health and nutrition examination survey (NHANES I) epidemiological follow up study all cause mortality at low cholesterol concentrations was increased in both men and women, but this increase was significant only in those aged over 60 at baseline.[27] Our results support the hypothesis that the relation between total cholesterol concentration and mortality is dependent on age at baseline.

The present study shows that total cholesterol concentration is a strong risk factor for coronary heart disease and all cause mortality in men as well as in women. No significant increase in all cause mortality at low concentrations was observed. Our results add to the evidence that increased non-cardiovascular mortality at low cholesterol concentrations is limited to subjects who are middle aged or older at baseline.

We thank Mrs Röntgen-Pieper for her invaluable secretarial help with the mortality follow up and Statistics Netherlands for providing data on causes of death.

Funding: Former Dutch Ministry of Public Health and Environmental Protection.

Conflict of interest: None.

1 Manolio TA, Pearson TA, Wenger NK, Barrett-Connor E, Payne GH, Harlan WR. Cholesterol and heart disease in older persons and women. Review of an NHLBI Workshop. *Ann Epidemiol* 1992;2:161-76.
2 Anonymous. *Women and cardiovascular diseases.* (In Dutch.) The Hague: Dutch Heart Foundation, 1994.
3 Ruwaard D, Kramers PGN, eds. *Public health status and forecasts. The health status of the Dutch population over the period 1950-2010.* The Hague: National Institute of Public Health and Environmental Protection, 1993:377-92.
4 Meijer J, Geuns HA van, Sluyter DP. Screening for risk factors of coronary heart disease in consultation bureaus for tuberculosis. CB heart project in the Netherlands. *Hart Bulletin* 1976;7:42-6.
5 Stamler J, Wentworth D, Neaton JD. Is the relationship between serum cholesterol and risk of premature death from coronary heart disease continuous and graded? Findings in 356,222 primary screenees of the multiple risk factor intervention trial (MRFIT). *JAMA* 1986;256:2823-8.
6 Chen Z, Peto R, Collins R, MacMahon S, Lu J, Li W. Serum cholesterol concentration and coronary heart disease in a population with low cholesterol concentrations. *BMJ* 1991;303:276-82.
7 Jacobs DR, Blackburn H, Higgins M, Reed D, Iso H, McMillan G, *et al.* Report of the conference on low blood cholesterol: mortality associations. *Circulation* 1992;86:1046-60.
8 Neaton JD, Blackburn H, Jacobs DR, Kuller L, Lee D-J, Sherwin R, *et al.* Serum cholesterol level and mortality findings for men screened in the multiple risk factor intervention trial. *Arch Intern Med* 1992;152:1480-500.
9 Huang TC, Cheng CP, Wefler V, Raftery A. A stable reagent for the Liebermann-Burchard reaction: application to rapid serum cholesterol determination. *Anal Chem* 1961:33:1405-7.
10 Anonymous. Netherlands cholesterol consensus update. (In Dutch.) *Hart Bulletin* 1990;23(suppl):9-21.
11 Verschuren WMM, Al M, Blokstra A, Boerma GJM, Kromhout D. Trend in serum total cholesterol level in 110,000 young adults in the Netherlands, 1974-1986. *Am J Epidemiol* 1991;134:1290-302.
12 SAS Institute. *SAS/STAT user's guide.* Version 6. 4th Ed. Vol 1 and 2. Cary, North Carolina: SAS Institute, 1989.
13 Isles CG, Hole DJ, Hawthorne CM, Lever AF. Relation between coronary risk and coronary mortality in women of the Renfrew and Paisley survey: comparison with men. *Lancet* 1992;339:702-6.
14 MacMahon S, Peto R, Cutler J, Collins R, Sorlie P, Neaton J, *et al.* Blood pressure, stroke, and coronary heart disease 1. Prolonged differences in blood pressure: prospective observational studies corrected for the regression dilution bias. *Lancet* 1990;335:765-74.
15 Law MR, Wald NJ, Wu T, Hackshaw A, Bailey A. Systematic underestimation of associations between serum cholesterol concentration and ischemic heart disease in observational studies; data from the BUPA study. *BMJ* 1994;308:363-6.
16 Klag MJ, Ford DE, Mead LA, He J, Whelton PK, Liang K-Y, *et al.* Serum cholesterol in young men and subsequent cardiovascular disease. *N Engl J Med* 1993;328:313-8.
17 Law MR, Wald NJ, Thompson SG. By how much and how quickly does reduction in serum cholesterol concentration lower risk of ischaemic heart disease? *BMJ* 1994;308:367-73.
18 Anderson KM, Castelli WP, Levy D. Cholesterol and mortality. 30 Years of follow-up from the Framingham study. *JAMA* 1987;257:2176-80.
19 Verschuren WMM, Leer EM van, Blokstra A, Seidell JC, Smit HA, Bueno de Mesquita HB, *et al.* Cardiovascular disease risk factors in the Netherlands. *Netherlands Journal of Cardiology* 1993;4:205-10.
20 Kark JD, Smith AH, Hames CG. The relationship of serum cholesterol to the incidence of cancer in Evans County, Georgia. *J Chronic Dis* 1980;33:311-22.
21 International Collaborative Group. Circulating cholesterol level and risk of death from cancer in men aged 40 to 69 years. *JAMA* 1982;248:2853-9.
22 Hiatt RA, Fireman BH. Serum cholesterol and the incidence of cancer in a large cohort. *Journal of Chronic Disease* 1986;39:861-70.
23 Schatzkin A, Hoover RN, Taylor PR, Ziegler RG, Carter CL, Albanes D, *et al.* Site-specific analysis of total serum cholesterol and incident cancer in the national health and nutrition examination survey I epidemiologic follow-up study. *Cancer Research* 1988;48:452-8.
24 Isles CG, Hole DJ, Gillis CR, Hawthorne VM, Lever AF. Plasma cholesterol, coronary heart disease and cancer in the Renfrew and Paisley survey. *BMJ* 1989;298:920-4.
25 Davey Smith G, Shipley MJ, Marmot MG, Rose G. Plasma cholesterol concentration and mortality. The Whitehall study. *JAMA* 1992;267:70-6.
26 Persson B, Johansson BW. The Kockum study: twenty-two years of follow-up. *Acta Med Scand* 1984;216:485-93.
27 Harris T, Feldman JJ, Kleinman JC, Ettinger WH Jr, Makuc DM, Schatzkin AG. The low cholesterol-mortality association in a national cohort. *J Clin Epidemiol* 1992;45:595-601.

(Accepted 14 July 1995)

Waiting list dynamics and the impact of earmarked funding

John N Newton, Jane Henderson, Michael J Goldacre

Abstract

***Objective*—To determine how changes in the number of admissions from waiting lists and changes in the number of additions to the lists are related to list size and waiting times, in the context of local waiting list initiatives.**

***Design*—Review of national and Körner statistics.**

***Setting*—England (1987-94) and districts of the former Oxford region (1987-91).**

***Main outcome measures*—Correlation of quarterly changes in the number of admissions from waiting lists in England with changes in total list size, numbers of patients waiting one to two, or over two years, and number of additions to the lists; examination of changes in waiting list statistics for individual district specialties in one region in relation to funding for waiting list initiatives.**

***Results*—Nationally, changes in the number of admissions to hospital from lists closely correlated with changes in the number of additions to lists ($r = 0{\cdot}84$; $P < 0{\cdot}01$). After adjusting for changes in the number of additions to lists, changes in the number of admissions correlated inversely with changes in list size ($r = -0{\cdot}62$; $P < 0{\cdot}001$). Decreases in the number of patients waiting from one to two years were significantly associated with increases in the number of admissions ($r = -0{\cdot}52$; $P < 0{\cdot}01$); locally, only six of 44 waiting list initiatives were followed by an increase in admissions and a fall in list size, although a further 11 were followed by a fall in list size without a corresponding increase in admissions.**

***Conclusions*—An increase in admissions improved waiting times but did not reduce list size because additions to the list tended to increase at the same time. The appropriateness of waiting list initiatives as a method of funding elective surgery should be reviewed.**

Unit of Health Care Epidemiology, University of Oxford, Oxford OX3 7LF
John N Newton, *consultant epidemiologist*
Jane Henderson, *research officer*
Michael J Goldacre, *director*

Correspondence to:
Dr Newton.

BMJ 1995;311:783-5

Introduction

The number of people on hospital waiting lists, and the length of time that they wait, are used extensively as performance indicators in the NHS.[1] Although there are still over a million people on waiting lists in England, the number waiting over a year has decreased steadily since 1990. Policy initiatives to reduce waiting times include the patient's charter,[2] earmarked funds of about £30m a year nationally from 1987 to 1993, and the funding of 100 new consultant posts in 1990 specifically to reduce waiting times.

The effectiveness of these policies is difficult to assess, given the complex nature of waiting lists.[3,6] Waiting list initiatives mostly aim to reduce list size and waiting times by admitting more patients from the list.[7] Research studies, however, have so far failed to show a strong inverse correlation between admission rates and list size.[4,8]

We examined national waiting list statistics from 1987-94 to determine how list size and waiting times changed in relation to changes in the number of admissions from the list. We also considered changes in the number of patients added to the list, information about which has been routinely available only since 1987. We used local data to assess the impact of earmarked waiting list funds on admission rates, list size, and waiting times at an individual district specialty level.

Methods

Aggregated national information on the number of people on waiting lists, and the number admitted from them, is published every six months by the Department of Health.[9] The department also supplied us with additional quarterly data for the period 1987-94, including information on the numbers of additions to the list or "decisions to admit in due course."

Pearson's corrrelation coefficient was used to assess correlations between changes in the number of admissions from waiting lists in England and in total list size, changes in the numbers of those waiting one to two, or over two years, and changes in the number of additions to the lists. Multiple regression analysis was used to control for simultaneous changes when appropriate.

For patients treated in the former Oxford region during 1987-91, the numbers of admissions from waiting lists were obtained from the regional health authority's information system and the numbers waiting, time waited, and numbers of additions to waiting lists from Körner returns. For every elective surgical specialty in each district, these data were examined in relation to the allocation of waiting list initiative funds by the regional health authority, by the Inter-Authority Comparisons and Consultancy Unit directly, and on behalf of the NHS Executive and by the Department of Health when funding additional consultant posts (information provided by the health authority). After 1991 specific specialties no longer received centrally allocated waiting list funding.

Results

Nationally, quarterly changes in the number of admissions from the list and in the number of additions to it correlated closely ($r=0{\cdot}84$; $P<0{\cdot}01$). There was a corresponding inverse correlation between changes in admissions and changes in list size ($r=-0{\cdot}62$; $P<0{\cdot}001$ only after controlling for the former relation). Changes in the number of patients waiting over two years correlated with changes in both the number waiting one to two years ($r=0{\cdot}53$; $P<0{\cdot}01$) and the overall list size ($r=0{\cdot}55$; $P<0{\cdot}01$). Increases in the number of admissions were significantly associated with decreases in the numbers of people waiting one to two years ($r=-0{\cdot}52$; $P<0{\cdot}01$), but not with decreases in the number waiting over two years ($r=-0{\cdot}08$; NS).

Between 1988 and 1991, 44 waiting list initiatives (total value £3·3m) were distributed among 25 of the 40 district specialties studied in the former Oxford region.

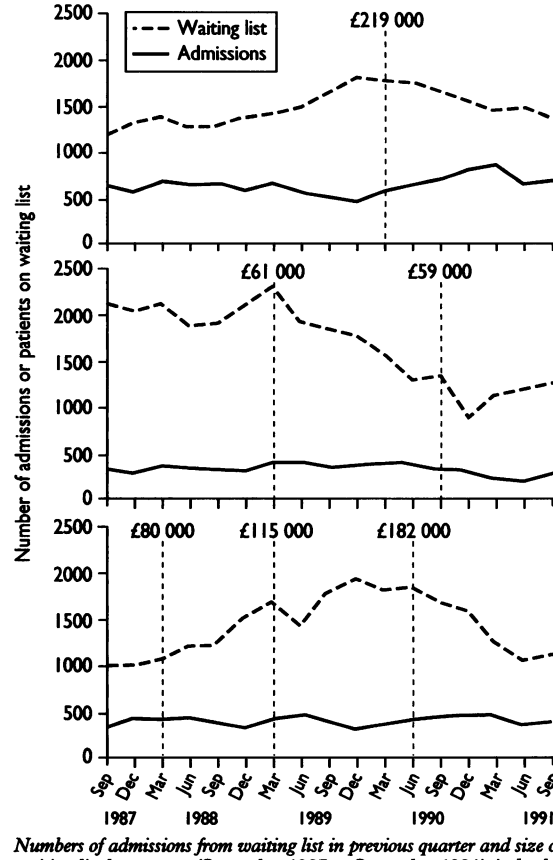
In only six cases was additional funding followed by a rise in admissions and a fall in list size in the subsequent six months (figure). In 11 cases extra funding was followed by a decline in list size but no equivalent increase in admissions (figure). In 27 cases list size either did not change or increased in the six months after extra funds had been allocated (figure). Waiting list initiatives were not consistently followed by a decline in the numbers of patients waiting one to two years, or over two years. Many of the district specialties with substantial reductions in waiting times had received no extra funds.

Discussion

A close correlation between changes in the number of patients entering and leaving waiting lists is not surprising as many of the same resources contribute to both outpatient and inpatient services. For example, waiting list initiatives that increase admissions are likely to increase the number of patients added to the same waiting list, particularly if they involve the appointment of additional surgeons. The net effect would be a reduction in waiting time but not necessarily a change in list size. The data confirm that periods when admission rates increased were also periods when the numbers of people waiting between one and two years fell. The regression analysis suggests that list size would have decreased as well except for the fact that additions to the list tended to increase at the same time.

When the number of patients waiting over two years fell, there was usually a decline in the number waiting one to two years. The policy to reduce very long waits has not, therefore, apparently been at the expense of others on the list, at least at this level of aggregation.

The national study showed that increasing admissions tended to improve waiting times but not list size. The local study showed that it was unusual for admissions to increase after an allocation of waiting list funds. Rather, allocations seemed to reduce list sizes without increasing admissions—possibly as a result of identifying patients on the list who did not require surgery for various reasons.[10] The objective of



Numbers of admissions from waiting list in previous quarter and size of waiting list by quarter (September 1987 to September 1991) in health district for three different specialties, showing timing of additional funding

Key messages

- The numbers of patients on hospital waiting lists and the length of time they wait are used extensively as performance indicators
- Increasing the numbers of admissions improves waiting times but not list size
- Targeted funding often fails to achieve its objectives
- Use of waiting list initiatives should be reviewed

validation of the list alone could not justify the expense of these initiatives.

Waiting list initiatives were intended to act as catalysts to encourage other, more definitive, measures that would improve waiting times. The NHS Management Executive considered that the decline in the numbers of people waiting two years and over owed more to waiting lists having a higher priority for existing resources than to targeted additional funding.[11] This study provides further evidence that earmarked funds have often failed to improve waiting lists by increasing the number of admissions.

Waiting list initiatives from central funds have now ceased in line with the government's policy of devolving funding decisions to local health authorities.[12] Purchasing authorities are, however, being asked to achieve progressively more stringent waiting time targets for inpatients and new targets for outpatients.[13] These authorities are inclined to use their reserve funds for waiting list initiatives towards the end of the financial year, to ensure that these targets are met. The allocation of substantial funds which may not be available in the next financial year is deeply unpopular with managers of hospital trusts, who cannot use these funds to make substantive appointments or to develop facilities. Funds released in the middle of winter are particularly difficult for trusts to use effectively because beds are fully occupied with emergency admissions.

Before purchasers divert further resources into waiting list initiatives they should consider, firstly, the evidence on the effectiveness of this approach[14,15] and, secondly, the relative priority of the health need represented by waiting lists for elective surgery.[16,17]

Funding: The Department of Health and the Anglia and Oxford Regional Health Authority funds the Unit of Health Care Epidemiology, which is part of the Department of Public Health and Primary Care, University of Oxford.

Conflict of interest: None.

1 Radical Statistics Health Group. NHS "indicators of success": what do they tell us? *BMJ* 1995;310:1045-50.
2 Department of Health. *Health service charter*. London: HMSO, 1992.
3 Pope C. Cutting queues or cutting corners: waiting lists and the 1990 NHS reforms. *BMJ* 1992;305:577-9.
4 Goldacre MJ, Lee A, Don B. Waiting list statistics I: relation between admissions from the waiting list and length of waiting list. *BMJ* 1987;295: 1105-8.
5 Pope C. Trouble in store: some thoughts on the management of waiting lists. *Sociology of Health and Illness* 1991;13:193-212.
6 Frankel S. The natural history of waiting lists: some wider explanations for an unnecessary problem. *Health Trends* 1989;21:56-8.
7 Parmar JR. A waiting list initiative in general surgery—experience in a large district general hospital. *Ann R Coll Surg Engl* 1993;75 (suppl 1):4-6.
8 Williams M, Frankel S, Nanchahal K, Coast J, Donovan J. *Epidemiologically based needs assessment: total hip replacement surgery*. 2nd ed. London: Department of Health, 1992.
9 Department of Health NHS Executive. *Hospital waiting list statistics: England*. Leeds: NHS Executive, 1987-94.
10 Arnstein PM, Bryson R. The waiting list initiative: a cautionary tale. *Br J Plastic Surg* 1991:44;553-4.
11 Committee of Public Accounts. *Fourth report. Progress on NHS operating theatres and waiting lists in England*. London: HMSO, 1992.
12 NHS Executive. *Waiting time policy*. Leeds: NHS Executive, November, 1994. (EL(94)90.)
13 NHS Executive. *Revised and expanded patient's charter*. Leeds: NHS Executive, 1994.(EL(94)101.)
14 Umeh HN, Reece-Smith H, Faber RG, Galland RB. Impact of a waiting list initiative on a general surgical waiting list. *Ann R Coll Surg Engl* 1994;76 (suppl 1):4-7.
15 Mills RP, Heaton JM. Waiting list initiatives: crisis management or targeting of resources. *J R Soc Med* 1991;84:405-7.
16 Naylor CD, Slaughter PM. A stitch in time: case for assessing the burden of delayed surgery. *Quality in Health Care* 1994;3:221-4.
17 Hemingway H, Jacobson B. Queues for cure? Let's add appropriateness to the equation. *BMJ* 1995;310:818-19.

(Accepted 26 June 1995)

Acquired immunodeficiency without HIV infection: epidemiology and clinical outcome in Italy

G Rezza, P Pezzotti, F Aiuti for the Italian Study Group on non-HIV AIDS

Centro Operativo AIDS, Istituto Superiore di Sanità, 00161 Rome
G Rezza, *director*
P Pezzotti, *research assistant*

Cattedra di Allergologia e Immunologia Clinica, Università La Sapienza, 00162 Rome
F Aiuti, *director*

Members of the study group are given at the end of the report

Correspondence to:
Dr Rezza.

BMJ 1995;311:785-6

Cases of acquired immunodeficiency without HIV infection, but with depletion of CD4 T lymphocytes have been reported since 1989. We estimated the prevalence of this condition in Italy and evaluated its clinical outcome.

Subjects, methods, and results

In January 1993 the Italian National AIDS Unit began a nationwide retrospective survey of symptomatic cases of acquired immunodeficiency without HIV infection. Cases were defined as having (*a*) one or more clinical conditions indicating severe immunosuppression; (*b*) depleted CD4 T lymphocytes (fewer than 300×10^6 cells/l or proportionately less than 20% of the lymphocyte count) at the time of clinical diagnosis; (*c*) no known cause of immunosuppression; and (*d*) negative results for HIV infection on enzyme linked immunosorbent assay (ELISA) and in at least one supplementary test. This case definition was circulated to all doctors who were considered most likely to have seen such patients—namely, immunologists and specialists in infectious diseases who had reported a high number of AIDS cases—in a letter asking them to compile standardised case reports.

Up to 30 June 1994, 13 case reports had been received from all over Italy. Two cases were immediately excluded because they did not meet diagnostic criteria; another case was later excluded because the patient developed sarcoidosis. The year of diagnosis of the 10 confirmed cases is reported in the table. The mean age was 47·3 years (range: 38-59); seven of the 10 cases were reported among men.

Only one patient (case 1) reported risk factors for HIV infection; another patient (case 6) came from Ethiopia and has been reported on previously. None of the patients reported injecting drug misuse, which is the most common risk factor for HIV infection in Italy. Eight patients had a regular sexual partner; four of the partners tested negative for HIV-1 and HIV-2 antibodies (the other four partners were not tested). None of the members of the patients' extended families had serious infections or problems with their immune system.