

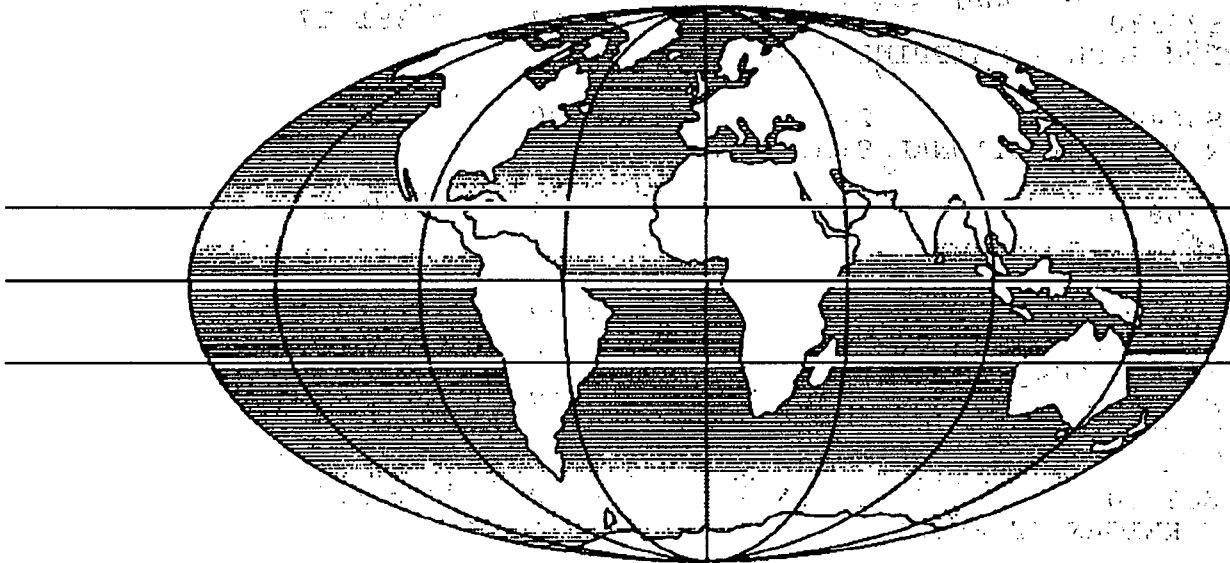


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## ROAD SAFETY IN AFRICA - BACKGROUND AND OVERVIEW

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### INTRODUCTION

Road safety cannot be considered in isolation. Its problems and possibilities are intimately linked to social and economic conditions, as is the transport system in which they arise. This background paper takes a broad look at the road accident situation in the African continent, particularly the changes which have taken place in the last decade. It then attempts to set these in the context of some of the other major social and economic changes taking place, and draw some general lessons for the future as well as provide a background against which the more specialised papers of this conference can be considered. A recurrent theme will be the scarcity of reliable data on which to make statistically-sound statements, and the dangers in looking for "global" trends in a continent as richly diverse as Africa.

### ROAD DEATHS IN AFRICA

Table 1 records the change in absolute fatalities for certain countries between 1980 and 1986. The detailed statistics are given in an appendix to this paper, and have been drawn from a variety of sources, including the questionnaire compiled and distributed specifically for this meeting. The table covers 22 countries for which reliable data exist for the two years in question. Egypt, Nigeria and South Africa, are listed separately, because the size and nature of their contributions could distort the statistical picture).

The most striking feature of the final line of table 1 is the relatively small increase in absolute fatality numbers over the six year period. The earlier dire warnings of impending crisis and of a new form of "epidemic" appear, with the benefit of hindsight, to have been misplaced. Whether they were mistaken or simply premature remains, of course, to be seen.

The fall in the number of fatalities in Nigeria is to some extent an artifact of the two years chosen for comparison; recorded totals have been volatile for the past decade rising from around 8000 in 1977 to a peak of nearly 11,400 in 1982 and falling back to below 8000 in 1987. The decline is clearly associated with a steep decline in the amount of travel, but unfortunately reliable data on vehicle ownership and use are not available.

Even a cursory examination of the other national data reveal some striking differences. The average of 9.4% for the 19 nominated countries conceals national increases of greater than 25% for Botswana, Cameroon, Ethiopia, Kenya and Rwanda, and decreases of greater than 25% for Ghana, Liberia and Niger.

Although absolute figures are of concern to national administrations and policy makers, they can, by themselves, give a misleading impression of the true situation and they are, of course, unsuitable for international comparisons. Two measures which allow for exposure are commonly used; fatalities per head of population (personal safety) and fatalities per vehicle or vehicle-km (system safety). The latter are more customary amongst road and transport authorities and will be used in the subsequent discussion. Ideally, we would consider fatality and casualty rates per vehicle kilometer, but in the absence of this data for most African countries the simpler statistic of fatalities per 10,000 vehicles will be used. The relevance of this is immediately obvious from table 2, which shows vehicle numbers for 1980 and 1986. (The sample size for the group of countries has dropped from 19 to 16, with the omission of Liberia, Mozambique and Senegal. The original 19 countries covered some 35% of the African population, and inclusion of Egypt, Nigeria and South Africa boosted this to 68%). The vehicle figures for Egypt and Nigeria have been estimated assuming that vehicle growth is directly proportional to gross national product - an estimate which is likely to be on the conservative side.

Table 2 suggests that the fatality rate with respect to vehicles has in fact improved in our selected group of countries, but worsened in South Africa. To examine the situation in more detail, we need to include population numbers, and examine the relationship between fatality rates and vehicle ownership levels. Plotting national data of fatalities per vehicle against vehicles per head of population produces what is sometimes called a Smeed diagram, after the English professor who first used it to demonstrate a seemingly global statistical relationship between these two quantities. Such a diagram is shown in figure 1 and it summarises information for several African countries for the years around 1980. The regression line from that figure appears again in figure 2, which also now includes national data points for 1980 and 1986.

A general drift in the direction suggested by the regression line as motorisation increases can be detected, but there is clearly a wide range of movements which makes any generalisations suspect, if not meaningless. This point is brought home more forcibly in figure 3, where the 16 sub-Saharan countries have been aggregated to give a single "African" data point. The movement of this point between 1980 and 1986 indicates a decrease in the fatality rate per vehicle as the number of vehicles has grown, and even a slight improvement in the fatality rate per head of population. However, if the data from South Africa is included, the situation becomes almost static, since that country experienced a slight worsening of its fatality rate per vehicle over the six years in question which does not appear to have been compensated by an increase in the number of vehicles.

This limited analysis suggests that:-

- (i) the data should be re-examined and individual countries asked to provide more verified national data
- (ii) when more countries are represented, a clearer picture may emerge at the sub-regional level.

allowed to deteriorate to save the rest.

Tables 4 and 5 summarise information coming from the World Bank's Road Maintenance Initiative - a component of its sub-Saharan African transport programme (SSATP). Table 4 shows that the countries of West, and East and Southern Africa, some 39 in total, have only about 30% of the main network paved, and a quarter of this is in poor condition. Only 50% is classified as good, and the situation with the unpaved network is even worse. Although table 5, which shows the figures for 1984 in parenthesis, suggests that the situation is relatively stable, the projections for the future are not optimistic and point at best to a barely adequate network.

There are two immediate lessons for road safety:-

- (i) there will be a premium on small low cost improvements which could be integrated with minor upgrading and maintenance activities;
- (ii) the number of accidents which can be directly attributed to poor road condition (and related factors such as marking and signing) is likely to increase on parts of the network.

## ROAD SAFETY AND THE YOUNG

National safety statistics from Africa show that a high proportion of the casualties are young people. To a considerable extent this is to be expected, being simply a reflection of the typical age distribution. Figure 4 shows the population pyramid for Africa as a whole (although the data is for the male population, the female numbers are virtually identical until over the age of 60) Nearly half the population is under the age of 15. The situation is projected to be very similar in 15 years time - only the absolute numbers will have been increased by some 50%. By contrast, the population of western Europe (shown on the right of figure 4) is remarkably stable and the only new problems facing the road safety planners is a modest increase in the number of elderly people who, hopefully, will be increasingly active as medical and social care improves.

The implications of these curves for planning and resources is clearly immense, but they immediately suggest that measures which concentrate on school children should have both priority and long term benefits. They also suggest that such measures will consume an expanding share of available resources - and, if directed at training and behaviour, will need constant renewal as well as growth. Collective measures, as distinct from individual ones, will be preferable.

Progress in the general area of education may well be limited by the channels of communication, as much as by the availability of suitable materials. A survey of a sample of 33 countries reveals that just under a half have more than 80% of eligible children in primary education, and that at secondary level only one country (Egypt) can claim more than 60% attendance. The majority are below 20%. (Table 6). The figures vary considerably from country to country and careful country-specific studies will be needed before efficient programmes can be drawn up and implemented.

## URBAN ROAD SAFETY

Another factor which is having, and will continue to have, an important impact on road accidents and their distribution is the growing urbanisation of the continent. This is already reflected in the national accident statistics from several countries, and is often accompanied by a reduction in overall severity and an increase in the number of reported accidents. Increases in pedestrian death and injury are also reported.

Urbanisation is a global phenomenon, but whereas the relatively low income countries of the sub-Saharan Africa have the lowest absolute figures they can boast the greatest rate of growth (Table 7). Once more, the situation is diverse, with a sample of 37 countries showing a quarter with less than 20% of their population in towns in 1987, but an equal number in the range 40-49%. (Table 8).

The relative affluence of the urban areas means that the levels of motorisation are well above the national average, even if that motorisation is reflected in two-wheeler ownership or fleets of public service vehicles rather than the private motor car which dominates western transport planning.

The growth of urban traffic presents both challenges and opportunities to the road safety community. The challenges are self-evident, but the opportunities lie in the greater accessibility of the urban network both for remedial measures (whether they be in traffic engineering, enforcement or wherever) and for post-accident emergency services and medical care. Also there is a tendency for urban accidents to concentrate along busy city corridors and in commercial areas, enabling safety measures to be targetted at the most sensitive parts of the network.

## ROAD SAFETY PROGRAMMES

Road safety programmes will be dealt with in some depth by other papers in this conference and two of the themes which are likely to emerge are:

- (i) the wide diversity of road safety actions that are possible, and the need for cost-effective programmes which are tailored to suit the national and local conditions and situations;
- (ii) the need for multi-disciplinary action in devising and running such programmes, and a corresponding need for close collaboration and inter-sectorial cooperation to make the best use of scarce resources.

Road safety is not unique in its diversity of actions and its possible spheres of influence, but the number of different sectional interests it penetrates make the institutional challenges a significant part of the overall problem. It is therefore encouraging that, of the 23 countries which responded to an OECD questionnaire, 8 reported active national road safety committees, either governmental or non-governmental, and actions being taken on a significant number of fronts. Table 9 summarises the reported activity in the 23 countries, although it must be stressed that the replies gave no details of extent or duration of the measures planned or implemented. There is no apparent correlation between the level of activity reported and the GNP of the country.

Clearly African countries and indeed most developing countries have made encouraging efforts to improve road safety in the last decade and in doing so they have displayed a good deal of technical competence, goodwill and enthusiasm. It is hoped that these efforts will continue throughout the next decade and more and more countries will adopt a scientific approach to the wide range of national road safety programmes which Africa needs, with an emphasis on data collection, national analysis and experimentation and evaluation.

#### Selected sources

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#### ACKNOWLEDGEMENTS

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## APPENDIX 1

## Road accident and related data in African countries

Country	Year	Population (10 <sup>3</sup> )	Fatals	Casualties	Vehicles	$\frac{(\text{Veh})}{(\text{Pop})} \times 10^4$	$\frac{(\text{Fatal})}{(\text{Veh})} \times 10^4$	$\frac{(\text{Casualties})}{(\text{Veh})} \times 10^4$
Botswana	1980	814	116	1118	26825	329.5	43.2	416.8
	1986	1149	192	2632	55604	483.9	34.5	473.3
Burkina Faso (Upper Volta)	1980	6908	-	-	47128	68.2	-	-
	1986	8101	-	-	-	-	-	-
Cameroon	1980	8503	671	6820	98000	115.3	68.5	695.9
	1986	10151	1117	7992	183400	180.7	60.9	435.8
Congo	1980	-	-	-	-	-	-	-
	1986	2000	106	315	-	-	-	-
Cote d'Ivoire	1980	8034	719	10241	244707	304.6	29.4	418.5
	1986	10650	728	9137	324224	304.4	22.5	281.8
Ethiopia	1980	30017	967	1494	53295	17.7	181.4	280.3
	1986	44743	1258	4385	64427	14.4	195.3	680.6
Egypt	1980	42201	4999	22519	724821	171.8	69.0	310.6
	1986	49739	-	-	-	-	-	-
Gabon	1980	548	196	1119	23824	434.7	82.3	49.9
Ghana	1980	11450	992	9843	76544	66.9	129.6	1285.9
	1986	14045	705	6977	63306	45.1	111.4	1102.1
Kenya	1980	16402	1413	8900	168718	102.9	83.7	527.5
	1986	20384	1832	15377	299000	146.7	61.3	514.3
Lesotho	1980	1339	184	925	14267	106.5	129.0	648.3
	1986	1586	230	1383	22000	138.7	104.5	628.6
Liberia	1980	1873	118	1842	2897	15.5	40.7	6418.1
	1986	2253	51	256	-	-	-	-
Malawi	1980	5968	-	-	38510	64.5	-	-
	1986	7380	537	2571	-	-	-	-
Mauritius	1980	957	124	1944	69188	723.0	17.9	281.0
	1986	1029	109	2834	78229	760.2	13.9	362.3
Morocco	1980	20242	2256	32897	642948	317.6	35.1	511.6
	1986	22466	-	-	774064	344.5	-	-
Mozambique	1980	10473	515	3204	-	-	-	-
	1986	14336	626	2761	-	-	-	-
Niger	1980	5533	219	1791	39448	71.2	55.5	454.0
	1986	7250	73	742	58998	81.4	12.3	125.8
Nigeria	1980	85630	9150	25904	640045	74.7	143.0	404.7
	1986	103147	-	-	-	-	-	-
Rwanda	1980	5046	187	3120	16685	33.1	112.1	1870.0
	1986	6236	264	2231	23783	38.1	111.0	938.1
Senegal	1980	5661	429	5475	115155	203.4	37.3	475.4
	1986	6770	450	7853	-	-	-	-
Seychelles	1980	65	-	-	-	-	-	-
	1986	66	5	205	4834	732.4	10.3	424.1



Country	Year	Population (10 <sup>3</sup> )	Fatals	Casualties	Vehicles	$\frac{(\text{Veh})}{(\text{Pop})} \times 10^4$	$\frac{(\text{Fatal})}{(\text{Veh})} \times 10^4$	$\frac{(\text{Casualties})}{(\text{Veh})} \times 10^4$
South Africa	1980	29285	7572	81219	4118392	1406.3	18.4	197.2
	1986	32436	9343	102867	4674784	1441.2	20.0	220.0
Sudan	1980	18691	592	5860	130933	70.1	45.2	447.6
	1986	22567	665	6055	167536	74.2	39.7	361.4
Swaziland	1980	556	181	937	34100	613.3	53.1	274.8
	1986	689	157	677	43800	635.7	35.8	154.6
Tanzania	1980	18263	954	6381	132000	72.2	72.3	483.4
	1986	23049	1071	6542	151000	65.5	70.9	433.2
Togo	1980	2625	210	1539	-	-	-	-
	1986	3144	275	2840	27200	86.5	101.1	1044.1
Tunisia	1980	6369	988	9716	273908	430.1	36.1	354.7
	1986	7311	987	10415	639600	874.8	15.4	162.8
Zimbabwe	1980	7360	1140	9538	281973	383.1	40.4	338.3
	1986	8705	934	9508	347177	398.8	26.9	273.9

Table 1 ROAD ACCIDENT FATALITIES - AFRICA

	1980	1986	GROWTH	%
19 COUNTRIES	10719	11724	1005	9.4
EGYPT	5000	5200	200	4.0
NIGERIA	8736	8154	-582	-6.7
SOUTH AFRICA	7572	9343	1771	23.4
TOTAL (22 COUNTRIES)	32027	34421	2394	7.5

Table 2 VEHICLE NUMBERS - AFRICA (10<sup>3</sup>)

	1980	1986	GROWTH	%
16 COUNTRIES	2304	3091	787	34
EGYPT	725	964*	239*	33*
NIGERIA	640	567*	73	-11.4*
SOUTH AFRICA	4118	4674	556	14
TOTAL (22 COUNTRIES)	7787	9296	1509	19

\*ESTIMATED ASSUMING PROPORTIONAL TO TOTAL GNP

Table 3 AVERAGE ANNUAL GROWTH OF GNP PER CAPITA

	1973-1980	1980-1984	1985	1986	1987
INDUSTRIALISED COUNTRIES	2.1	1.3	2.4	2.0	2.2
DEVELOPING COUNTRIES	3.1	0.7	3.3	3.1	1.8
SUB-SAHARAN AFRICA	0.7	-4.9	2.9	-0.2	-4.6
		AV. 1980-87      -2.9%			

Table 4 AFRICAN ROADS - 1984

SUBREGION (OR COUNTRY)	LAND AREA 10 <sup>3</sup> Km <sup>2</sup>	TOTAL NETWORK 10 <sup>3</sup> Km	MAIN NETWORK 10 <sup>3</sup> Km	MAIN PAVED NETWORK			
				% OF TOTAL MAIN	CONDITION		
					GOOD	FAIR	POOR
NORTH (4) (EX. LIBYA)	3,094	244	104	69	38	35	27
EAST & SOUTHERN (19)	11,105	589	191	24	42	32	26
WEST (20)	8,891	431	144	37	52	23	25
NIGERIA	924	108	29	72	62	15	23

UK TRUNK ROADS 1983		
85	12	3

Table 5. ROAD CONDITION SUB-SAHARAN AFRICA 1988  
MAIN NETWORK CONDITION

	PAVED			UNPAVED		
	%GOOD	%FAIR	%POOR	%GOOD	%FAIR	%POOR
EAST and SOUTHERN (20)	50 (42)	33 (32)	17 (26)	28 (42)	30 (30)	42 (28)
WEST (21)	54 (52)	17 (23)	29 (25)	19 (20)	34 (36)	47 (44)
TOTAL - ALL SUB-SAHARA (41)	52 (47)	25 (27)	23 (26)	29 (33)	32 (32)	39 (35)

SOURCE: WORLD BANK ROAD DETERIORATION STUDY  
WEIGHTED AVERAGES ACCORDING TO LENGTH

Table 6 EDUCATION IN AFRICA - 1986  
SAMPLE OF 33 COUNTRIES

	0-20%	21-40%	41-60%	61-80%	81-100%
PRIMARY EDUCATION	1	6	4	8	14
SECONDARY EDUCATION	18	11	3	1	0

Table 7 URBANISATION - GLOBAL TRENDS

	1965		1987	
	%	RATE	%	RATE
LOW INCOME (less INDIA & CHINA)	14	4.8	24	5.6
LOWER MIDDLE INCOME	39	3.8	51	3.5
UPPER MIDDLE INCOME	46	3.9	66	3.2
SUB-SAHARAN AFRICA	14	5.5	27	6.9
OECD			77	0.8

Table 8 URBANISATION IN AFRICA - 1987  
SAMPLE OF 37 COUNTRIES

20%	20-29%	30-39%	40-49%	50%
9	9	6	9	4*

\*INCLUDES SOUTH AFRICA

Table 9 RESPONSES FROM 23 COUNTRIES  
(SELF-COMPLETION QUESTIONNAIRE)

ACTIVITY AREA	NO REPLY	MEASURES PLANNED	MEASURES IMPLEMENTED
Data collection	10	4	9
Data analysis	11	6	6
Traffic legislation	8	5	9
Law enforcement	6	4	13
Driver training/test	6	6	11
Vehicle testing	6	8	9
Engineering (road)	7	5	11
Education/publicity	6	8	9
Alcohol measures	12	7	4
Emergency services	14	4	5
Public transport	13	5	5
Goods transport	14	4	5
TOTAL	113	66	97



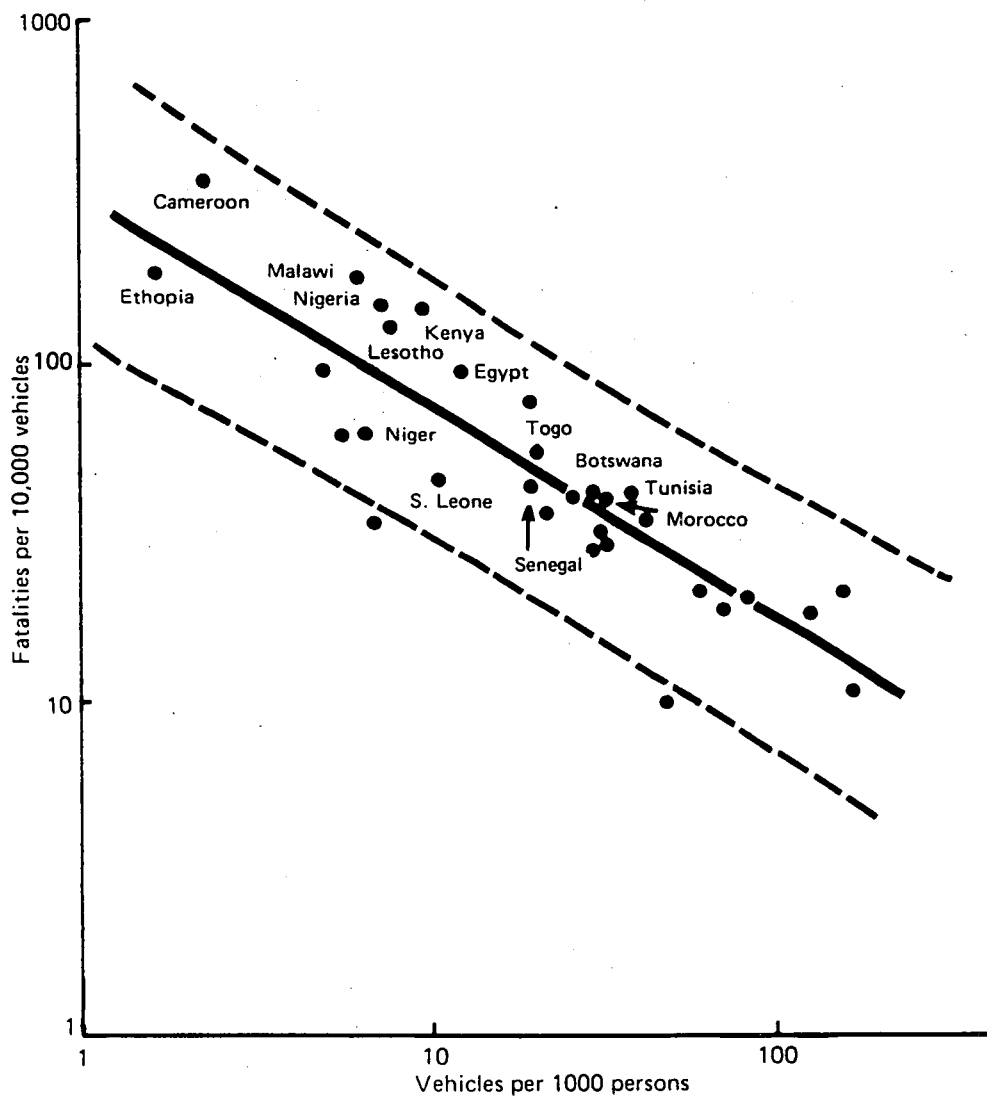


Fig 1. Developing countries 1978-80  
 Relationship between fatality rates and vehicle ownership levels

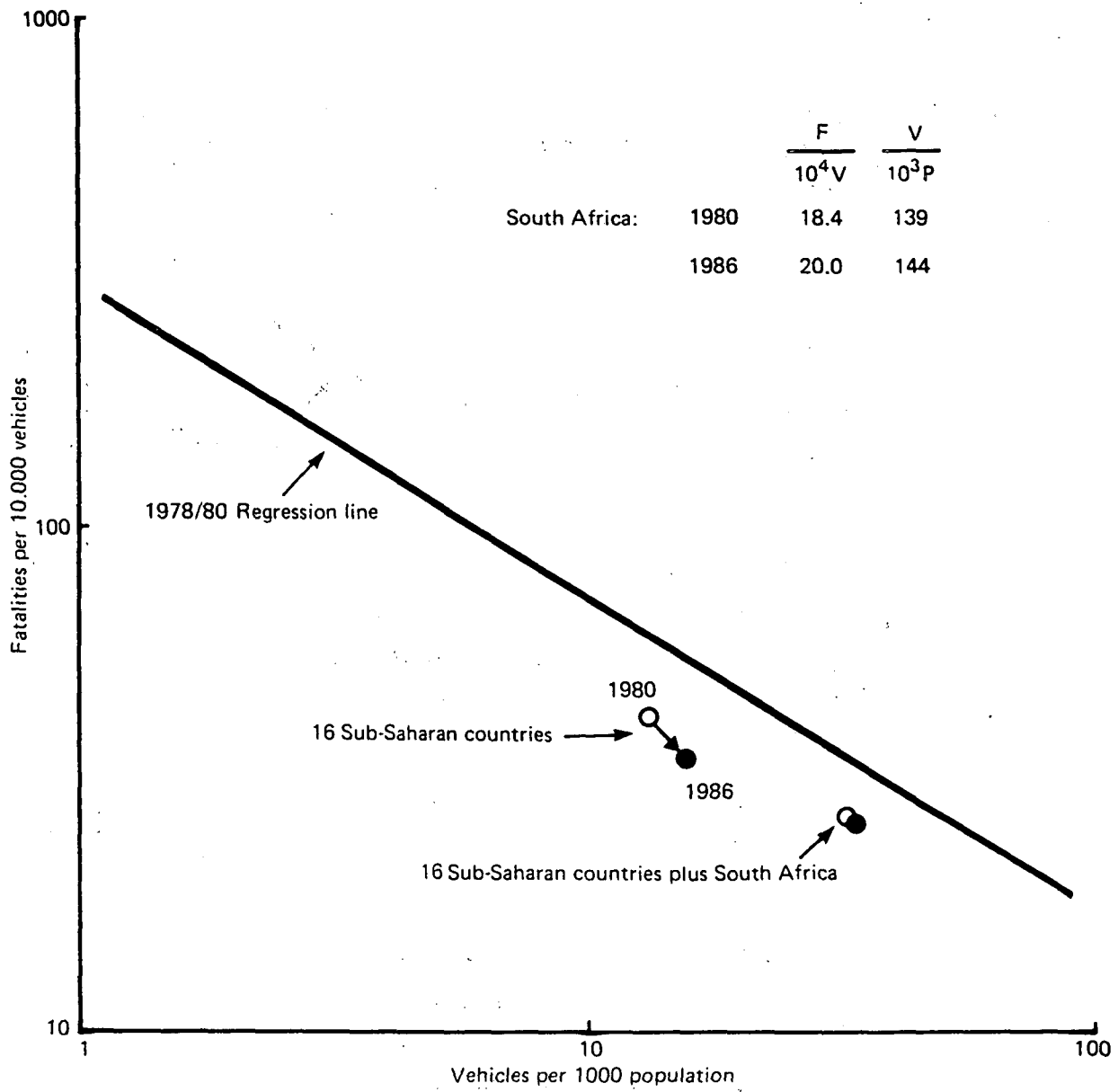


Fig 3. Aggregated data for changes in fatality rates and vehicle ownership 1980-86

Fig 4. Population age distributions (male)

