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**Epidemiology of Injuries from Road Traffic Accidents in  
Lagos State, Nigeria**

**Atubi, Augustus .O., Ph.D.**

Associate Professor

Department of Geography and Regional Planning  
Delta State University, Abraka

E-mail: [atubigrp@yahoo.com](mailto:atubigrp@yahoo.com)

Phone No.: +2348037450078

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**Abstract**

*Epidemiology of injuries from Road Traffic Accidents (RTAs) has become a major public health concern worldwide. However, unlike developed or high-income countries, many developing countries have made very little progress towards addressing this problem. Nonetheless, there are ways to strengthen the reduction of injured persons that will help to lower the toll from road traffic accidents. The purpose of this paper was to elucidate ways to accomplish these goals in the context of Lagos State, Nigeria. The reported*

*injuries from road traffic accidents in the 20 Local Government Areas of Lagos State were compared using the Analysis of Variance (ANOVA). The result showed that for the two factors, Local Government Areas and years, the F-calculated of 21.34 and 9.77 respectively were higher than the F-tabular of 1.57 and 1.46 respectively at 0.05 level of significance. It then implies that the means for reported number of injured from road accidents for each of the two factors were significantly different. The result of the multiple regression analysis was 0.61. This implies that the proportion of variation in the dependent variable (injured from road traffic accidents) explained by the independent variables was 61%. Based on the findings, recommendations were proffered on how to reduce the phenomenon of injuries from traffic accidents in Lagos State.*

**Key words:** Injuries; Traffic; Accidents; Epidemiology; Lagos State

### **Introduction**

Road traffic injuries are a major cause of morbidity and mortality worldwide, but especially in low-and middle – income countries. The World Health Organization estimates that more than 3000 people are killed every day in road traffic crashes globally, with at least 30,000 others injured or disabled. This adds up to over 1 million people killed and between 20-50 million injured or crippled in road traffic crashes each year (Krug, 2000). Low-and middle-income countries account for more than 85% of the deaths and up to 90% of the disability-adjusted life years (DALYs) lost globally (Krug et al, 2000). At the current rate, it is projected that road traffic disability-adjusted life years lost will move from being the ninth leading cause of DALYs in 1999 to the third leading cause by 2020 (Murray et al, 2001). The rising trend in morbidity and mortality rates due to road traffic injuries in low-and middle-income countries has moved some to declare road traffic injuries an ‘epidemic’ (Nantulya, 2002), describing it as a “war” on the roads.

The global costs of road injuries are enormous. One report estimates the global costs of road crashes is about 518 billion annually in U.S. dollars and ranges in percentage of GNP from 0.3% in Vietnam to almost 5% of GNP in the USA, Malawi and Zulu Natal, South Africa (Jacobs et al, 2000). The true costs to society are probably much greater since these estimates are based on direct costs only.

In almost all countries in Africa, Asia and Latin America, road traffic crashes have become one of the leading causes of death in older children and economically active adults between the ages 30 and 49 years (Murray, 1996; Ross et al, 1991; Jacobs et al, 2000). Despite this burgeoning problem, little attention has been paid to road traffic injury prevention and treatment in most developing countries. Efforts to combat the problem of injuries have, in most cases, been hampered by paucity of funds and lack of relevant data.

In Nigeria, road traffic accident situation over the last three decades has been particularly disturbing. In 1976, there were 53,897 road traffic accidents resulting in 7,717 deaths. Although in 1981, the magnitude reduced to 5,114 accidents, but the fatality increased to 10,236 which means that there was an average of 96 accidents and situation in subsequent years has not been any better. The number of people killed in road accidents between 1990 and 2005 rose from 28,253 and the fatality rate remains consistently high (Atubi, 2009c).

International comparison indicates that the chance of a vehicle killing someone in Nigeria is 47 times higher than in Britain. The proportion of fatalities to injuries reported is also very high. For example, while Czech Republic has only one death in 175 accidents, France one death in 175, South Africa, one death in 47 accidents, Nigeria has one death in 2.65 accidents (Atubi, 2010b).

Road traffic accidents' statistics in Nigeria reveal a serious and growing problem with absolute fatality rate and casualty figure rising rapidly. In majority of developing countries, accident occurrence and related deaths are relative to either population or number of vehicles. Ironically, in Nigeria, studies have indicated that better facilities in terms of good quality and standardized roads have been accompanied by increasing number of accidents (Onakomaiya, 1988; Gbadamosi, 2002; Atubi and Onokala, 2009). This is totally contrary to the trends in countries where even the level of sophisticated road network and volume of vehicular traffic are much higher (Atubi, 2010a).

Based on data that are at best conservative estimates, Nigeria is a country with a serious and growing road accident problem that is among the worst in the world (Asogwa, 2002). Analysis of global statistics indicates that fatality rates (per licensed vehicle) in developing countries are high in comparison

with those of developed countries (Adeniji, 2002). African countries in particular have rates often 30 to 50 times greater than those in the countries of Western Europe.

According to Federal Road Safety Commission, between 1970 and 2001, Nigeria recorded a total of 726,383 road traffic accident, resulting in the death of 208,665 persons and injuries to another 596,425. In that period, each succeeding year recorded more accidents, deaths and injuries. Also, between 1997 and 2002, Lagos State alone recorded a total of 17,141 road accidents, resulting in the death of 3,132 persons and injuries to 9,972 persons.

Indeed, the Nigeria accident pattern seems to suggest that the better the road, the higher the accident and fatality rate as well as the severity and non-survival indices because of driver non compliance with speed limits (Onakomaiya, 1988; Filani and Gbadamosi, 2007).

### **Methodology**

This study, in a broad sense, under takes a spatial analysis of injuries from road traffic accidents over a period of 32 years (i.e. 1970-2001) in Lagos State. This is an attempt to conduct a detailed investigation of accident phenomenon more than the ones that had hitherto engaged the attention of researchers.

Secondary data were collected from various sources, which include the records of the Federal Road Safety Commission, the Nigeria Police, Federal Ministry of Transport and the Federal Office of Statistics. The data collected were analyzed using both descriptive and inferential statistics.

### **Data Analysis**

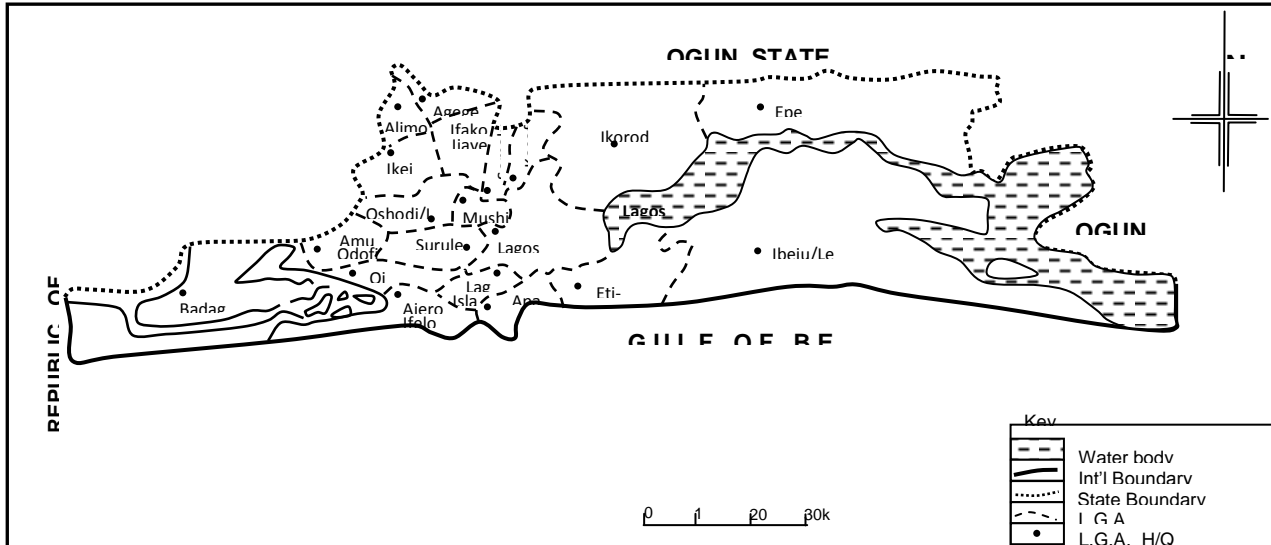
The analysis of variance statistical (ANOVA) techniques were used to test for the significance of variability in the spatial pattern of injury from road accidents in Lagos State. Also, the multiple regression analysis statistics was used in this study to investigate the factors that influence the number of injuries from reported road traffic accidents in Lagos State. The dependent variable was reported number of injuries from road accident, while the independent variables considered include length of roads in Lagos State from 1970-2001, presence of road safety corps and population. However, data on alcohol induced accidents, over speeding and reckless driving could also have been useful but were not considered for lack of data.

## **Study Area**

Lagos State is a suitable case study because it hosts metropolitan Lagos, Nigeria's major traffic centre, fastest growing city, and most heavily motorized urban area in the country. Consequently, the state has one of the highest accident and casualty rates in the country (Federal Republic of Nigeria, 1997, p. 6). Moreover, the traffic situation in Lagos State is bad because of the absence of effective planning, vehicle-misuse, poor management, inadequate street parking, traffic congestion, delays and accidents among other contributory factors.

Lagos State is situated in the South Western corner of Nigeria. This elongated state spans the Guinea Atlantic coast for over 180km, from the Republic of Benin on the west to its boundary with Ogun State in the east (figure 1), while Lagos State is the smallest in Nigeria, it has over 5 percent (i.e. 9,013,534) of the country's estimated 140 million people (National Population Census, 2006). Its rate of population growth has been in excess of 9 percent per annum, or 25,000 per month or 833 per day or 34 per hours in the last decade (Lagos urban Transport Project, 2002). This population increase has been accompanied by a corresponding increase in motor vehicles and traffic accidents. However, accident rates in Lagos State are still very much on the high side compared to other states in the federation. But, fatalities and non-survival indices for the state are on the decline. This is attributable to its high level of traffic congestion (which reduces the probability of the high fatality accidents resulting from over speeding) and accessibility to good post – crash medical care in the Lagos metropolitan area.

**Fig. 1: Map of Lagos State Showing the 20 L.G. As**



**Source:** Lagos State Ministry of Environment and Physical Planning (1999)

### Discussion of Findings/Results

The reported number of injured from road traffic accidents in the twenty Local Government Areas in Lagos State from 1970-2001 were compared using the Analysis of Variance (ANOVA). Two one way ANOVA, one for testing difference between the reported number of injured from road traffic accidents across the twenty Local Government Areas and the other for testing difference between the reported number of injured from road accidents and across different years 1970 to 2001. The result showing the ANOVA table for the mean comparisons are presented in Table 1.

**Table 1:** Analysis of variance for reported number of injured from road traffic accidents in Lagos State

Factor	Source of variation	Sum of squares	Df	Means squares	F-Cal	F-table
Local Govt. Area	Between L.G.A.	94477.49	19	4972.50	21.34	1.57
	Within L.G.A.	94138.28	404	233.02		
	Total	188615.77	423			
Years (1970-2001)	Between years	82220.67	31	2652.28	9.77	1.46
	Within years	106395.11	392	271.41		
	Total	188615.77	423			

The results show that for the two factors, Local Government Areas and years, the F-calculated of 21.34 and 9.77 respectively at 0.05 level of confidence were higher than the F-ratios of 1.57 and 1.46 respectively. Since their F-calculated were higher than F-table at 0.05 level of confidence, it then implies that the means for reported number of injured from road traffic accidents for each of the two factors, Local Government Areas and years were significantly different. In order to ascertain the means that were significantly different, the Duncan New multiple Range Test (DNMRT) was used for comparisons (Appendix 1). The results for the mean comparisons for different Local Government Areas and that of different years (197-2001) are shown in tables 2 and 3 respectively.

**Table 2:** Means of Reported number of injuries from road traffic accidents in different Local Government Areas in Lagos State

S/N	L.G.A.	N	Means
1	Ikeja	32	69.81a
2	Lagos mainland	32	62.03ab
3	Lagos island	32	60.31 ab
4	Ajeromi/Ifelodun	32	52.94bc
5	Mushin	32	47.25c
6	Apapa	16	46.81c
7	Oshodi/Isolo	16	36.63d
8	Ikorodu	32	36.09d
9	Surulere	16	35.50d
10	Badagry	32	34.13d
11	Alimosho	13	34.08d
12	Agege	13	33.62d
13	Ojo	13	32.69ef
14	Epe	32	30.53ef
15	Shomolu	16	29.75ef
16	Ifako-Ijaye	13	25.46efh
17	Amuwo-odofin	13	22.08fgh
18	Ibeju-Lekki	13	21.54gh
19	Kosofe	13	21.38gh
20	Eti-osa	13	14.62i

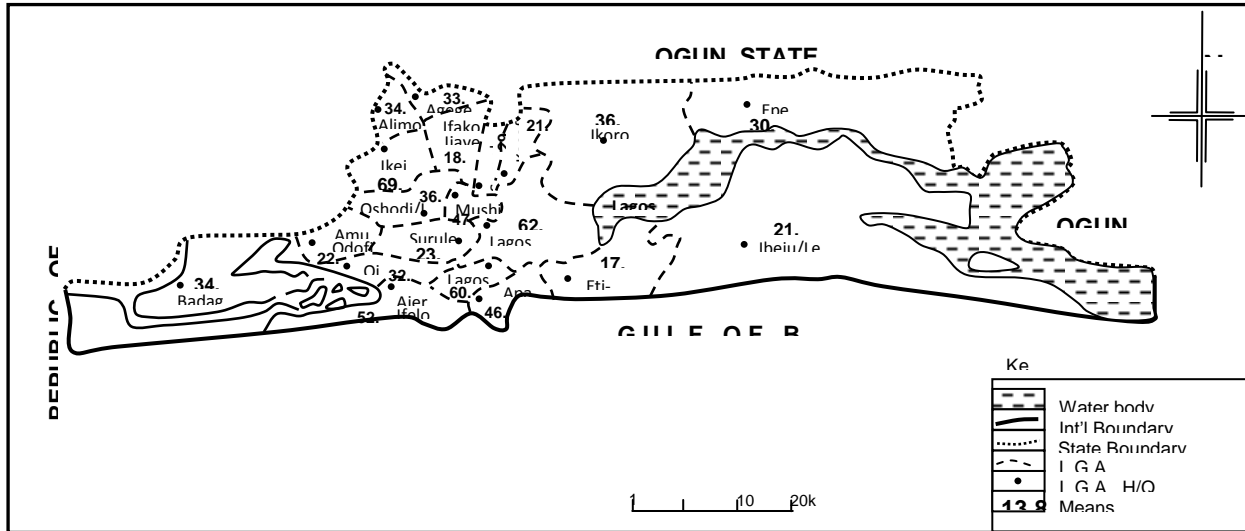
In table 2, the means were arranged from the highest mean to the lowest mean. The letters of alphabet indicated significant difference. Means with the same letter of alphabet attached to them are not significantly different while means that have a different letter of alphabet attached to them are significantly different. For example, from table 2, the means of reported number of injured from road traffic accidents in Ikeja Local Government Area is not significantly different and significantly different from those in Lagos Mainland and Lagos Island Local Government Areas which are not significantly different. However, that of Ajeromi/Ifelodun Local Government Area and Apapa Local Government Area, although that of Oshodi/Isolo Local Government Area is not significantly different from those of Ikorodu, Surulere, Badagry, Alimosho, Agege, Ojo ad Epe Local Government Areas. The result suggests that although Kosofe and Agege Local Government Areas had the highest reported accidents, the road traffic accidents were not



serious as much as injured were reported in Ikeja and Lagos Mainland Local Government Areas (Table 2, Figure 2 and Appendix 1).

In Table 3, the means were equally arranged from the highest down to the lowest. The letters of alphabet indicate significant difference. Means with the same letters of alphabet attached to them are significantly different. For example, the means of reported number of injured from road traffic accidents was highest in 1980 and 1985 and they were not significantly different from those of 1979, 1981, 1973, 1978, 1976, 1988 and 1977 but were significantly different from that of the other years. The result shows that reported number of injured from road traffic accident was highest in 1980 which also recorded the highest number of road traffic accidents (Table 3 and Appendix 1).

Fig. 2: Map of Lagos State Showing L.G.A's with Means of Reported number of injured from R.TA's



Source: Adopted from Table 2

**Table 3:** Means of reported number of injured from reported Road Traffic Accidents from 1970 – 2001

S/N	Years	N	Mean
1	1980	8	75.75a
2	1985	8	72.50ab
3	1979	8	70.13ab
4	1981	8	67.63abc
5	1973	8	66.38abcd
6	1978	8	66.25abcd
7	1976	8	64.50abcd
8	1988	12	60.50abcd
9	1977	8	60.00abcd
10	1975	8	58.50f
11	1982	8	57.50f
12	1986	12	52.17fg
13	1984	8	51.88fg
14	1983	8	50.13fgh
15	1974	8	48.25fghi
16	1987	12	46.42fghij
17	1989	20	38.80ghlij
18	1994	20	37.65ghij
19	1993	20	34.60hijk
20	1990	20	34.45hijk
21	1971	8	34.13hijk
22	1970	8	32.38ijk
23	1991	20	32.25ijk
24	1997	20	32.15ijk
25	1072	8	32.00ijk
26	1996	20	31.75ijk
27	1995	20	31.70ijk
28	2001	20	31.60ijk
29	1998	20	31.30jkl
30	1999	20	29.85kl
31	1992	20	29.60ki
32	2000	20	29.10m

In other to determine the factors that influence the number of injured from road traffic accidents, a multiple regression analysis was done. The result of the analysis shows that the  $R^2$  value was 0.61. This implies that the proportion of variation in the dependent variable (injured from road traffic accidents) explained by the independent variable was 61%. F-ratio of 14.34

was higher than the table value of 2.92 at 0.05 level of confidence indicating that at least one of the independent variables had significant influence on the dependent variable. Table 4 shows the regression result (see also Appendix 2).

**Table 4:** Regression Results of the Factors of road traffic accidents in Lagos State

Independent variables	Regression coefficients	Std. Error	T-start	Remark
Length of roads (km)	1.866	0.533	3.371	S
Presence of road safety	95.453	69.76	1.371	NS
Population	$-1.47 \times 10^{-5}$	0.00	-.955	NS
Constant	36.321	127.104	0.286	

S = Significant at 0.05 level of probability

NS = Not significant

From table 4, only the number of roads (km) positively and significantly influenced injured from road traffic accidents. This shows that the higher the length of roads (km), the more the number of injured from road traffic accidents. This also corroborates the studies by (Onakomaiya 1988; Gbadamosi, 1994; Filani and Gbadamosi, 2007 and Atubi, 2010c). Road safety had positive but not significant effects on injured from road traffic accidents.

### Policy Implications/Recommendations

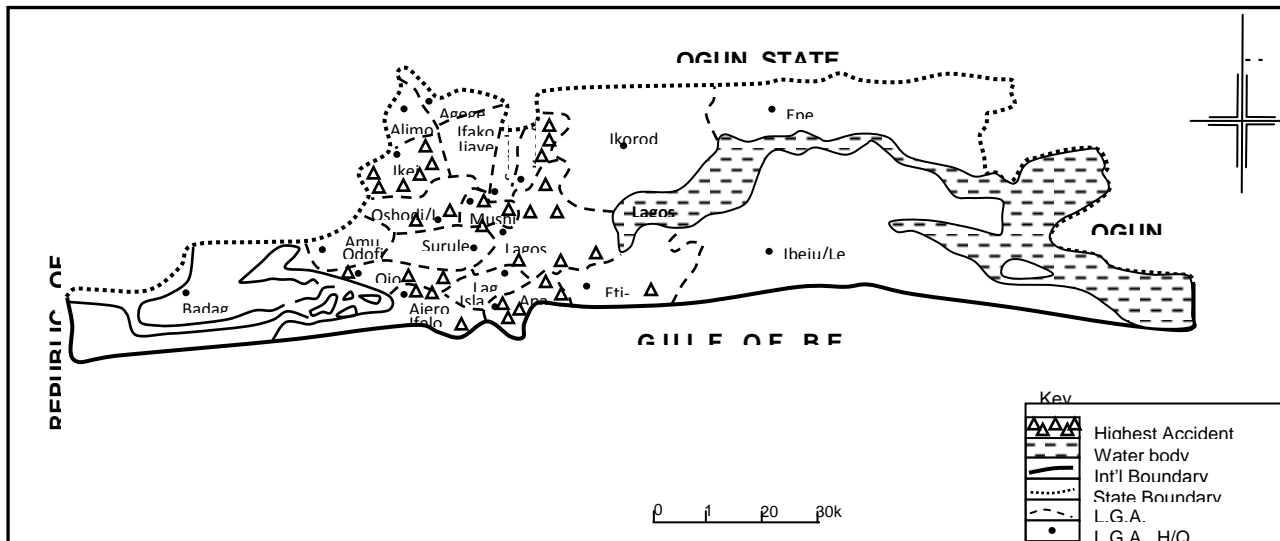
By the serious road traffic accident situation in the study area, Local Government Areas like Lagos Island, Lagos Mainland, Ajeromi/Ifelodun, Ikeja, Mushin, Oshodi/Isolo, Apapa, Eti-Osa, Kosofe and Ojo Local Government Areas can be described as accident prone areas, because they are all associated with high accident rate, high number of deaths, high number of injuries and so on (Figure 3). This, trend therefore, suggest that these Local Government Areas of Lagos State are associated with the menace of road traffic accidents, and these deserves urgent attention and appropriate policy intervention.

Since the driver of a vehicle is the most important determinant of the occurrence of an accident, the quality of drivers on the roads in Lagos State

cannot be over – emphasized. Consequently, training and retraining of drivers should be a basic effort towards reducing the carnage on our roads. The training and retraining of operators of vehicles is a sine qua non if the operators are to develop, retain, and display skills that match the demands imposed on them by constantly changing characteristics of the system. This measure is the only means of ensuring that operators serving or remaining in action in the system are first endowed with the necessary skills.

There should be measures aimed at children, particularly through schools and parents to in-still ideas of good road behaviour. The educationist should be responsible for incorporating traffic education into the curricular of primary and secondary school systems as well as seeing to the establishment, accreditation and supervision of driving schools, and nation-wide organisation of defensive driving courses, which has been found most useful in reducing accident rate among all classes of drivers.

FIG 3: Spatial Distribution of Highest Accident L.G.As in Lagos State



Source: Lagos State Ministry of Environment and Physical Planning (1999)

Preventive measures should also be taken which would include proper design of road networks as well as the planning of the general public transport system to ensure that it runs in an effective and efficient manner as this would reduce the volume of vehicles plying the roads; these measures must be commenced in the early stages of urban planning.

Also, the system of apprehension and punishment of offenders of traffic rules, to a large extent, constitute a major cause of lawlessness and blatant and general disrespect for the traffic laws on most of Nigerian roads and the consequent increase in accident occurrence. The responsibility of the police and other law enforcement agencies is to create awareness among people of the necessity to behave responsibly while driving on the roads. The police, the Federal Road Safety Corps (FRSC) and traffic wardens are grossly under resourced and under trained for this task. Worst still, is the low salary paid to police officers, which increases corruption among them and makes it impossible for many offences to be reported.

From the above, it is clear that enforcement of traffic regulations is one of the factors, which could have a major influence on road safety in Nigeria. Traffic police should seek to influence driver behaviour but this cannot be done successfully if the traffic police themselves are not adequately trained and equipped.

### **Conclusion**

Generally Nigerians have been found to exhibit nonchalant attitudes to traffic regulations. As such traffic offence has become a regular behavioural tendency among various classes of road users. Thus, an obvious policy question is how to increase the level of compliance of road user's compliance with traffic regulations so as to reduce the level of traffic offences. There is need to create avenues through which road users' behaviour can be improved upon in order to conform to the existing road safety norms. This calls for improvement in traffic education which can be achieved through regular seminars, workshops particularly for drivers and vehicle owners, among others. Traffic education should be of high priority and all segments of the society and particularly the youths needs to be made aware of the need to comply with traffic regulations.

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## Appendix 1

### Descriptive

#### Reported number of injured from accidents in Lagos State

L.G.A.	N	Means	Std. Deviation	Std. Error	95% confidence interval for mean	
					Lower bound	Upper Bound
Lagos Island	32	60.3125	24.4282	4.3183	51.5052	69.1198
Ikorodu	32	36.0938	13.1035	2.3164	31.3694	40.8181
Ajeromi	32	52.9375	20.8155	3.6797	45.4327	60.4423
Badagry	32	34.1250	8.5033	1.5032	31.0592	37.1908
Epe	32	30.5313	7.2778	1.2865	27.9073	33.1552
Ikeja	32	69.8125	21.1987	3.7474	62.1696	77.4552
Mushin	32	47.2500	18.9703	3.3535	40.1696	54.0895
Lagos mainland	32	62.0313	22.7078	4.0142	40.4105	70.2183
Apapa	16	46.8125	15.2456	3.8114	53.8442	54.9363
Osodi/Isolo	16	36.6250	10.4491	2.6123	31.0571	42.1929
Surulere	16	35.5000	5.1121	1.2780	32.7760	38.2240
Shomolu	16	29.7500	9.3773	2.3443	24.7532	34.7468
Agege	13	33.6154	8.5784	2.3792	28.4315	38.7993
Ojo	13	32.6923	11.3606	3.1509	25.8271	39.5575
Eti-osa	13	17.6154	3.8197	1.0594	15.3072	19.9236
Ibeju-lekki	13	21.5385	4.7542	1.3186	18.6655	24.4114
Ifako-ijaye	13	25.4615	5.1578	1.4305	22.3447	28.5783
Kosofe	13	21.3846	6.4490	1.7886	17.4875	25.2817
Alimosho	13	34.0769	9.7849	2.7138	28.1640	39.9899
Amuwo-odoan	13	22.0769	4.5545	1.2632	19.3247	24.8292
Total	424	41.6698	21.1163	1.0255	39.6541	43.6855

## Appendix 2

Population, length of roads (in km), and presence of road safety corps in Lagos State from 1970-2001

Year	Population	Length of roads (km)	Road safety Presence
1970	1,028,327	140	0 (No)
1971	1,085,913	142	0
1972	1,146,724	144	0
1973	1,210,940	147	0
1974	1,278,752	150	0
1975	1,350,362	152	0
1976	1,425,982	154	0
1977	1,505,836	156	0
1978	1,647,384	157	0
1979	1,802,238	157	0
1980	1,971,648	157	0
1981	2,156,982	158	0
1982	2,359,938	161	0
1983	2,581,553	164	0
1984	2,824,218	160	0
1985*	3,089,694	148	0
1986	3,380,125	144	1 (yes)
1987	3,697,856	130	1
1988	4,024,554	130	1
1989	4,425,726	130	1
1990	4,842,744	130	1
1991	5,680,000	135	1
1992	6,213,920	135	1
1993	6,790,028	150	1
1994	7,097,141	194	1
1995	7,416,512	197	1
1996	7,661,256	203	1
1997	7,914,077	200	1
1998	8,175,241	250	1
1999	8,445,025	250	1
2000	8,723,709	256	1
2001	9,011,591	300	1

**Source:** Lagos Metropolitan Area Transport Authority

(LAMATA, 2002); Master Plan Project, Urban and Regional Planning Division, Lagos State Ministry of Economic Planning and Land Matters, 2002.

\* There was a decline in length of roads in the country between 1985 and 1992 because these were the years of military rule in Nigeria and the various military regimes of that era disregarded the development of infrastructure such as roads. Moreover, flagrant abuse of power and massive corruption greatly diminished the resources available for road and other infrastructural developments.

### **Academic Background**

*Atubi, Augustus .O. holds B.Sc., M.Sc., and Ph.D. degrees in Geography from the University of Nigeria, Nsukka. He is an Associate Professor at the Delta State University, Abraka. Dr. Atubi is a specialist in Urban Transportation Planning, Road Traffic Accident Analysis and Transport Policy Impact Analysis. He is an erudite scholar and researcher of repute. He has wide knowledge of the scientific framework for transportation modeling in inter-city and inter-country transport service provision and networking. He has since been teaching courses both at the Undergraduate and Postgraduate levels of the Department of Geography and Regional Planning, Delta State University, Abraka. Dr. Atubi has contributed on several occasions fundamental issues relating to transport policies and guidelines.*