

# STROKE IN RURAL SOUTH AFRICA — CONTRIBUTING TO THE LITTLE KNOWN ABOUT A BIG PROBLEM

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*Objectives.* To describe the extent of mortality from cerebrovascular accident (CVA) in a rural South African population.

*Design.* Annual demographic and health surveillance with verbal autopsy of all deaths, 1992 - 1995.

*Outcome measures.* Stroke mortality rate by age and sex.

*Results.* Stroke mortality increased with age and is higher in men than women over age 35. Proportionate mortality ratio from CVA: 10.3% of deaths in the 35 - 64-year age group.

*Conclusion.* Cerebrovascular disease is an important cause of death in South Africa's rural north-east. Community-based research is needed to inform policy and practice.

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Existing data on the epidemiology of stroke in South Africa are limited, particularly among the black population, for whom basic demographic data are scanty and death certificate diagnoses unreliable. This is clearly articulated in an editorial by Fritz<sup>1</sup> on stroke incidence in South Africa. Despite their limitations she quotes from two studies that shed light on stroke among black South Africans, one by Rosman<sup>2</sup> in 1986 and another by Joubert<sup>3</sup> in 1991.

Both these studies were based on urban hospital cases, although the one by Joubert<sup>3</sup> and another study by Matenga<sup>4</sup> (also based on urban hospital cases, but in Zimbabwe) claim to be community-based. Information on stroke in rural populations, where hospital data only provide part of the picture, seems even more limited.

This report presents data on deaths from cerebrovascular accident (CVA) in a rural South African population, collected as part of a community-based prospective study examining the burden of disease, in particular of mortality. A major study of risk factors for chronic disease is anticipated.

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## STUDY AREA

In the absence of vital registration the Agincourt Health and Population Programme was established in Bushbuckridge in South Africa's rural north-east in 1992, to provide information to support district health development. The demographic and health surveillance system (DHSS), foundation for this programme, covers a subdistrict of some 63 000 people, a quarter of whom are Mozambican. The dependency ratio is high, with 44% of the population aged under 15 years and 4% over 65 years. The area is densely populated and arid with low rainfall. There is limited scope for subsistence farming and employment opportunities are scarce, leading to extensive labour migration. Over 60% of men and 14% of women aged 30 - 49 years are migrants; this results in a high proportion of single-parent households with three-quarters of homes headed by single women.<sup>5</sup>

## METHODS

The Agincourt census was first conducted in 1992 and is updated annually, with all birth, death and migration events recorded. Quality checks on a random sample of households, manual checking of data-capture forms, computer programme checks and validation routines, repeat visits to households where necessary, and high community acceptance of the project all contribute to the reliability of the data.

Where vital registration is poor or absent the 'verbal autopsy' (VA) is currently the only tool available with which to ascertain probable cause of death. In Agincourt a VA is conducted on every death. During this procedure a validated questionnaire is administered by a trained, lay fieldworker to the closest caregiver of the deceased. The questionnaire has an open section where the respondent describes all symptoms and signs preceding death in his/her own words. This is followed by a number of filtering questions, e.g. 'did the deceased cough?' Wherever the answer is positive, detailed questions follow for that particular symptom. If negative, the interview proceeds to the next filtering question. Emphasis is placed on the sequence of signs and symptoms, and on their duration with regard to time of death. Use of modern and traditional treatments and lifestyle practices are also covered. Quality was initially enhanced by on-site supervision of interviews, and was maintained by regular review of completed questionnaires with feedback to the relevant fieldworker.

The questionnaires are assessed blind by two medical practitioners. If the same diagnosis is reached this is accepted as the 'probable cause of death'. Where this is not the case, a third practitioner makes a further blind and independent assessment. If two out of the three diagnoses correspond, the medical practitioners discuss the case. Where consensus is achieved the diagnosis is accepted, otherwise the cause of death is described as 'undetermined'. A diagnosis of stroke can generally be distinguished from other forms of cerebral insult (such as cerebral tumour, infection, hydrocephalus or head injury) by its sudden onset, absence of fever or injury, and

occurrence in the adult years.

A proportion of the VAs have been validated by comparing VA diagnoses with hospital reference diagnoses, followed by calculation of sensitivities, specificities and positive predictive values for each cause of death found in hospital. Cause-specific mortality rates for the period 1992 - 1995 have been calculated using number of deaths by cause as the numerator and person-years at risk as the denominator.

## RESULTS

Based on VAs of all deaths that occurred between 1992 and 1995 ( $N = 932$ ), 55 deaths were attributed to CVAs; 28 of these (51%) occurred in people below age 65, and 29 (53%) among women. Twenty-nine of the cases (53%) died at home and 16 (29%) sought no Western treatment. CVAs accounted for around a quarter of all non-communicable disease diagnoses (22% among all ages, 26% in the 35 - 64-year age group). On validation, sensitivity of the verbal autopsy for CVA was found to be 87%, specificity 97% and positive predictive value 81%. Age-specific stroke mortality rates for both sexes rose with age, and were higher among men than women: 135/100 000 compared with 120/100 000 in the population aged over 35 years (Table I). Although the numbers are smaller, and consequently the confidence intervals wider, this trend remains true for all 10-year age strata (above age 35), except for the 65 - 74-year stratum. Stroke mortality for men in this age group was lower than that for women, and lower than that for men aged 55 - 64 years. The proportionate mortality rate from CVAs was 5.5% of all deaths and 10.3% of deaths in persons aged 35 - 64 years. Of the leading causes of death, stroke ranks second in the 35 - 54-year age group (8% of all deaths), first in the 55 - 74-year age group (11% of all deaths), and second among those aged 75 and older (6% of all deaths) (Table II).

Information on risk factors collected during the VAs was limited to alcohol and cigarette consumption reported by the next of kin. No differences were found between those who died of cerebrovascular disease and the group as a whole. A history of hypertension was reported in 8 cases (14.6%) but was not known for the remainder of the group.

Table I. Stroke mortality rate per 100 000 by age and sex, Agincourt 1992-1995

	Age (yrs)		Total ( $\geq 35$ )
	35 - 64	$\geq 65$	
Men	100 (16)	315 (10)	135 (26)
95% CI			83 - 187
Women	62 (12)	354 (17)	120 (29)
95% CI			76 - 163
Total	80 (28)	338 (27)	127 (55)
95% CI	50 - 108	211 - 466	93 - 160

\*Number of deaths in parentheses.



Table II. Leading causes of death by selected age group (% of all deaths in each age group), Agincourt 1992 - 1995

Rank	Age group		
	35 - 54 years (N = 164)	55 - 74 years (N = 273)	≥ 75 years (N = 176)
1	Assault (10%)	CVA (11%)	Congestive cardiac failure (11%)
2	CVA (8%)	Congestive cardiac failure (9.2%)	CVA (6%)
3	Motor vehicle accident (7%)	Pulmonary tuberculosis (9%)	Pulmonary tuberculosis (4%)
4	AIDS (6%)	Genito-urinary cancer (3.3%)	Diarrhoea (3%)
5	Congestive cardiac failure (5%)	Motor vehicle accident (2.9%)	Gastro-intestinal cancer (2%)

## DISCUSSION

Stroke mortality in Agincourt increases with age, as has been demonstrated in other studies described by Fritz.<sup>1</sup> However, the proportion of deaths occurring in younger age groups is of particular concern because of the social and economic consequences of premature death (almost a quarter of CVA deaths occurred below age 55 and more than half below age 65). Male mortality exceeds that of women in all age groups other than 65 - 74 years.

The Agincourt data can be compared with other data available in South Africa. Fritz quotes a Central Statistical Services report for 1980 that documents CVAs as accounting for 298/100 000 deaths in coloured patients aged 35 - 74 years.<sup>1</sup> Data from Agincourt, 1992 - 1995, give a rate of 107/100 000 deaths due to CVAs in rural blacks of the same age group. Using 1988 data from the Central Statistical Services (this excludes deaths in the former 'independent homelands' of Transkei, Bophutatswana, Venda and Ciskei), Steyn, Fourie and Bradshaw<sup>6</sup> show that chronic lifestyle-related diseases were responsible for 28.5% of deaths in all South Africans in the 35 - 64-year age group, with cerebrovascular disease causing 7.2% of all deaths, and 7.9% of deaths in this age group. For all deaths, the proportionate mortality ratio from CVA is lower in Agincourt (5.5%), while for the 35 - 64-year age group it is higher (10.3%). This reflects differences in mortality from other causes, explained in part by differences in the population age distributions. In keeping with a number of African countries, 44% of the Agincourt population is below 15 years of age; for South Africa as a whole the 1991 figure ranges between 23.5% for whites and 34.4% for blacks.<sup>7</sup>

The number of deaths presented in this study is relatively small. However, this does not reflect any sampling bias but is rather a function of a rare event in a defined community. Accurate denominator data derive from carefully supervised annual census updates; rigorously obtained numerator data contribute to the validity of cause-specific death rates in Agincourt. This is evidenced by the relatively high sensitivity and specificity obtained by comparing VA diagnoses with

hospital reference diagnoses. The results indicate that for CVA it is possible to use VA findings to inform health system planning.

In situations without vital registration VA is the only method available for assessing population-based mortality rates. Research based entirely on hospital cases is of limited value as 59% of all deaths and 53% of CVA deaths in Agincourt occurred outside a hospital.

Although the rates reported here are not as high as those in urban populations (using the 1980 coloured rate as a proxy), cerebrovascular disease is nevertheless an important cause of death in South Africa's rural north-east. Data on CVA mortality in Agincourt hint at the extent of cerebrovascular disease, which is already high and likely to increase if risk factors continue to receive little attention. Community-based work looking at morbidity and disability, risk factors, and appropriate district-level interventions, is sorely needed to inform policy and practice relating to cerebrovascular disease and other chronic lifestyle-related diseases in rural South Africa.

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