PAPERS AND SHORT REPORTS

Some international comparisons of mortality amenable to medical intervention

JOHN R H CHARLTON, RAMON VELEZ

Abstract

A series of outcome indicators was proposed for assessing the curative aspects of health care using several diseases for which evidence suggested that death was largely avoidable provided that appropriate medical treatment could be given in time. International data were examined for those causes for which data were readily available. Time trends in mortality were compared for each of these conditions for six countries that had experienced appreciable growth in health services during 1950-80.

Mortality from the heterogeneous "avoidable" causes had declined faster than mortality from all other causes in each of the six countries. Despite problems of diagnosis, reporting, and classification of diseases that may have existed among countries, making international comparisons of absolute mortality difficult, the trends of declining mortality were similar, lending credibility to the use of these causes of mortality as indices of health care within countries. Changes within countries may also have been attributable to changes in social, environmental, genetic, and diagnostic factors, which were not examined. Nevertheless, the consistency in mortality trends for this group of "amenable" diseases suggested that improvements in medical care were a factor in their rapid decline.

Introduction

One approach to developing indices reflecting the outcome of health service intervention is to count adverse events. Such counts, when standardised to allow for differences in population and incidence, may provide useful indicators of health service performance. Although changes in such indices may not be interpreted causally, they provide warning signals which may prompt further investigation. A working group on preventable and manageable diseases in the United States suggested a list of diseases where disease, disability, or death were wholly or substantially avoidable by adequate medical care in its broadest sense.[1 2] From this list 14 reasonably common disease groups have been selected for which there is evidence that suitably timed medical treatment can prevent death once the disease has been contracted. The disease groups and age ranges were chosen so that mortality would reflect as much as possible the adequacy of medical intervention rather than, for example, primary preventive measures such as the use of diphtheria toxoid.

The considerable variation in mortality from these diseases within England and Wales has been reported.[3] In this paper we examine age standardised time trends (1950-80) for 10 of these causes for which international data were readily available relating to six developed countries which have experienced appreciable growth in health service expenditure. Comparison of mortality trends for different countries must be done with caution because like is not always being compared with like. Since health care, and access to it, had improved over the study period in each country, we should expect that "avoidable" mortality would decrease and to a greater extent than mortality from all other causes where most deaths are hypothesised to be related less to medical treatment. Though changes in environment and social conditions may have an influence on each of these diseases, these are unlikely to affect these heterogeneous disease groups to the same extent.

United Medical and Dental Schools of Guy's and St Thomas's Hospitals, St Thomas's Campus, London SE1

JOHN R H CHARLTON, MSC, lecturer in medical statistics, department of community medicine

Audie L Murphy Memorial Veterans Hospital, San Antonio, Texas 78284, USA

RAMON VELEZ, MD, MSC, Milbank Memorial Fund scholar in clinical epidemiology

Correspondence and requests for reprints to: Mr John R H Charlton, Department of Community Medicine, St Thomas's Hospital Medical School, London SE1 7EH.

Method

Only developed countries for which mortality data for most of the period 1950 to 1980 were already readily available were considered for this study, and six countries were selected to provide a variety of forms of health care delivery. In addition to England and Wales, where regional variations in mortality had already been studied, Sweden was chosen because of its longstanding tradition of excellence when judged in terms of conventional health indicators. Italy, on the other hand, has the least favourable infant and maternal mortality rates in the European Economic Community. Japan is interesting because it had experienced major restructuring, reorganisation, and improvements in health services over the study period. The United

States and France were also included, since they differ in methods of funding and show wide geographic differences in the availability of doctors.

Mortality data for 1950 to 1980 for most diseases, and for 1956-78 for all diseases, were available for 10 of the diseases analysed for England and Wales[3] (see table I). For these disease groups there were no major changes in disease classification over the period, as evidenced by bridge coding.[4]

Comparisons of mortality presented here are based on direct standardisation using the standard European population of Waterhouse *et al*,[5] and the mortality data have been drawn from data supplied previously by the World Health Organisation to the London School of Hygiene and Tropical Medicine, supplemented for the most recent years by data published by WHO, and the United States Department of Health and Human Services, all data being based on submissions from national government agencies.[6,7] The data on infant and maternal mortality were obtained from the Central Statistical Office of the United Kingdom and the United Nations demographic yearbook.[8,9]

Table I gives the list of 10 causes included in this study together with the codes in the 7th, 8th, and 9th revisions of the ICD, references to evidence for the treatability of each disease, and age groups considered to be the most amenable to treatment. Infant and maternal deaths, which are already widely accepted as indicators of the quality of health care, are included for comparison. Pneumonia, influenza, and acute respiratory diseases, which were included in a previous paper,[3] were excluded from this study because incidence and severity tend to fluctuate widely from year to year. Mortality from cerebrovascular disease has been added to the list because the Hypertension Detection and Follow-up Program Co-operative Group study has shown that mortality from stroke may be reduced by half with intensive antihypertensive treatment.[10]

Results

Table II shows the decline in mortality for each of the disease groups and each country between 1956 and 1978 (the most extreme years for which complete data were available for all six countries). There were large declines for all "amenable causes," most notably in Japan. Mortality from "all other causes," however, showed only a small decline, with the exception of Japan, where there was a 43% fall. Figure 1 contrasts the trends in mortality from the amenable causes (where only deaths occurring in the relevant age groups have been counted) with all other deaths. Hodgkin's disease is excluded, since complete mortality data for all countries were not available for the whole period.

Japan started out with very high mortality rates and ended with much reduced rates. By 1979 the mortality from "avoidable causes" in Japan had fallen by 72%, the greatest decline seen in the six countries, and mortality from "all other causes" had also changed, from being the highest to the lowest. Sweden, on the other hand, began with relatively low rates, which continued to improve. Almost all trends in avoidable deaths were both downward and rapid, compared with the more gradual pattern of mortality from the deaths not so classified.

Figures 2 to 6 show the trends for each of the individual causes over a longer time period. For almost all trends for all countries the "avoidable" deaths had been declining rapidly, similarly to maternal and infant mortality, while deaths from the causes not so classified had declined much more gradually. One exception was malignant neoplasm of the cervix uteri (fig 3), for which a steady decline was seen only in the United States and, to a less extent, England and Wales. In other countries mortality from this cause had risen until around 1960 and declined thereafter. Mortality from hypertensive disease in the United States (fig 5) was affected when the eighth revision of the ICD was adopted in 1968, but other countries did not show a similar sharp drop. Nevertheless, the overall trend was not much altered.

Table III summarises the changes that had occurred in the provision of health care and in per caput gross domestic product.[11-14] In all countries there had been great improvements in health care, and in wealth.

Discussion

The contribution of medicine to improvements in human health and life expectancy in the nineteenth and early twentieth centuries has been questioned by critics of modern medical developments.[15,16] Such improvements have been largely attributed to improvements in the physical environment and nutrition. There is little doubt that these have been important but the methodological problems of identifying the exact causes of change in health largely preclude a definitive verdict on the respective proportions of improvement due to changes in health services and the environment. There are, however, some diseases for which medical treatment is highly effective and others for which specific preventive actions may have

TABLE I—*Cause of untimely death avoidable by medical treatment*

Cause group	ICD code 7th Revision	ICD code 8th Revision	ICD code 9th Revision	Age groups (years)
(1) Infant mortality	—	—	—	<1
(2) Tuberculosis[31,32]	001-008, 010-019	011-019	010-018,137	5-64
(3) Malignant neoplasm of cervix uteri[33,34]	171	180	180	5-64
(4) Hodgkin's disease[35,36]	201	201	201	5-34
(5) Chronic rheumatic heart disease[25,26]	410-416	393-398	393-398	5-44
(6) Hypertensive disease[10,37,38]	440-447	400-404	401-405	5-64
(7) Cerebrovascular disease[10,39]	330-334	430-438	430-438	5-64
(8) Appendicitis	550-553	540-543	540-543	5-64
(9) Cholelithiasis and cholecystitis[40,41]	584-585	574-575	574-575·1	5-64
(10) Maternal deaths	—	—	—	—

TABLE II—*Comparison of mortality levels in 1956 and 1978* (directly standardised rates per 100 000 population except for infant and maternal mortality†)*

	1956						1978						% Fall (1956-1978)					
	England and Wales	USA	France	Japan	Italy	Sweden	England and Wales	USA	France	Japan	Italy	Sweden	England and Wales	USA	France	Japan	Italy	Sweden
(1) Infant mortality†	25·8	26·4	38·6	39·8	50·9	17·4	13·3	13·6	10·6	8·4	16·8	7·8	48	48	73	58	67	55
(2) Tuberculosis	10·0	7·5	26·0	60·5	22·9	7·7	1·0	0·74	2·2	4·0	2·3	0·74	90	90	92	93	90	90
(3) Cervical cancer	10·6	13·9	5·0	3·6	2·8	7·1	8·5	5·2	3·3	3·4	1·1	6·0	20	63	34	6	61	15
(4) Hodgkin's disease	1·2	1·0	1·1	0·19	1·4	0·83	0·72	0·62	0·66	0·077	0·93	0·19	40	38	40	59	34	77
(5) Chronic rheumatic heart disease	6·1	4·7	1·4	1·9	7·6	1·5	1·0	0·80	0·65	0·60	1·6	0·30	84	83	54	68	79	80
(6) Hypertensive disease	11·2	21·0	3·0	5·2	9·8	7·4	3·3	2·2	2·7	2·1	5·0	0·72	71	90	10	60	49	90
(7) Stroke	37·1	35·4	35·6	103·5	38·1	28·9	24·7	18·6	17·5	40·6	24·5	15·2	33	47	51	61	36	47
(8) Appendicitis	1·2	0·90	1·1	1·5	1·9	1·0	0·19	0·19	0·31	0·13	0·26	0·25	84	79	72	91	86	75
(9) Cholelithiasis and cholecystitis	0·94	1·46	0·83	4·3	2·4	2·3	0·32	0·33	0·66	0·72	1·3	0·39	66	77	20	83	46	83
(10) Maternal deaths†	52	40	54	154	115	34	10	10	15	22	17	6	81	75	72	86	85	82
(11) All causes (ages 5-64)	395·8	473·2	454·5	532·9	412·8	318·6	346·4	388·6	336·6	251·1	310·1	279·1	12	18	26	53	25	12
(12) "Amenable causes"‡ (ages 5-64)	68·6	74·7	69·4	177·6	81·4	50·4	33·4	24·6	25·0	49·2	34·9	19·7	51	55	64	72	57	61
(13) All other causes (not 12) (ages 5-64)	327·2	398·6	385·1	355·3	331·5	267·2	313·0	364·0	311·6	201·9	275·3	259·4	4	9	19	43	17	3

*Latest data for Hodgkin's disease are for 1975. Source for USA Hodgkin's disease: National Cancer Institute (Monograph No 59). Source for remaining data: WHO.

†Infant mortality expressed as deaths per 1000 live births, maternal mortality as deaths per 100 000 live births and stillbirths. Source: United Nations (*Demographic Yearbook 1980*). English and Welsh rates for maternal and infant mortality are those of United Kingdom.

‡Includes tuberculosis, cervical cancer, chronic rheumatic heart disease, hypertensive disease, stroke, appendicitis, and cholelithiasis and cholecystitis, counting only deaths in age groups specified in table I.

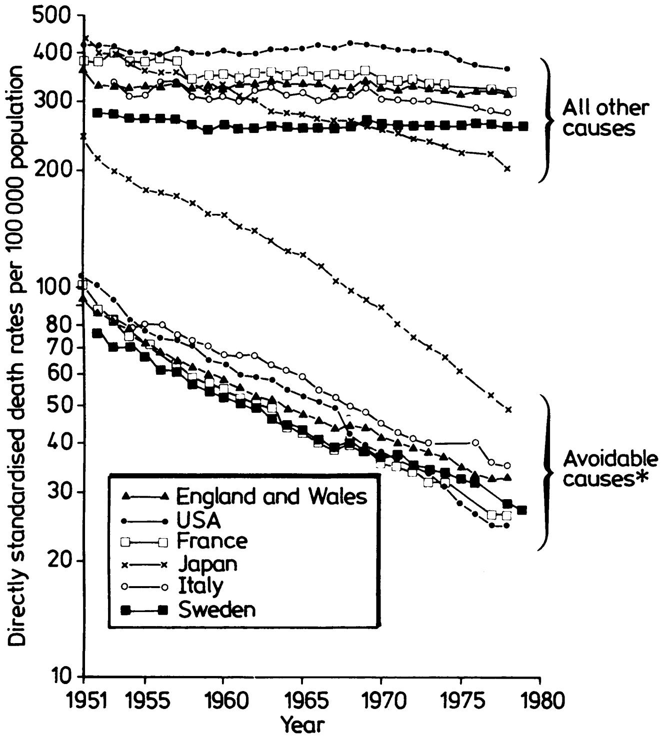

FIG 1—Comparison between trends in aggregate of avoidable causes of death* and all other causes (ages 5-64).
*Includes tuberculosis, cervical cancer, chronic rheumatic heart disease, hypertension, stroke, appendicitis, and cholelithiasis and cholecystitis (counting only deaths in age groups specified in table I).

an important impact. For those conditions comparison of mortality levels may uncover shortcomings in the operation of the health care system in question, just as has been achieved in studies of maternal and perinatal mortality,[17-19] though any interpretation should be made with caution.

All the countries examined here have experienced appreciable growth in their expenditure on health care and use of medical manpower over the postwar period. They have also experienced varying extents of growth in income per head of the population. Of the six countries, Japan's economic and physical environment has changed most over the postwar years, as has its health service. Over the period in question Japan has conducted a major reorganisation and investment in its health services, adopting whatever Western and other methods it found to be best. Of the six countries, however, Japan spends the smallest proportion of its gross national product on health servics (4·5% in 1975). It is worth while noting the relative ranking of Sweden to other countries. For most indicators of "avoidable" death Sweden started out with low mortality rates. Though this may have been due to lower incidences of disease, it is unlikely that this was the case for all these diseases. More probably it was due to the organisation of health services. Anderson has described Sweden as having the most generously distributed hospital and medical system in the world.[20]

In the United States hysterectomy rates have been increasing, thereby reducing the organ at risk for cervical cancer, and this has contributed to the declining death rates from cervical cancer.[21] Wynder and Hiranyoma also observed that survival rates for the various stages of cervical cancer had not changed in the United States for 25 years.[22] Survival is therefore a function of the stage of the cancer when it is diagnosed. Hence detection of early stages is probably the most important factor in determining survival. There should be virtually no mortality from properly diagnosed and treated stage 0 (in situ) cervical cancer. The latency period for

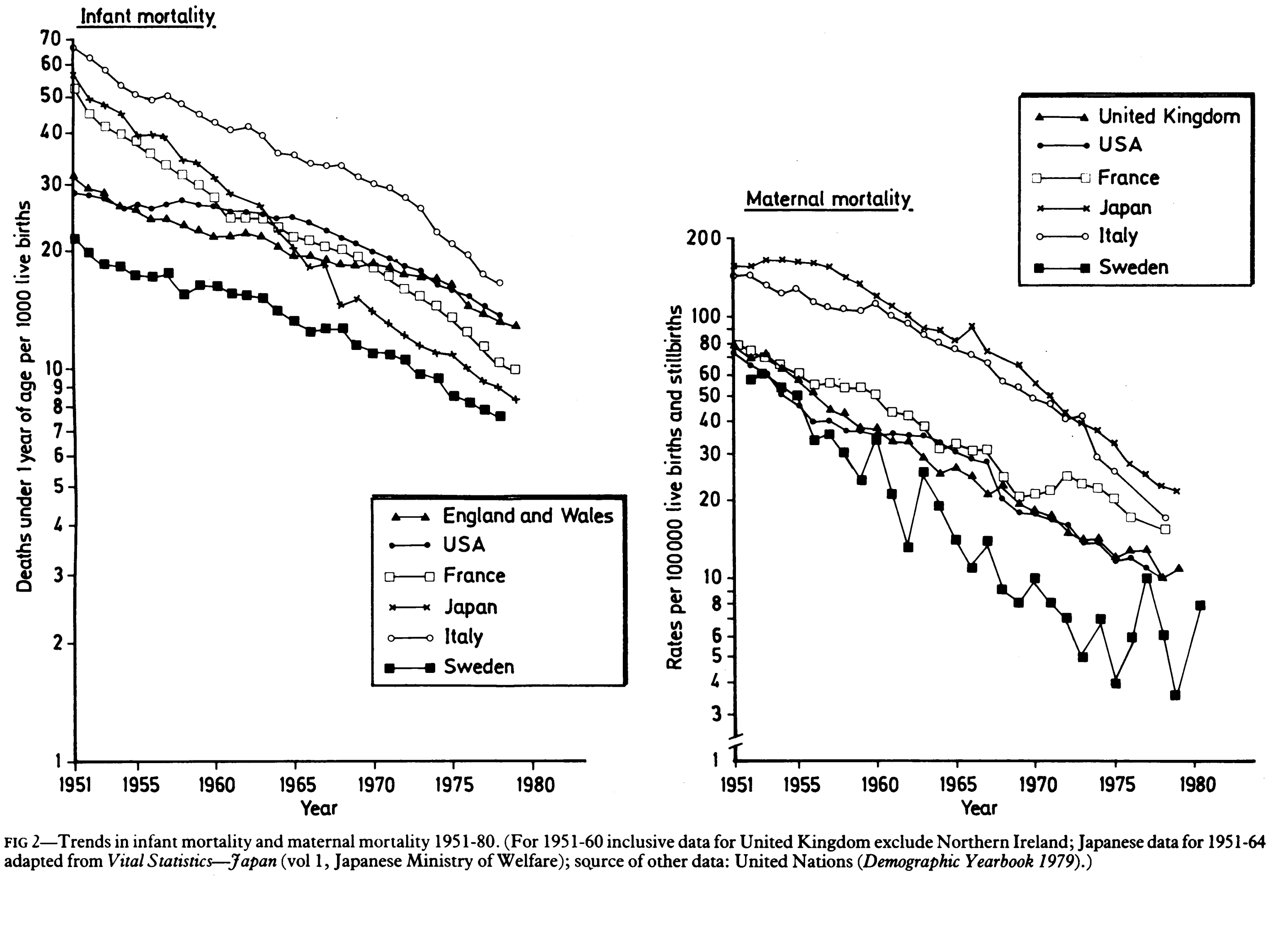

FIG 2—Trends in infant mortality and maternal mortality 1951-80. (For 1951-60 inclusive data for United Kingdom exclude Northern Ireland; Japanese data for 1951-64 adapted from *Vital Statistics—Japan* (vol 1, Japanese Ministry of Welfare); source of other data: United Nations (*Demographic Yearbook 1979*).)

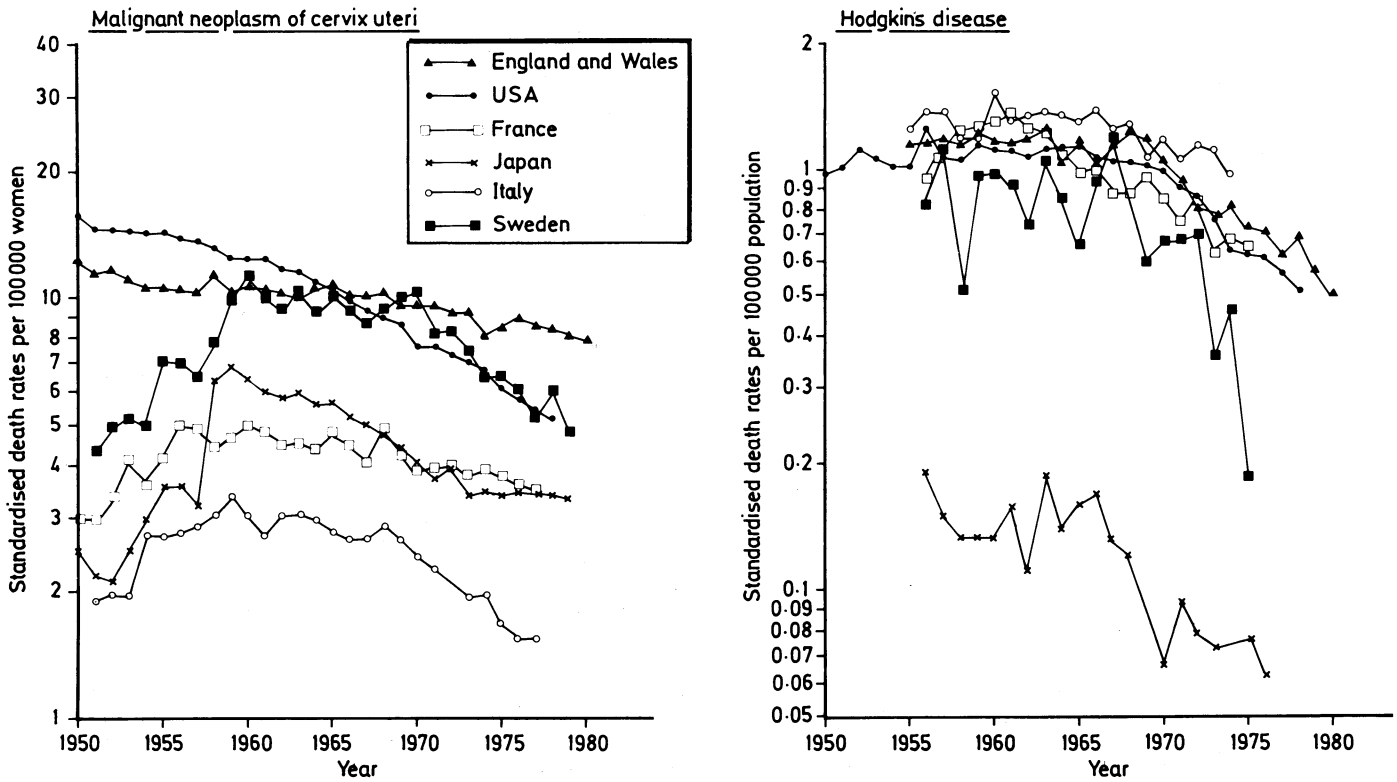

FIG 3—Trends in mortality from cervical cancer in population aged 20-64 and in mortality from Hodgkin's disease in population aged 5-34 (1950-80).

transition to more advanced stages is variable but may be up to 20-30 years in individual cases. The declining incidence of advanced disease, possibly due to screening and early detection, is probably responsible for the declining mortality. The rates in Britain and Italy have not fallen as rapidly as in other countries. We may speculate that this is due to a combination of less vigorous screening programmes and to the fact that women in the lower social classes do not avail themselves of cervical smears.

In the United States the incidence of Hodgkin's disease increased slightly between 1950 and 1970, though in common with the other countries examined, including Japan, the mortality has been declining since the mid-1960s. Japan has had a stable and low incidence of Hodgkin's disease, which may account for its low mortality rates.[22 23] The decline in mortality from Hodgkin's disease coincides with improvement in treatment, as reflected by increased five year survival. In the United States this was 34% (all ages, all stages, both sexes) in 1950-9, increasing to 61% in 1967-73.[24]

Much of the observed fall in chronic rheumatic heart disease was due to the fall in incidence of rheumatic heart disease in the past 40 years, which has been at least partly environmental.[25] Medical care, however, has been shown to be effective in reducing the incidence of rheumatic fever itself.[26] Many patients with rheumatic valvular disease benefit from surgical intervention (valve replacement or valvotomy). Excess mortality might therefore result from lack of access to appropriate cardiovascular surgical facilities. This indicator, however, reflects past environmental as well as past and present health service influences, and this should be considered when the indicator is used.

Mortality from hypertension and, to a less extent, that from stroke have been declining rapidly since the early to mid-1960s. Comparison of the seventh and eighth revisions of the ICD showed a drop of some 30 000 deaths from hypertensive heart disease in the United States in 1968, which were transferred to chronic ischaemic heart disease with hypertension (ICD (8th revision) code 412).[27] The effect of this transfer in England and Wales was, however, negligible,[28] as it appeared to be for the other countries. England and Wales and Italy have experienced the smallest decline in stroke mortality, and Japan the greatest. Though changes in diet and standard of living may play an important part in the decline in mortality from hypertension and stroke, clinical trials have shown a 50% reduction in mortality from stroke with intensive antihypertensive treatment.[10]

TABLE III—*Trends in health care and wealth*

Year	France	Italy	Sweden	UK	USA	Japan
(a) Percentage of gross national product spent on health						
1955	4·5	-	4·1	3·4	4·4	2·7
1960	4·7	-	4·7	3·8	5·3	2·5
1965	5·8	5·0	5·6	3·9	6·1	3·4
1970	6·4	6·1*	7·4	4·3	7·6	3·4
1975	7·9	7·1	8·5	5·5	8·6	4·5
1980	8·3	6·1	8·5	6·0	9·4	6·1
(b) Physicians per 10 000 population						
1960	10·0	15·9	9·5	10·5	13·4	10·8
1970	13·2	18·1	13·6	12·3	15·8	11·3
1975	14·6	19·9	17·1	13·1	16·7	11·8
1980	17·2	29·4	20·4	15·4	19·2	12·8
(c) Qualified nurses per 10 000 population						
1960	18·6	7·6	28·6	20·8	27·9	NA
1970	26·6	6·9	40·7	30·7	35·3	NA
1975	37·2	15·3	59·1	26·7	42·7	NA
(d) Growth in gross national product† per head of population at 1975 prices (1952 taken as 100)						
1952	100	100	100	100	100	100
1955	111	117	111	112	104	133
1960	139	158	127	123	107	191
1965	177	194	158	139	125	309
1970	225	251	186	154	139	500
1975	252	272	208	169	150	587
1980	293	322	219	182	170	717
(e) Population (millions)						
1980	53·71	57·04	8·31	55·95	227·66	116·78
(f) Gross national product per head (US dollars)						
1983	10 500	6400	12 470	9200	14 110	10 120

NA=Not available.
*Data for 1971.
†Gross domestic product for France, Italy, and UK.
Sources: (*a*)—(*c*) for 1955-75, references 11-13; (*d*), (*e*), reference 14 (adapted); (*f*), (*b*) for 1980, World Bank (*World Development Report 1985*, Oxford University Press); (*a*) for 1980—(i) France, Italy, Japan, Sweden, taken from Organisation for Economic Cooperation and Development national accounts 1984 (government and private final consumption expenditure) and reference 14; (ii) USA, taken from *Statistical Abstract of the United States, 1985*; (iii) UK, taken from national accounts 1984 and 1985 and Family Expenditure Survey 1980.

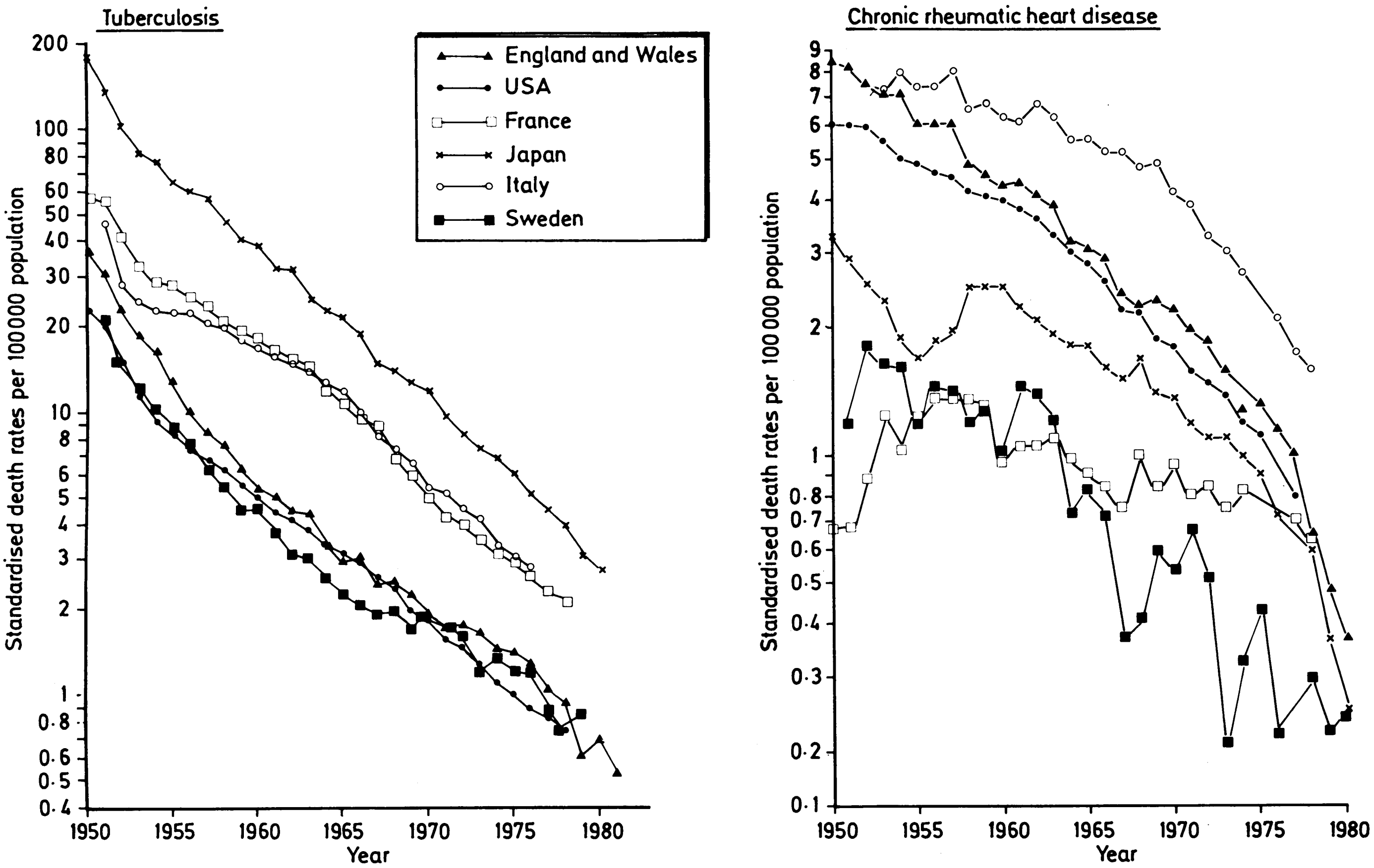

FIG 4—Trends in mortality from tuberculosis in population aged 5-64 and in mortality from chronic rheumatic heart disease in population aged 5-44 (1950-80).

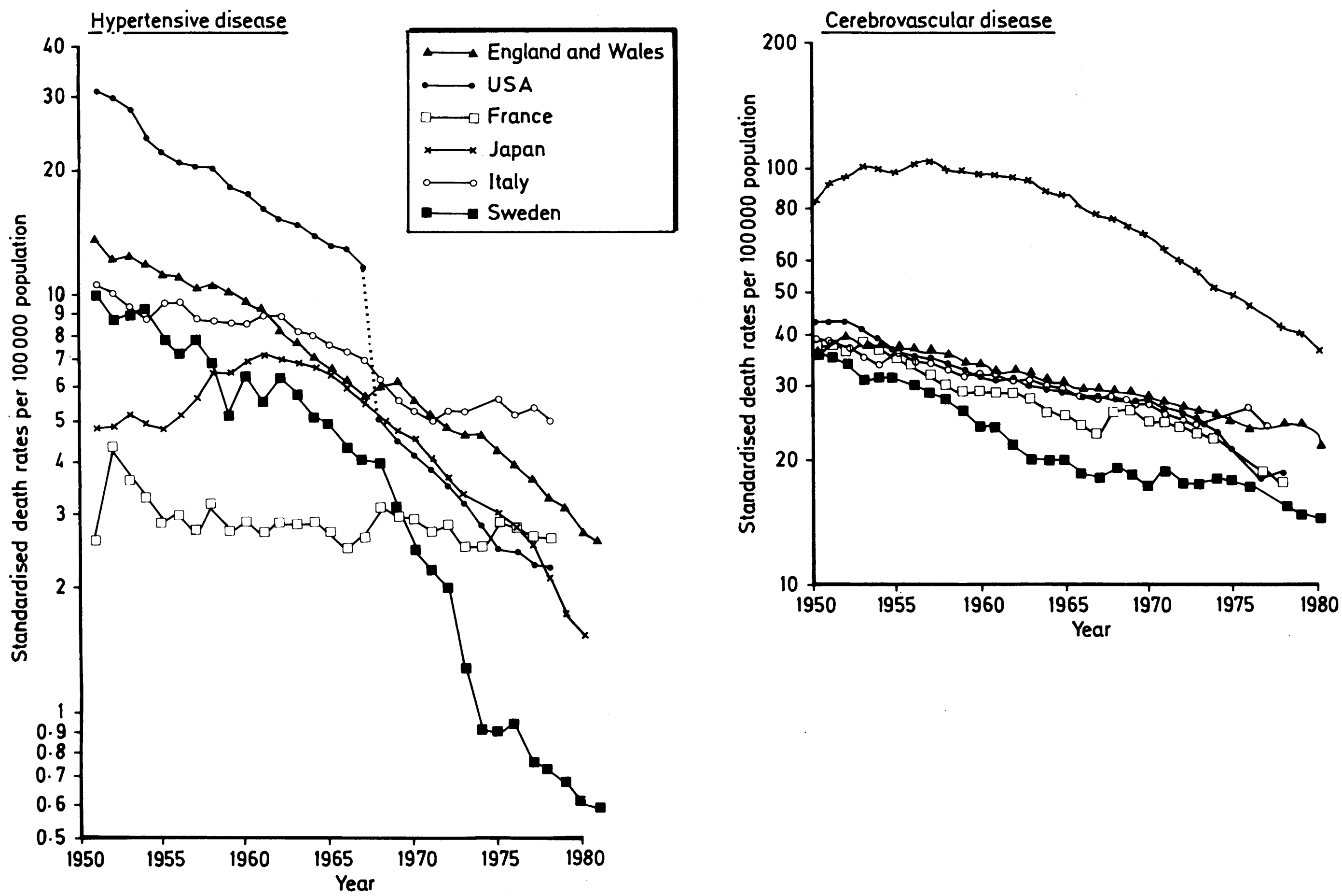

FIG 5—Trends in mortality from hypertensive disease and stroke in population aged 5-64 (1950-80).

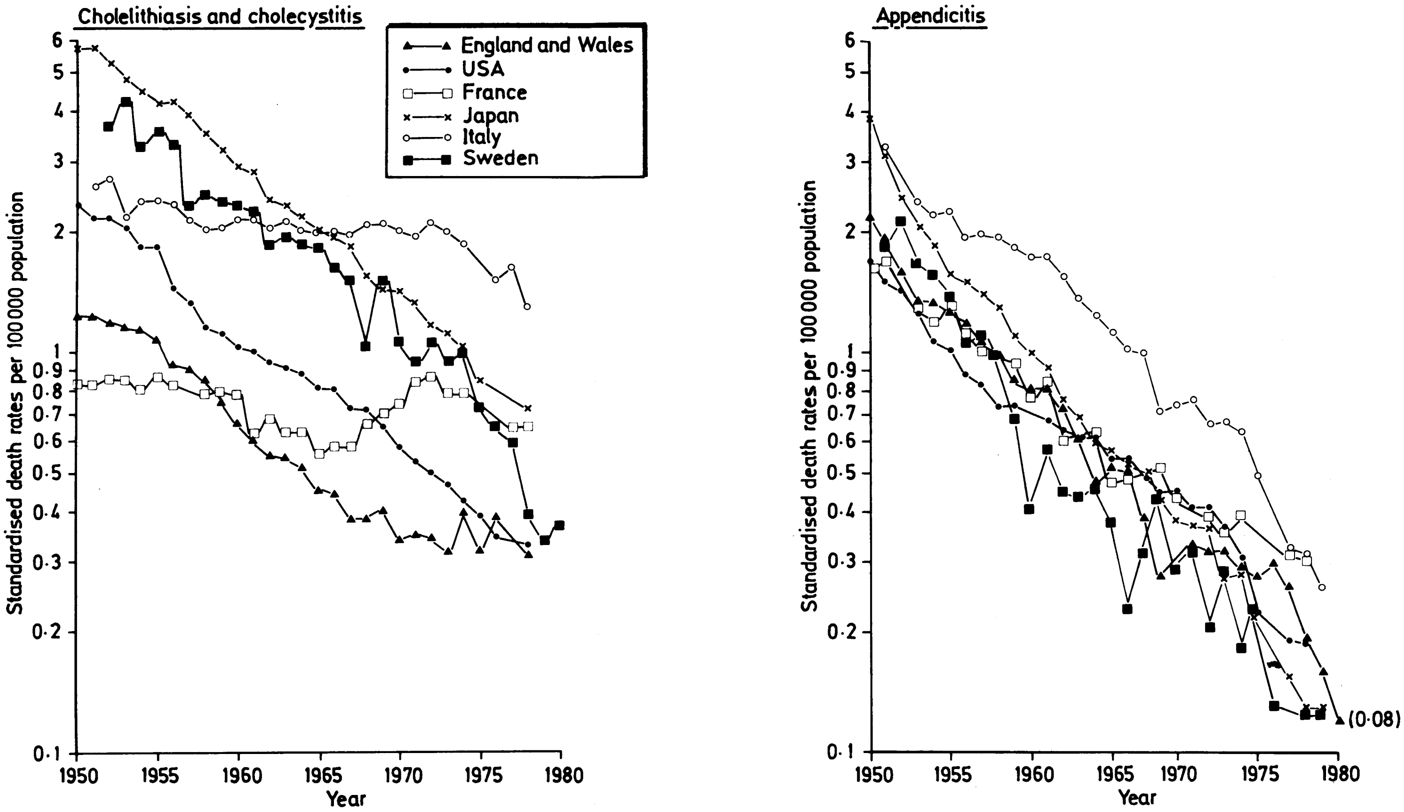

FIG 6—Trends in mortality from cholelithiasis and cholecystitis and in mortality from appendicitis in population aged 5-64 (1950-80).

There have been claims of a decline in the incidence of appendicitis, some of this being attributed to changes in diagnostic practice.[29 30] Those claims, however, have been based on hospital data, which are also influenced by surgical rates that also may have been declining. The lack of reliable data on incidence of disease remains a problem in interpretation.

The disease groups described in this paper were chosen because there is evidence that appropriate and timely health care can reduce mortality from these causes. Observed changes in reported death rates from these diseases may be due to changes in the efficacy of and access to health care, changes in disease incidence, or changes in diagnostic habit and coding. It is not possible precisely to establish the causes from aggregate data, which would require more detailed data specific to individual patients. Nevertheless, since access to appropriate treatment had improved in all countries over the study period and medical treatment for some of the causes had improved, we should expect that unless the incidence of disease had increased considerably mortality from the causes amenable to medical intervention would drop—and to a greater extent than mortality from other, less amenable causes. This indeed was the case. It is unlikely that environment and diagnostic habit would have had a similar, large effect on many unrelated amenable causes but a small effect on the other causes. We made no attempt to control for extraneous factors, since this cannot be done reliably with aggregate data. The consistency in the patterns of international mortality trends for this group of amenable diseases, however, lends support to the use of these mortality causes as indices of the quality of health care.

The examination of such mortality data may be of value as indicators of the impact of changes or differences in availability and access to medical care within individual countries. Though such associations cannot be interpreted as causal, they will suggest areas for further study. Also by comparing the trends over time for the various countries, some of which had had greater changes in their health systems than others, we may develop hypotheses concerning the impact such changes have on mortality from these "amenable" causes for testing in more detailed studies. We recognise that even under optimal conditions a certain level of mortality from these conditions may always exist, but this should not preclude their use in making comparisons.

We are grateful to Professor W W Holland and our other colleagues in the department of community medicine for their help and advice, and to Nicholas Tait and Ruth Silver for help with computing, to the London School of Hygiene and Tropical Medicine for access to their data, and to Sarah Firsht for explaining how to access those data. We are also grateful to Professor Archie Cochrane for his comments on an earlier draft of the manuscript, and to Caroline Draugn for help in obtaining economic data for 1980.

This work was initiated while RV was visiting research fellow in the department of community medicine at St Thomas's Hospital Medical School, supported by a Milbank Memorial Fund scholarship in clinical epidemiology. The research was supported by the Department of Health and Social Security.

References

1 Rutstein DD, Berenberg W, Chalmers TC, Child CG, Fishmen AP, Perrin EB. Measuring the quality of medical care. *N Engl J Med* 1976;11:582-8.
2 Rutstein DD, Berenberg W, Chalmers TC, Child CG, Fishmen AP, Perrin EB. Measuring the quality of medical care: second revision of tables of indexes. *N Engl J Med* 1980;**302**:1146.
3 Charlton JRH, Hartley RM, Silver R, Holland WW. Geographical variation in mortality from conditions amenable to medical intervention in England and Wales. *Lancet* 1983;i:691-6.
4 Alderson M. Alignment of the revisions of the International Classification of Diseases. *International mortality statistics*. London: MacMillan, 1981: ch 6.
5 Waterhouse J, Muir C, Correa P, Powell J, eds. *Cancer incidence in five continents: IARC scientific publications*. No 15. Vol 3. Lyon: IARC, 1976:456.
6 World Health Organisation. World health statistics annual 1981—vital statistics and causes of deaths. Geneva: WHO, 1981.
7 United States Department of Health and Human Services, National Center for Health Statistics. *Vital statistics of the United States 1978*. Vols 1, 2. Hyattsville: USDHHS, 1982.
8 Central Statistical Office. *Social trends*. No 12. London: HMSO, 1981.
9 United Nations. *Demographic yearbook 1980*. New York: United Nations, 1982.
10 Hypertension Detection and Follow-up Program Co-operative Group. Five-year findings of the hypertension detection and follow-up program. I. Reduction in mortality of persons with high blood pressure, including mild hypertension. *JAMA* 1979;**242**:2562-71.
11 Maxwell RJ. *Health and wealth. An international study on health care spending*. Toronto: Lexington Books, 1981.
12 Maxwell RJ. *Health care. The growing dilemma*. 2nd ed. New York: McKinsey and Co Inc, 1975.
13 Hashimoto M. *National health administration in Japan*. Tokyo: Japanese Public Health Administration, 1981.

14 International Monetary Fund. *International financial statistics yearbook*. Washington, DC: International Monetary Fund, 1982.
15 McKeown T. *The role of medicine: dream, mirage or nemesis?* New Jersey: Princeton University Press, 1980.
16 Illich I. *The expropriation of health*. London: Calder and Boyars, 1975.
17 Department of Health and Social Security. Report on confidential enquiries into maternal deaths in England and Wales 1976-8. *Reports on health and social subjects*. No 26. London: HMSO, 1982.
18 New York Academy of Medicine, Committees on Public Health Relations. *Maternal mortality in New York City: a study of all puerperal deaths 1930-1932*. New York: The Commonwealth Fund, 1933.
19 Ryan GM, Pettigrew AH, Fogerty S, Donalue CL Jr. Regionalizing perinatal health services in Massachusetts. *N Engl J Med* 1977;**296**:228-30.
20 Anderson OW. *Health care: can there be equity? The United States, Sweden and England*. New York: John Wiley and Sons, 1972.
21 Cramer DW. Uterine cervix. In: Schothenfeld D, Fraumeni JF, eds. *Cancer epidemiology and prevention*. Philadelphia: WB Saunders Company, 1982:881-900.
22 Wynder EL, Hiranyoma T. Comparative epidemiology of cancers of the United States and Japan. *Prev Med* 1977;**6**:567-94.
23 Devesa SS, Silverman DT. Cancer incidence and mortality trends in the United States: 1935-74. *Journal of the National Cancer Institute* 1978;**60**:545-74.
24 Green SB. *Survival for lymphomas and leukemias*. Washington, DC: DHEW, 1978. (NIH 78-1546.)
25 Feinstein AR, Stern EK, Spagnuola M. The prognosis of acute rheumatic fever. *Am Heart J* 1966;**111**:533-43.
26 Gordis L. Effectiveness of comprehensive programs in preventing rheumatic fever. *N Engl J Med* 1973;**289**:331-5.
27 Gordon T, Thorn T. The recent decrease in CHD mortality. *Prev Med* 1975;**4**:115-25.
28 Clayton DG, Taylor D, Shaper AG. Trends in heart disease in England and Wales, 1950-1973. *Health Trends* 1977;**9**:1-6.
29 Raguveer-Saran MK, Keddie NC. The falling incidence of appendicitis. *Br J Surg* 1975;**67**:681.
30 Noer T. Decreasing incidence of acute appendicitis. *Acta Chir Scand* 1975;**141**:431-2.
31 Johnston RF, Wilderick KH. "State of the art" review. The impact of chemotherapy on the care of patients with tuberculosis. *Am Rev Respir Dis* 1974;**109**:636-46.
32 British Thoracic and Tuberculosis Association. A survey of tuberculosis mortality in England and Wales in 1968. *Tubercule* 1971;**52**:1
33 Clarke EA, Anderson TW. Does screening for "PAP" smears help prevent cervical cancer? *Lancet* 1972;ii:1-4.
34 Task Force appointed by Conference of Deputy Ministers of Health. Screening for carcinoma of the cervix. *Can Med Assoc J* 1976;**114**:1013-26.
35 Aisenberg AC. The staging and treatment of Hodgkin's disease. *N Engl J Med* 1978;**299**:1228-32.
36 Kaplan HS. *Hodgkin's disease*. 2nd ed. Cambridge, Massachusetts: Harvard University Press, 1980:548-97.
37 Management Committee of Australian Therapeutic Trial in Mild Hypertension. Report. *Lancet* 1980;i:1261-7.
38 Veterans Administration Co-operative Study Group on Antihypertensive Agents. Effects of treatment on morbidity in hypertension. II. Results in patients with diastolic blood pressure averaging 90—through 114 mmHg. *JAMA* 1970;**213**:1143-52.
39 Hypertension Detection and Follow-up Program Co-operative Group. Five year findings of the hypertension detection and follow-up program. III. Reduction in stroke incidence among persons with high blood pressure. *JAMA* 1982;**247**:633-8.
40 Ranshoff DF, Gracie WA, Wolfenson LB, Newhamser D. Prophylactic cholecystectomy or expedient management for silent gallstones. A decision analysis to assess survival. *Ann Intern Med* 1983;**99**:199-204.
41 Fitzpatrick G, Newtra R, Gilbert JP. Cost effectiveness of cholecystectomy for silent gallstone. In: Bunker JP, Barues BA, Mostellen F, eds. *Cost risks and benefits of surgery*. New York: Oxford University Press, 1977:201-76.

(Accepted 20 November 1985)

Antiglomerular basement membrane antibody mediated disease in the British Isles 1980-4

CAROLINE O S SAVAGE, C D PUSEY, CHRISTINE BOWMAN, A J REES, C M LOCKWOOD

Abstract

Clinical and pathological data on 71 patients from throughout the British Isles who developed antiglomerular basement membrane antibody mediated nephritis in the period 1980-4 were studied. Two principle patterns of disease were recognised: young men presenting in their 20s with Goodpasture's syndrome (glomerulonephritis and lung haemorrhage) and women presenting in their 60s with glomerulonephritis alone. The effect of treatment on prognosis of a total of 108 patients was also reviewed (the 71 patients plus patients seen before 1980 at Hammersmith Hospital). Treatment with prednisolone, cytotoxic drugs, and plasma exchange hastened the time to clearance of autoantibody and improved the outlook of patients who were not dependent on dialysis and those with lung haemorrhage.

Introduction

Antiglomerular basement membrane antibody mediated disease is characterised by the formation and linear deposition of antiglomerular basement membrane autoantibodies along the glomerular basement membrane, resulting in injury to tissues that is clinically manifested by acute glomerulonephritis. In some patients antibodies are also deposited on the alveolar basement membrane, causing lung haemorrhage (Goodpasture's syndrome). The pathogenetic role of antiglomerular basement membrane autoantibodies was established by Lerner *et al* in 1967 using transfer experiments in which subhuman primates developed glomerulonephritis after injection of human antiglomerular basement membrane antibodies obtained from serum or eluted from the glomerular basement membrane of renal homogenates of patients with the disease.[1] Subsequently, assays have been developed that detect circulating antiglomerular basement membrane autoantibodies, allowing rapid diagnosis and monitoring of disease activity.[2]

A sensitive radioimmunoassay has been available in our laboratory since 1980 and is used to test serum samples from patients sent by doctors throughout the British Isles for the presence of antiglomerular basement membrane antibodies on an emergency or routine basis.[3 4] We have therefore been able to study many patients who had antiglomerular basement membrane antibody mediated nephritis and have conducted a survey of the 83 patients who developed antiglomerular basement membrane antibody mediated nephritis from June 1980 to June 1984 and whose serum samples were sent to our laboratory to be assayed for antiglomerular basement membrane antibodies.

Data on 71 patients were collected and used to determine the clinical and laboratory features at presentation. Furthermore, to study the effect of treatment on prognosis we reviewed the outcome of 49 consecutive patients treated at Hammersmith Hospital since 1974, when treatment with intensive plasma exchange was started,[5] and 59 patients in whom the diagnosis was confirmed by our assay but who were treated at other hospitals.

Medical Research Council Clinical Immunology Research Group, Renal Unit and Department of Medicine, Royal Postgraduate Medical School, Hammersmith Hospital, London W12 0HS

CAROLINE O S SAVAGE, MRCP, MRC research fellow
C D PUSEY, MRCP, senior lecturer and honorary consultant physician
CHRISTINE BOWMAN, BSC, research officer
A J REES, FRCP, consultant nephrologist and honorary senior lecturer
C M LOCKWOOD, FRCP, senior lecturer and honorary consultant physician

Correspondence to: Dr Savage.