.06	105	Secondary Target
15	307	2.98	104	Secondary Target
16	197	1.92	136	Secondary Target
20	188	1.83	147	Secondary Target
22	364	3.54	172	***Primary Target***
26	266	2.59	131	***Primary Target***
27	180	1.75	124	Secondary Target
34	210	2.04	124	***Primary Target***
38	265	2.58	113	Secondary Target
39	288	2.80	151	***Primary Target***
41	260	2.53	159	***Primary Target***
42	118	1.15	131	Secondary Target
44	264	2.57	128	***Primary Target***
57	311	3.02	126	***Primary Target***
58	426	4.14	196	***Primary Target***
59	451	4.39	256	***Primary Target***
62	243	2.36	122	***Primary Target***

Table 2: Clusters with A High Percentage of Motorcycle Drivers Involved

Cluster Code	**Motorcycle Driver Count**	**Motorcycle Driver Percent**	**Motorcycle Driver Index**	**Cluster Classification**
06	47	0.15	199	Secondary Target
10	196	0.65	151	Secondary Target
12	651	2.15	114	Secondary Target
11	212	2.06	105	Secondary Target
15	684	2.25	76	Secondary Target
19	640	2.11	128	***Primary Target***
21	607	2.00	140	***Primary Target***
22	618	2.04	58	Secondary Target
23	535	1.76	259	Secondary Target
25	679	2.24	135	***Primary Target***
26	764	2.52	97	Secondary Target
27	622	2.05	117	Secondary Target
28	520	1.71	126	Secondary Target
29	261	0.86	158	Secondary Target
30	500	1.65	239	Secondary Target
31	474	1.56	177	Secondary Target
32	770	2.54	165	***Primary Target***
34	775	2.55	125	***Primary Target***
35	1,019	3.36	392	***Primary Target***
36	353	1.16	222	Secondary Target
39	1,050	3.46	124	***Primary Target***

Table 2: Clusters with A High Percentage of Motorcycle Drivers Involved (continued)

Cluster Code	**Motorcycle Driver Count**	**Motorcycle Driver Percent**	**Motorcycle Driver Index**	**Cluster Classification**
43	683	2.25	115	Secondary Target
44	789	2.60	101	Secondary Target
45	397	1.31	198	Secondary Target
46	392	1.29	136	Secondary Target
47	475	1.57	366	Secondary Target
48	544	1.79	125	Secondary Target
51	565	1.86	138	Secondary Target
52	829	2.73	234	***Primary Target***
53	703	2.32	160	***Primary Target***
54	602	1.98	219	Secondary Target
55	510	1.68	162	Secondary Target
56	488	1.61	145	Secondary Target
57	651	2.15	71	Secondary Target
58	751	2.47	60	Secondary Target
59	673	2.22	51	Secondary Target
60	678	2.23	160	***Primary Target***

INSERT CHART 1 MOTORCYCLE OWNERSHIP BY PERCENT FOR PRIMARY TARGET CLUSTERS

INSERT CHART 2 MOTORCYCLE OWNERSHIP BY INDEX FOR PRIMARY TARGET CLUSTERS

INSERT CHART 3 MOTORCYCLE DRIVERS INVOLVED BY PERCENT FOR PRIMARY TARGET CLUSTERS

INSERT CHART 4 MOTORCYCLE DRIVERS INVOLVED BY INDEX FOR PRIMARY TARGET CLUSTERS

4.2 Incidence of Drivers in Fatal Motorcycle Crashes

It is important to know the relationship of the clusters that are most likely to own motorcycles and also have the highest incidence of drivers involved in fatal motorcycle crashes. This will give a clear understanding whether ownership of motorcycle effects the incidence of drivers involved in fatal motorcycle crashes. Table 3 compares the primary clusters with ownership indicators to primary clusters with incidence of drivers involved in fatal crashes.

Table 3: Primary Clusters with Motorcycle Ownership and Primary Clusters with Incidence of Drivers Involved in Fatal Motorcycle Crashes

Primary Ownership of Motorcycles	**Primary Incidence of Drivers in Fatal Crashes**	**Percent of Drivers**	**Percent of Population**
Cluster 4		1.39	1.87
	Cluster 19	2.11	2.00
	Cluster 21	2.00	1.42
Cluster 22		2.04	2.06
	Cluster 25	2.24	1.56
Cluster 26		2.52	1.98
	Cluster 32	2.54	1.58
Cluster 34	Cluster 34	2.55	1.65
	Cluster 35	3.36	1.57
Cluster 39	Cluster 39	3.46	1.85
Cluster 41		1.22	1.59
Cluster 44		2.60	2.01
	Cluster 52	2.73	1.46
	Cluster 53	2.32	1.74
Cluster 57		2.15	2.40
Cluster 58		2.47	2.11
Cluster 59		2.22	1.71
	Cluster 60	2.23	2.18
Cluster 62		1.45	1.94
Total Percent		**43.60**	**34.68**

Clusters that demonstrate either a high propensity to own a motorcycle or to have a driver involved in a fatal crash are responsible for 43.60 percent of all fatal motorcycle crashes. However, only two clusters, 34 and 39 are high on both ownership and incidence of fatal crash. This finding indicates that a high propensity to own a motorcycle does not necessarily indicate the high potential for driver to be involved in fatal crash. Those clusters that appear in the right hand column (primary

incidence of drivers in fatal crashes) and in both columns are accounting for more than their share of fatal motorcycle crashes (25.54%) and should receive attention in developing crash prevention programs. Clusters that appear in the left-hand column and do not appear in the right hand column may be considered safer motorcycle drivers, but still are groups that need to be aware of motorcycle safety.

The total percent population that is involved in 45.10% of the fatal motorcycle crashes is 34.68%. Of this, 17.01% of the population accounts for 25.54% of the fatal crashes. These percentages are shown in the Table 3 above.

Primary Targets for crash prevention programs include those clusters that are high on incidence of drivers in fatal crashes or both motorcycle ownership and drivers in fatal crashes. The percentage and index of motorcycle drivers involved for all 62 clusters is included in Appendix E. Chart 5 displays the incidence of motorcycle crashes for clusters that are primary targets on incidence of drivers in fatal crashes, motorcycle ownership, or both.

INSERT CHART 5 INCIDENCE OF FATAL MOTORCYCLE CRASHES FOR PRIMARY TARGETS

4.3 Age of Motorcycle Drivers in Fatal Crashes

About 55% of fatal motorcycle crashes involve drivers of motorcycle under age 30. About 80% involve drivers of motorcycle under 40. Certainly, younger people are involved in most of the fatal motorcycle crashes in the U.S. However, lifestyles among the different age groups did not prove to be as significant a predictor of fatal motorcycle crashes as anticipated. Some clusters were more likely to have crashes among younger motorcycle drivers as shown in Table 4.

Overall, the affluent suburban clusters are younger with a higher percentage of their fatal crashes among consumers under age thirty. The town and rural clusters have a lower percentage of crashes among consumers under 30 and therefore more older drivers involved in fatal crashes. Chart 6 displays the percent of fatal motorcycle crashes with drivers under age 30 for primary clusters with incidence of drivers in fatal crashes, motorcycle ownership, or both. Chart 7 displays the percent of fatal motorcycle crashes with drivers under age 40 for primary clusters with incidence of drivers in fatal crashes, motorcycle ownership, or both.

A comparison is made to the distribution of fatally injured drivers of passenger cars, light trucks and vans (also called passenger vehicles) between the years 1987 to 1997. The comparison shows that national average percentage of drivers involved in fatal crashes for drivers of passenger vehicles under age 30 is 42.4% and for drivers under age 40 is 63%. These numbers show that the national average percentages for motorcycle drivers under the ages of 30 and 40 is high compared to the national average percentages for drivers of passenger vehicles for the same age group.

Table 4: Percent of Fatal Motorcycle Crashes with Drivers Less Than Age 30 and Age 40 for Primary Clusters with Ownership or Incidence of Drivers in Fatal Crashes

Primary Ownership of Motorcycles	**Primary Incidence of Drivers in Fatal Crashes**	**Percent of Drivers Involved under Age 30**	**Percent of Drivers Involved under Age 40**
Cluster 4		63	85
	Cluster 19	59	84
	Cluster 21	56	83
Cluster 22		59	83
	Cluster 25	54	83
Cluster 26		51	80
	Cluster 32	56	79
Cluster 34	Cluster 34	52	79
	Cluster 35	55	79
Cluster 39	Cluster 39	50	78
Cluster 41		46	75
Cluster 44		49	77
	Cluster 52	49	74
	Cluster 53	51	79
Cluster 57		46	74
Cluster 58		48	73
Cluster 59		44	70
	Cluster 60	50	76
Cluster 62		56	80
National Average		**54**	**79**

INSERT CHART 6 on PERCENT OF MOTORCYCLE CRASHES FOR DRIVERS UNDER 30

INSERT CHART 7 on PERCENT OF MOTORCYCLE CRASHES FOR DRIVERS UNDER 40

4.4 Presence of Positive Alcohol and Drug Tests

In 1997 approximately 38% of drivers involved in fatal motorcycle crashes had presence of alcohol. The presence of alcohol seems to have been almost equally likely across all clusters as seen from Claritas analysis. Few clusters had indices over 120 or under 80. No clusters had indices below 80 or above 120 and a percentage above 2%.

Fewer drivers in fatal motorcycle crashes involve positive drug tests (about 7%). While alcohol did not vary as much as might be expected among the clusters, drug testing certainly did. However, among the primary target clusters described above only three have a notable above average propensity for reported drug use in conjunction with a crash. These clusters are19, 32 and 34.

Police-reported alcohol use also did not vary greatly across lifestyle clusters, but accounted for almost 28% of all drivers in motorcycle crashes. Less than 1% of all drivers in fatal motorcycle crashes involve police-reported drug use.

About 10% of drivers in fatal motorcycle crashes involve a Blood Alcohol Level (BAC) of 0.01-0.09. About 28% of the drivers involved had BAC Levels of 0.10 or more. Neither of the above two BAC factors proved to vary greatly across the clusters. While alcohol has proven to be a contributor to fatal motorcycle crashes, the incidence seems to be equal across all clusters.

4.5 Gender of Motorcycle Driver

Males were the drivers in almost 98% of all fatal motorcycle crashes. As a result, there is no significant variation from the incidence of these crashes in general. Female motorcycle drivers account for so few crashes that it is not possible to analyze the variation across clusters at this time.

4.6 Urban Versus Rural Motorcycle Crashes

More drivers in fatal motorcycle crashes were involved in urban areas than in rural areas. Approximately 55% of these drivers were in urban areas, while a corresponding 45% were in rural areas.

As might be expected, there is almost a perfect correlation between the occurrence of urban crashes and the urban clusters. The same is true for rural crashes and rural clusters. These findings suggest that crashes occur in the local areas of the residence of the driver.

4.7 License Status of Motorcycle Driver

About 71.4% of fatal motorcycle crashes involve drivers with valid driver's licenses. About 7% occur among motorcycle drivers not licensed and 16% with an invalid license (licensed but not valid). Fatal motorcycle crashes among drivers without licenses occurred mostly among clusters

in rural and country areas. However, this group represents a very small percentage of crashes in general and may not require specific action at this time. Crashes involving drivers with valid licenses showed little variance among the lifestyle clusters.
Urban riders are the most likely to have their licenses suspended. In fact, every urban cluster involved in a fatal crash with a middle or lower income profile was above average in having their motorcycle licenses suspended. Only two clusters (33 and 50) were significantly above average in having their licenses suspended as a result of a crash. None of the primary target clusters involved in motorcycle crashes demonstrated a high likelihood of having their licenses suspended. These findings may reflect tighter laws and enforcement in the urban environments than in the suburbs, towns and rural areas.

The percentage of licensed drivers of passenger cars, light trucks and vans involved in fatal crashes are 86.05%. The unlicensed drivers for the same is 12.85% and license unknown drivers is 1.10%.

4.8 Use of Motorcycle Helmets

An almost equal number of fatal motorcycle crashes occur among drivers using helmets and those that do not on a national basis. The use of helmets varied little among the lifestyle clusters. The small number of observations based on each state makes it difficult to see any variance among the states and clusters based on the individual state helmet licensing laws.

About 55% of fatal crashes involve passengers using helmets and 45% involve passengers not using helmets. The small number of passengers involved in fatal motorcycle crashes makes it difficult to analyze for any variance across the clusters.

4.9 Collisions with Other Vehicles and Fixed Objects

Forty five percent of fatal motorcycle crashes involve a single vehicle, while the remaining 55% involve multiple vehicles. The clusters show little variation when considering the occurrence of single vehicle crashes and multi-vehicle crashes. This means that the ability to reduce the number of multi-vehicle crashes is limited using the lifestyle clusters.

Just over half of all fatal motorcycle crashes involve collisions with other vehicles, as noted above. Another 29% involve collisions with fixed objects. The remaining involve collisions with objects that are not fixed or no collision at all. Again the analysis shows no patterns on these variables and little variance across the lifestyle clusters. This suggests that the most important goal of control program is preventing the occurrence of crashes rather than trying to influence the types of crashes that occur.

4.10 Role of Weather in Fatal Motorcycle Crashes

Approximately 96% of fatal motorcycle crashes occur in normal weather. Just under 3% occur in the rain and less than 1% in snow or other weather. This suggests that most motorcycle owners don't ride in bad weather. Because of the vast majority of crashes occur in normal weather, there was little variance across the lifestyle clusters.

4.11 Media Usage

The analysis identified several clusters of drivers that are likely to be involved in fatal motorcycle crashes. The clusters are:

Cluster 19;
Cluster 21;
Cluster 25;
Cluster 32;
Cluster 34;
Cluster 35;
Cluster 39;
Cluster 52;
Cluster 53; and,
Cluster 60

In order to determine the media that will likely reach these audiences, data from the MRI and Simmons syndicated consumer research surveys of Media Usage for the clusters in Claritas was employed. The percentage of the primary target clusters on a national average for the survey was 16.6%.

Three measures were calculated in the analysis for the above primary target clusters. First, a performance index indicates the relative presence for the primary target clusters with 100 being average. Second, is the percentage of the particular media audience made up by the primary target clusters. Third, is a net reach calculation, which multiplies the media rating (percentage of households) by the percentage of the primary target clusters. Table 5 summarizes the results and shows the productive media.

Table 5: Summary of Media Usage Analysis-The Potentially Most Productive Media to Reach the Primary Target Clusters

Media Category	**Index**	**% of Audience**	**Net Reach**
MAGAZINES			
Computer	113	18.8	1.5
Entertainment/Performing Arts	110	18.2	0.7
Fishing/Hunting	107	17.8	2.5
Motorcycle	113	18.8	0.5
TELEVISION PROGRAM TYPE			
Country Music	133	22.1	2.6
QVC	127	21.1	1.1
Auto Racing	118	19.3	2.1
TELEVISION DAY-PART			
Saturday 1:00 PM to 4:30 PM	105	17.5	1.9
Sunday 10:00 AM to 1:00 PM	112	18.5	1.2
RADIO			
Country Stations	113	18.8	3.8
NEWSPAPERS			
The primary target clusters readership of newspapers is below average.			

5. CONCLUSIONS

The analysis described in this report supports a variety of conclusions about the targets for motorcycle crash prevention programs and the utility of Geo-demographic analysis for propagating the traffic safety message either directly to the drivers or indirectly through the people living and associated with the drivers.

5.1 Targeting Motorcycle Crash Prevention Programs

The analysis identified several clusters of drivers that are likely to be involved in fatal motorcycle crashes. These clusters are: 19, 21, 25, 32, 34, 35, 39, 52, 53 and 60. The zipcodes for these clusters identify the geographic areas for program development.

The most likely media for reaching the primary target clusters were country radio, country music TV, motorcycle and fishing/hunting magazines.

Other findings provide insight into the possible considerations for prevention programs as follows:

- Male drivers account for almost all of the fatal crashes as seen from FARS data and are therefore the sole target for a campaign against motorcycle fatalities;

- Age is a key determinant in the occurrence of fatal motorcycle crashes as seen from FARS data. In general, messages targeted at drivers under the age of 40 are recommended. However, lifestyle clusters that show a higher propensity for fatal motorcycle crashes seem to have a bimodal age factor -- younger suburban riders and older town/rural riders;

- Alcohol is involved in two out of five fatal crashes as seen from FARS data and should become a major topic of any campaign developed by NHTSA;

- There are key urban and ethnic clusters that can be targeted with the appropriate message regarding drug use and motorcycle fatalities;

- Helmet use, license status and weather does not seem to be factors that can be affected using a lifestyle analysis;

- The types of collisions involving one or more vehicles and other objects do not show a propensity to vary by cluster; and,

- While license suspension was highly correlated with the incidence of fatal crashes, the factor appeared to be a reflection of more rigorous enforcement in urban areas than rural areas.

6. APPENDICES

APPENDIX A FARS DATA ELEMENTS USED IN ANALYSIS

APPENDIX B DESCRIPTIONS OF THE GEO-DEMOGRAPHIC SOCIAL GROUPS AND CLUSTERS

APPENDIX C POPULATION OF INDIVIDUAL CLUSTERS

APPENDIX D MOTORCYCLE OWNERSHIP BY CLUSTER

APPENDIX E MOTORCYCLE DRIVERS INVOLVED BY CLUSTER