Appendix

Members of the joint working group were: Dr Douglas P Addy[1] (chairman; Dudley Road Hospital, Birmingham); Dr Anthony P Hopkins (Research Unit, Royal College of Physicians, London); Dr Christopher J Bacon (Friarage Hospital, North Yorkshire); Dr J S Brown (general practitioner, County Londonderry); Dr Peter M Crowle (Norfolk and Norwich Hospital, Norfolk); Dr Neil S Gordon (clinical medical officer, Cheshire); Dr Stuart H Green (Birmingham Children's Hospital, Birmingham); Professor D Hull (University Hospital, Queen's Medical Centre, Nottingham); Dr S Lingam (Child Development Centre, Harlow); Dr Roderick MacFaul (Pinderfields General Hospital, West Yorkshire); Dr I A McKinlay (Royal Manchester Children's Hospital, Manchester); Dr David R Morgan (University of Birmingham); Professor B G R Neville (Wolfson Centre, London); Professor Niall V O'Donohoe (National Children's Hospital, Dublin); Dr Richard O Robinson (Guy's Hospital, London); Professor Euan M Ross (King's College School of Medicine and Dentistry, London); Dr N Rutter (Queen's Medical Centre, Nottingham); Dr G W Rylance (Birmingham Children's Hospital, Birmingham); Dr G Stores (Park Hospital for Children, Oxford); Dr R Sunderland (Selly Oak Hospital, Birmingham); Dr S J Wallace (University Hospital of Wales, Cardiff).

BACKGROUND PAPERS

The following background papers were circulated before the meeting:

(1) "What do we mean by 'febrile convulsions?'" (Professor B G R Neville).

(2) "How are febrile convulsions best managed in general practice? When should the child be admitted to hospital?" (Dr D R Morgan).

(3) "Which investigations is it useful to perform on a child following a febrile convulsion? When should lumbar puncture be performed?" (Dr N Rutter).

(4) "When does an EEG contribute to the management of febrile convulsions?" (Dr G Stores).

(5) "What is the prognosis following a febrile convulsion?" (Professor E M Ross).

(6) "How important is it to control fever? How is it best controlled? Does control of fever affect febrile convulsions?" (Professor D Hull).

(7) "What do we know about the drugs which may be used in children with febrile convulsions? What are the potential toxic effects of the drugs?" (Dr G W Rylance).

(8) "What is the place of drug prophylaxis?" (Dr S J Wallace and Dr I A McKinlay).

(9) "What information and advice should be given to parents?" (Dr D P Addy).

(10) "What future research should be undertaken?" (Professor N V O'Donohoe).

These background papers can be obtained from the Publications Department, Royal College of Physicians, 11 St Andrew's Place, Regent's Park, London NW1 4LE. Price £6.00 to cover costs of photocopying and postage.

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The Health of the Nation: responses

Strategy for stroke

Martin Dennis, Charles Warlow

Department of Clinical Neurosciences, Western General Hospital, Edinburgh EH4 2XU
Martin Dennis, MRCP, *senior lecturer in stroke medicine*
Charles Warlow, FRCP, *professor of medical neurology*

Correspondence to:
Dr Dennis.

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In the consultation document for health in England the government identified stroke as a possible priority for disease prevention and treatment.[1] We will consider how well stroke fulfils the criteria for a key area, what targets should be set, how we might achieve them, and what the problems are likely to be, particularly in monitoring any progress.

Making stroke a priority

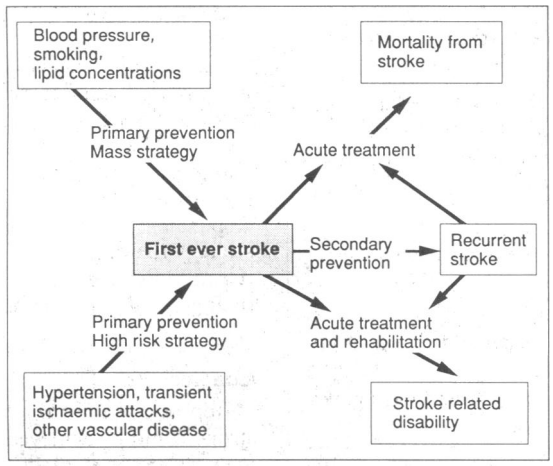
The first criterion for a key area is that it should be a major cause of premature death or avoidable ill health either in the population as a whole or among specific groups of people. About 100 000 people each year have a first stroke in England; about 25 000 are less than 65 years old and another 29 000 are aged between 65 and 74.[2] Each year 64 000 deaths are attributed to stroke in England, representing 12% of all deaths.[1] Of these, 5000 deaths occur in those under 65 years and 11 000 in those aged 65-75 (5% and 9% of all deaths in each age category respectively).[1]

Stroke is also one of the commonest causes of severe disability.[3] Furthermore it consumes vast resources. Isard and Forbes estimated that in Scotland in 1988 stroke accounted for about 4·3% of all NHS resources and 5·5% of hospital resources.[4] The costs to patients, their families, and society must be huge but have never been quantified. Also it is a disease which even in Britain particularly affects certain ethnic groups[5] and the socially deprived.[6] Thus stroke is clearly an important avoidable cause of premature death and disability.

Effective interventions

The government's second criterion is that there should be effective interventions and scope for improvement in health. Certainly over the past 20 years most developed countries have seen a reduction in mortality from stroke (by 2-7% a year[7]), and this may be due to a fall in incidence of stroke,[8] although there is no definite evidence that the incidence is falling in England as the discussion document wrongly asserts.[1] Most of the observed reduction in mortality is unexplained, although the treatment of hypertension may have played some part.[9]

The figure shows the interventions which would reduce the incidence of stroke and associated mortality and disability. Some interventions, for instance primary and secondary prevention, would reduce not



Strategies for improving health by reducing incidence of stroke and associated mortality and disability

just the incidence but also mortality and disability. Others, such as rehabilitation, will reduce only disability.

PRIMARY PREVENTION

Primary prevention can be approached in two ways: the "mass strategy" and the "high risk strategy."[10] The risk factors for stroke are qualitatively if not quantitatively the same as for coronary heart disease, another possible key area, so for practical purposes they should be considered together. In the mass strategy the aim is to reduce the prevalence or shift the distribution of a risk factor across the entire population. A modest 5 mm Hg reduction in mean population diastolic blood pressure, achievable by reducing the mean daily salt intake in the population by 50 mmol/l, might reduce mortality from stroke by 22%.[11] By reducing salt in processed food a reduction in mean salt intake of 100 mmol/l a day could be achieved, which might reduce the incidence of and mortality from stroke by 39%.[11] Further reductions in blood pressure might be derived by reducing the population's alcohol intake and obesity.

We could perhaps further reduce the incidence of stroke, especially in the young, by substantially reducing the prevalence of cigarette smoking, which increases the risk of stroke, by 50%.[12] The role of lipids in stroke is still unclear, but improvement in diet would probably reduce the incidence of ischaemic stroke as well as that of coronary heart disease. The cost and possible adverse effects of such mass strategies are difficult to estimate.

High risk strategies include identifying and treating people with hypertension and other established vascular disease. Treatment of all hypertensive people (>100 mm Hg diastolic pressure) in the population might reduce mortality from stroke by about 15%.[11] The risk of stroke (and other vascular events) in patients who have had transient ischaemic attacks can be reduced not just by modifying their risk factors but by using aspirin, which will reduce the risk of subsequent stroke by about 25%.[13] Carotid endarterectomy would further reduce the risk of stroke in suitable patients.[14] However, only 15% of patients with stroke have had previous transient ischaemic attacks; many of those who have had an attack do not present to a doctor and not all of those who do present are eligible for specific treatment. For example, about 5000 of the 20 000 patients presenting to a doctor in England with transient ischaemic attack each year may be suitable for carotid endarterectomy. The 5000 operations might prevent about 500 first strokes a year, representing a 0·5% reduction in incidence of first stroke. Aspirin, which is more widely applicable, may reduce the overall incidence of stroke by 1-2%, although even this reduction is an order of magnitude lower than that which could be achieved using the mass strategies described above. Another problem with the high risk strategy is that to be effective it would require a large scale screening or case finding programme and then even greater effort to provide treatment and follow up.[15]

SECONDARY PREVENTION

After a first stroke the risk of recurrence is about 13% in the first year and about 5% in each year thereafter. The modification of vascular risk factors, treatment with aspirin, and carotid endarterectomy all have a role in secondary prevention and would reduce the overall incidence of stroke and associated mortality and disability.

ACUTE TREATMENT

Treatments to reduce brain injury after acute stroke have great potential for reducing mortality and disability but none has yet been shown to be effective. Randomised trials of acute treatment have been too small to show clinically worthwhile effects of treatment, and efforts to carry out large trials are hampered by lack of resources for clinical research, interest, and acute stroke units. Simple inexpensive treatments such as aspirin, which could be given to most patients with acute stroke even if found to be only moderately effective, may yield important overall effects. For example, if 90% of all patients with acute stroke were given a drug that reduces the risk of death and disability by only 20% about 15 000 patients would be saved from death or disability in England each year.

REHABILITATION

Once the patient has had a stroke we have little to offer apart from effective rehabilitation. But stroke services in Britain are poorly organised,[16] and many patients fail to achieve their maximum potential for recovery. Although few randomised trials of stroke rehabilitation have been conducted, there is some evidence that organised stroke units can achieve more rapid functional improvement.[17] A lot of our efforts in rehabilitation are unfocused; without further research to give us precise estimates of the relative effectiveness of different aspects of rehabilitation it is impossible to predict the overall benefit that better organised rehabilitation could have on disability and handicap.

Setting and monitoring targets

The third criterion is that it should be possible to set objectives and targets in the chosen topic and to monitor progress towards their achievement through indicators. The government's targets for reducing mortality by 30% in people aged under 65 and 25% in those aged 65-74 by the year 2000 are ambitious (box) as the effects of changes in lifestyle will inevitably be delayed. Nevertheless, because treating blood pressure has an effect on risk of stroke within two to three years the targets are probably reasonable.[18] They might be reached by reducing the incidence of stroke by similar amounts. Difficulties arise in developing reliable methods to monitor progress towards these goals. This problem might be the main reason for not identifying stroke as a key area, although it must be an equal or even greater problem in other suggested key areas.

Mortality from stroke is the easiest target to assess or monitor but it depends on the accuracy of death certification, which is especially poor in elderly people.[19] If monitoring of mortality was restricted to those less than 70 years old it would be more accurate and might allow interpretation of geographic and secular trends.

Government's possible targets for stroke

REDUCTION IN PREMATURE DEATH

- Between 1988 and 2000 achieve a 30% reduction in mortality from stroke in people aged less than 65
- Reduce mortality from stroke by 25% in people aged 65-74 over the same period

OTHER TARGETS

Views on other targets are welcomed. Possibilities include:

- Reducing the incidence of stroke
- Local or national screening for and treatment of hypertension
- Proportion of people surviving stroke able to live outside institutional care after given period

We could then concentrate on reducing death rates in areas with the highest rates down to those in areas with the lowest rates, possibly by focusing on regional differences in diet, smoking habits, and social deprivation. Unless there are changes in fashion in death certification, the mortality from stroke is likely to be a fairly reliable indicator of change. Such a change may also reflect changes in incidence, although if the case fatality rate should alter—for example, because of the introduction of an effective acute treatment—then this may no longer be so.

Ideally the incidence of first and recurrent strokes should be monitored as this would give a direct measure of success in primary and secondary prevention. Measuring the incidence of stroke is tiresome but not difficult,[2] but it could not be achieved nationally unless stroke was a notifiable disease. Simply counting people admitted to or discharged from hospital with stroke could be misleading as the proportion of patients with stroke admitted to hospital varies greatly in different places[8] and is likely to change over time, especially with the NHS reforms. It would be possible, however, and not very expensive, to set up perhaps 10 studies to monitor stroke incidence in carefully selected and representative parts of the country. The methods would have to be identical and fulfil criteria laid down by Malmgrem *et al*[8] and the study populations large enough to provide reliable data. Ideally they would be combined with studies of other vascular diseases, such as coronary heart disease, to make the best use of resources.

To monitor changes in disability due to stroke would present considerable methodological problems. Direct measures of disability (for example, Barthel score) are not collected widely, and although indirect measures such as place and timing of discharge from hospital are collected, these are dependent on local community facilities (for example, adequate housing, good community care, etc), which also tend to change over time. Also, the most important factor in determining the disability of patients discharged from hospital is not the quality or amount of rehabilitation but the severity of stroke in patients admitted to hospital—that is, case mix. The questions of how and when to measure outcome, how outcome may relate to case mix, how its measurement can be done on a large enough scale to show progress towards a target, and how much its measurement will cost must be investigated in future health services research. An alternative approach would be to repeat the disability survey[3] regularly to determine whether the prevalence of disability caused by stroke is falling, but it is difficult to distinguish reliably between stroke related disability and that resulting from other diseases. Until a satisfactory measure of stroke related disability or handicap is identified it would seem premature to follow this option.

One solution would be to substitute measures of process until satisfactory measures of outcome and case mix have been developed. Process measures would, however, be indirect and possibly distract from the real issue of outcome. Possible measures include the proportions of health districts with an identified person responsible for stroke services,[16] a stroke unit, or a strategy for stroke or the proportion of patients with a recent blood pressure, weight, and smoking history in their general practitioners' records.

Conclusions

Improvements in the nation's health with respect to stroke could be achieved by primary prevention. The greatest effect is likely to be achieved with a mass strategy focusing on salt, alcohol, and fat intake and smoking. These issues go far wider than the Department of Health and the NHS and whether the political will exists to carry through such policies is open to debate. Health education alone may not be effective and would need to be backed up by legislation (for example, food labelling for salt content, ban on tobacco advertising) and financial incentives (taxing tobacco and alcohol). By encouraging effective screening or case finding and treating high risk individuals with interventions that have been properly evaluated in randomised trials, by developing effective treatments for acute stroke, and by improving rehabilitation services extra benefits are possible. Such interventions are, however, no substitute for the mass strategy. Some improvements could be monitored simply but rather unreliably by looking at changes in mortality, but we need to develop practical and inexpensive methods for routine monitoring of the incidence and outcome of stroke.

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