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**CURRENT CONCERNS**

SHS Paper number 3

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**EQUITY  
IN THE USE OF  
HEALTH CARE  
RESOURCES**

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Division of Strengthening of Health Services  
World Health Organization

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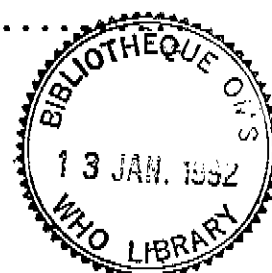
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## SYNOPSIS

'Health for All by the year 2000' implies achieving equity in some form. Estimates show for a number of countries this goal of geographical equity is remote and requires action now if it is to be achieved by the year 2000. Often an 'inverse care law' appears to be at work, with resources for health care distributed in inverse proportion to the need for them. This law obviously operates when access to care depends on ability to pay for it. But, even when health care is publicly financed, the inverse care law may still operate, as it did in the U.K., for nearly thirty years after the creation of a publicly-financed National Health Service.

The model proposed here for measuring inequity and the related policy to promote equity is that of the English Resource Allocation Working Party (RAWP). RAWP methods have been used to achieve regional equity in England, to measure inequity in a number of industrialized countries, and by a number of Ministries of Health in industrialized countries to promote greater equity. The underlying principles of estimating inequity by RAWP methods are described and it is argued that for developing countries, which lack the necessary data for their full application, approximate methods based on expenditure per capita are likely to be adequate.

The paper also argues that measuring inequity in the use of all health care resources remedies the common failure to promote equity because of piecemeal approaches, and helps generate political pressure to overcome inertia. Problems of achieving greater equity are discussed, particularly when there is no growth to finance the improvement of the relative position of poor areas. Ways of implementing a more equitable distribution through planning and an 'internal market' are contrasted.

## INTRODUCTION

This paper aims to provide general guidance for countries which intend to achieve geographical equity in the use of health care resources as part of "Health for All by the Year 2000". At the core of the paper is an analysis of the successful implementation in England of a policy to achieve geographical equity in the use of resources for hospital and community health services as recommended by the Resource Allocation Working Party. The RAWP approach may provide a useful model for other countries for two reasons: the basis of the policy and its impact has been clearly documented; and the RAWP approach is easily transferable. The approach has been closely followed by English regions (2), other countries within the U.K. (3), New Zealand (4) and states of Australia (5). RAWP methods have also been used to measure inequity in France and the Netherlands by Maynard and Ludbrook (6), and in Finland by Pekurinen et al (7).

This paper provides a basis for measuring geographical inequity in the use of health care resources in developing countries. It thus considers how English methods of measuring geographical inequity, and experience of reducing this inequity may be modified to take account of differences between industrialized and developing countries. Relevant data may be scant and unreliable in developing countries. In industrialized countries, a more equal distribution of resources is likely to entail redistributing the existing pattern of services, and may encounter obstacles in that this implies altering the distribution of physicians. In developing countries, a more equal distribution of health care resources is likely to entail a quite different pattern of services: with the concentration of acute hospital care in towns being replaced by primary care in rural areas. The distinction made by Mooney (8, 9) between equity in health outcomes and health care is relevant, because the impact of an equitable distribution of health care resources on health outcomes will depend on the type of country and the nature of the impact of redistribution. In industrialized countries, with well-developed preventive medicine, greater equity may mean fairer shares of secondary care with little or no measurable impact on health outcomes. In developing countries, where the current distribution means that some areas have advanced Western secondary care whilst others lack the most basic preventive and primary care, an equitable distribution of resources would allow the basic services to be provided which would have a dramatic impact on health care outcomes.

The paper consists of four main sections. First, reports are made of estimates of geographical inequality in per capita use of health care resources in developing countries discussion: India, Peru, Ghana, and Fiji. Second, an outline of the RAWP methods is given. These aim to improve on per capita estimates of inequality in use of health care resources by adjusting population numbers according to their relative risk of needing health care. Results from using these methods in the U.K., France, the Netherlands, Finland and New Zealand are illustrated. The estimates of inequality reported here indicate both its scale, and thus how far countries are from the goal of "Health for All", and also the sensitivity required in methods of estimation. Third, reasons for

failure to promote equity are discussed, based on experience in England (other than RAWP methods) and in other countries. Fourth, a discussion follows of how equity may be achieved by examining reasons for the English success, identifying future problems, and suggesting possible ways forward based on centralized planning and a devolved approach for service delivery. The conclusion summarizes the main points in terms of how different countries could apply the RAWP approach to their particular circumstances.

## 1. ESTIMATES OF INEQUALITY IN DEVELOPING COUNTRIES

Ideally measures of geographical inequity in use of health services would identify, for each area, residents' use of services (whether within or outside the area of residence) and their relative risk of needing care. This ideal is unattainable. The measurement of relative risk is contentious. This is because, although data exist on use of services, these data reflect the distribution of supply as well as underlying morbidity. There is often no routinely available direct measure of underlying morbidity. The best surrogate is mortality (10). There are problems in costing use of services: it is possible to estimate actual costs, but merely reimbursing these provides no incentives for efficiency, and estimating what cases ought to cost raises all the problems of measuring case-mix (11). Thus there are problems in formulating an equitable basis for paying for cross-boundary flows of residents of one area treated in another. In addition data may be lacking (on cross-boundary flows, costs, population statistics) or unreliable. Murray (12) points out that reliable recent data on mortality exist for only a few developing countries. Although data on all countries are routinely published these are often based on projections of old empirical data.

Fortunately a policy to promote equity requires measures of inequity which are much less stringent than the ideal. It is relatively easy to estimate health care resources located in an area, and providing the area is large enough (regions of more than one million population) or the boundaries define natural catchment areas, it can be assumed that those resources are used by residents of that area. This enables resource use per capita to be estimated. Weighting populations according to risk would tend to magnify rather than reduce the extremes. Thus simple methods will be adequate for making a start in promoting equity. This section of the paper illustrates that point by reporting estimates of inequality in developing countries using resources per capita and citing evidence that the population at greatest risk tends to be most deprived of resources.

Results are reported here of estimates of inequality in resource use per capita from four countries: India (13), Peru (14), Ghana (15), and Fiji (16). These examples have been chosen because each paper also raises important methodological issues about equity in health care. This section is mainly concerned with the practical problems of deriving estimates of geographical inequality in use of health care resources. Akhtar and Ishar (13) and Musgrove (14) are not primarily concerned with these

practical problems. Ofosu-Amaah (15) and Waddington and Newell (16) do address them and thus their papers are discussed more fully here.

#### Inequality in Health Expenditure in India (1975-76 to 1977-78)

Akhtar and Izhar (13) discuss inequity in India in terms of facilities per capita.

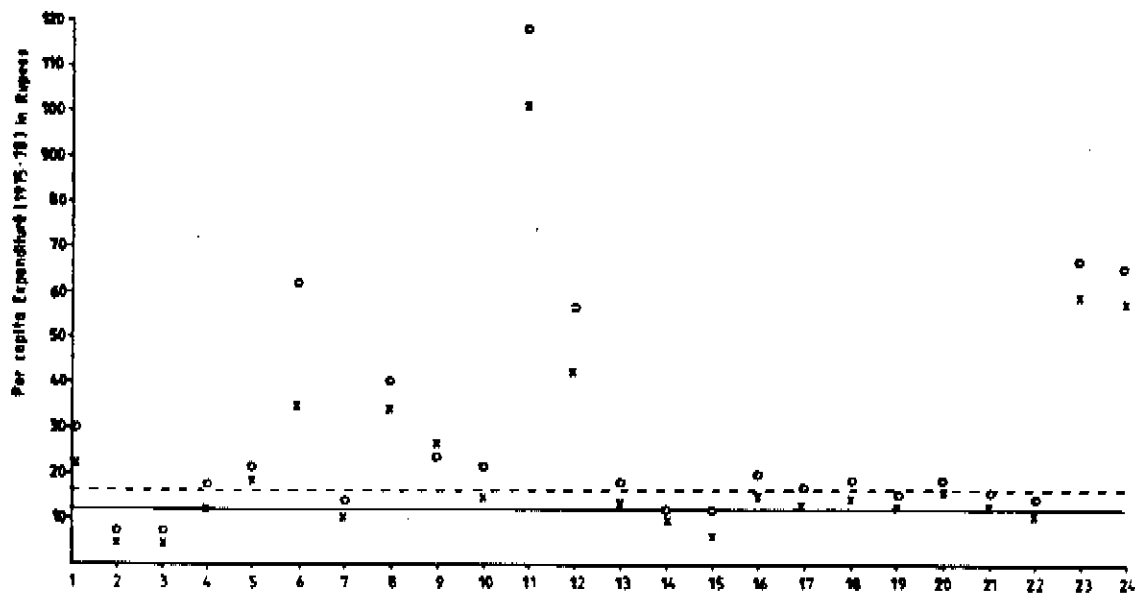
Figure 1 shows massive inequality in expenditure in health care in Indian States over the three year period 1975-76 to 1977-78. For example, per capita expenditure in Nagaland was nineteen times that in Bihar. By 1977-78 there was some narrowing of the extremes of inequality and the gap between Nagaland and Bihar had lessened to a seventeen-fold difference. Figure 1 compares States' per capita expenditure on health care with the national average in 1975-76 and 1977-78. There was a narrowing of the gap between States. Bihar continued to spend only half the national average on health care, but Nagaland which was spending approximately nine times the national average in 1975-76 reduced this to less than eight times by 1977-78. Although little progress could be expected in reducing such massive inequality over only three years, Figure 1 does not suggest that a clear policy to promote equity underlay resource allocation over the period. In most cases per capita expenditure on health increased, but such increases were greatest in those States already spending far more than the national average. Thus past levels of spending appear to have influenced the allocation of future resources.

#### Inequality in patient-related expenditures in Peru (1984)

Musgrove (14) presents various measures related to geographical equity in Peru: for example, the distribution of health care resources and sanitation services; prevalence of symptoms and percentage seeking treatment; consultations, hospitalizations and expenditures; vaccination and coverage. Musgrove states that the limitations of measures of inequality based on resources and population "can be overcome by referring to the morbidity and utilization data obtained from a large sample of the Peruvian population in the 1984 survey". But utilization data are affected by the distribution of supply and thus ought not be used in estimating inequity (17).

Table 1 gives the distribution of population and of patient-related expenditures in Peru as reported by Musgrove (14). Expenditure per capita ranged from twice the national average in Tacna (the smallest region) to 40% of the national average in Cajamarca. This five-fold variation may be an artefact of regional boundaries as the population varies enormously between regions. The population of Lima was, however, using resources at 145% of the national average and five regions had populations using resources at less than 60% of the national average, (with Chiclayo at only 38%). Thus there was about a five-fold difference in patient-

Figure 1: Variation in health care expenditures for states in India: 1975-76 and 1977-78



Key: x: 1975-76  
 o: 1977-78  
 —: average for India 1975-76  
 - - -: average for India 1977-78  
 Numbers refer to states

Source: Akhtar R and Izhar N (1986) The spatial distribution of health resources within countries and communities: examples from India and Zambia. Social Science and Medicine, 22, 11: 1115-1129.

Table 1: Inequality in use of patient-related resources in Peruvian regions (1984)

Health region	D i s t r i b u t i o n s o f		Expenditure per head National average = 100
	Population	Patient-related expenditures	
	%	%	
Ancash	4.92	3.57	72
Arequipa	4.33	6.07	140
Cajamarca	4.48	1.80	40
Chicalayo	7.30	2.79	38
Cuzco	7.00	4.42	63
Huancayo	7.07	7.30	103
Huanuco	4.75	2.65	56
Ica	3.40	4.55	133
Iquitos	3.01	2.06	68
Lima	32.12	46.71	145
Moyambamba	2.00	2.51	125
Piura	7.44	3.90	52
Puno	5.09	2.81	55
Tacna	1.51	3.03	200
Trujillo	5.59	5.83	104

Source: Musgrove P (1986) Measurement of equity in health *World Health Statistics Quarterly*, 39, 4: 325-335.

related expenditures between Lima and the least well funded region of Peru.

Inequality in Budgetary Allocations in Ghana (1974-75)

Ofosu-Amaah (15) shows how the regional distribution of the health budget in Ghana can be estimated from routinely available statistics, but emphasizes the difficulty of this task. Although the analysis was for one year only, the categories of spending chosen enable some assessment of whether inequality was likely to increase or decrease. There is, however, an obvious weakness in using budgets which are after all only statements of intentions. Figures of resulting expenditures are more meaningful as measures of actual inequality: the Tanzanian Ministry of Health/World Health Organization (18) showed significant discrepancies between budgets and actual expenditures for health services in Tanzania.

Ofosu-Amaah defined three categories of spending on health care in Ghana: medical care; public health; and training. These categories were defined pragmatically in terms of budget heads with the aims of allocating spending on curative care to medical care, and preventive services to public health. Table 2 gives the distribution of the total health budget (both recurrent and capital expenditures) on: Korle Bu teaching hospital; other medical care; public health; and training. Medical care (including Korle Bu teaching hospital) accounted for 81% of the total budget. Korle Bu teaching hospital alone accounted for 22% of the total budget, and this exceeded the total budget for the whole country on public health and training.

To estimate the distribution of the health budget in terms of spending per capita in the ten regions (population from 1.7 to 0.6 million) Ofosu-Amaah (15) assumed that funds on health campaigns and national clean-up campaigns were shared equally and funds on endemic disease programmes were shared by population size. These in total, however, only accounted for about 4% of total funds for public health. The main problem was the allocation of spending by Korle Bu teaching hospital, located in the Greater Accra Region (population 1.1 million), which has its own funds for medical care. One assumption made by Ofosu-Amaah was that Korle Bu is used only by residents of Greater Accra. Estimates based on that assumption are reported here, and whilst this overstates the degree of inequality in the budget for Ghana, it may not be too inaccurate, as it is typically found that people who live close to a hospital make the heaviest use of it.

Table 3 gives estimates of the regional distribution of the recurrent budget (for medical care; public health; and training) and the total capital budget. The ranges in regional budget per capita are: training recurrent - 16-fold; medical recurrent - nine-fold; total capital - four-fold; public recurrent - two-fold. The budget for current consumption consists of medical care and public health, and is dominated by medical care. Future consumption was indicated by the budgets

Table 2: Distribution of Ghanaian Health Budget 1974-75

Service	Share of Total Budget %
Korle Bu Teaching Hospital	22
Medical care (except Korle Bu)	59
Public health	12
Training	6
Total	99

Source: Ofosu-Amaah, S.: Reflections on the health budget. Ghana Medical Journal, September 1975, 215-222.

Note: # Total does not add to 100 due to rounding.

Table 3: Regional Distribution of Ghanaian Health Budget (1974-75)

Region	Population (millions)	Recurrent Budget			Capital Budget	Total
		Medical (per capita: national average per capita = 100)	Public	Training	Budget	
Greater Accra	1.12	367	124	393	272	
Volta	1.05	56	123	100	88	
Eastern	1.35	69	87	66	93	
Central	0.97	88	146	63	65	
Western	0.85	86	143	37	95	
Ashanti	1.71	67	52	82	71	
Northern	0.56	60	83	24	94	
Brong Ahafo	1.32	39	88	56	60	
Upper Region	0.92	52	90	44	71	

Source: Ofosu-Amaah, S.: Reflections on the Health Budget. Ghana

Medical Journal, September 1975, 215-222.

Note: # Total recurrent and capital spending of Korle Bu has been allocated to Greater Accra.

for training (recurrent) and all capital. Greater Accra region had an inequitably high share of the budget for current consumption - about three times the national average per capita. This region had a similarly high share of the budget for future consumption - thus its 1974-75 level was likely to be sustained. There is no equivalent to Greater Accra at the other extreme: different regions are worse off for different components of the budget.

The mean national average budget per capita for the categories given above were: medical care recurrent -  $c=5.65$ ; public health recurrent -  $c=0.93$ ; training recurrent  $c=.41$ ; total capital  $c=1.28$ .

#### Inequality in Health Expenditure in Fiji (1985)

Waddington and Newell (16) estimated inequality in use of resources for patient-related expenditures in Fiji in 1985 (using expenditure data or where these were not available budget data). They distinguished between three categories of data on resources in terms of their geographical allocation:

- Overheads: which were not allocated geographically.
- Patient-related services that serve patients not living in the host region: the costs of these institutions were allocated pro rata according to patient numbers from each region.
- Patient-related services that occur within a region and serve the population of that region.

Waddington and Newell estimated inequality between divisions (population ranging from 46 000 to 285 000) and provinces (population ranging from 3 000 to 100 000). The best-off division was estimated to spend 1.4 times more per capita than the worst-off division. And the best-off province was estimated to spend 2.3 times more per capita than the worst-off province. As they point out this appears to be inequitable but is not really so by international standards. Fiji is a small country, and as shown below, the smaller the scale used to estimate geographical inequity, the greater the estimates of inequity.

Waddington and Newell (16) discuss how their estimates might be improved by weighting populations for their relative risk (using data on age, sex, mortality) and accounting for "centres of excellence", capital stock, and particular costs of organizing services arising from sparsely-distributed population. The first of these is the most important. Per capita measures of resource use by failing to weight the geographical distribution of population for their relative risk may underestimate inequity.

### Impact of Measures of Risk

Hart (19) postulated the existence of the inverse care law from findings about need for and availability of care in the U.K.:

"In areas with most sickness and death, general practitioners have more work, larger lists, less hospital support, and inherit more clinically ineffective traditions of consultation, than in the healthiest areas; and hospital doctors shoulder heavier case-loads with less staff and equipment, more obsolete buildings, and suffer recurrent crises in the availability of beds and replacement staff."

In developing countries data necessary for measuring risk are often unavailable or unreliable. But it is often areas with poor health services that tend also to be deprived of access to other services and opportunities (with low incomes, little food, inadequate shelter, poor supply of water and sanitation, and low levels of education).

Gish (20) contrasted the nature of health services needed in Bangladesh in the mid-1970s with that actually provided and being developed. He described the type of health service needed as "one that related almost entirely to the countryside" and "concentrated on the delivery of primary care" to match the country's "pattern of morbidity and mortality, age structure, geography and physical infrastructure". The services being provided were quite different: "Around 70% of all recurrent expenditures for health is being spent on hospitals located in towns, which contain less than 10% of the population". This maldistribution was expected to worsen "as large new urban schemes approved in recent years came to completion".

Akhtar and Izhar (13) point out that in India the worst-off states in terms of per capita spending on health care (Uttar Pradesh and Bihar, States 2 and 3 in Figure 1) accounted for about one quarter of the total population and were where several types of communicable diseases are prevalent (e.g. filariasis, kala-azar, leprosy, malaria).

## 2. ESTIMATING INEQUITY IN INDUSTRIALIZED COUNTRIES

In England, the Resource Allocation Working Party (RAWP: 1) of the Department of Health and Social Security developed a practical approach to geographical equity. RAWP methods estimated for the National Health Service in England each region's fair share of the total cash available to all regions based on the estimated relative needs of their populations - known as "targets". The actual allocations of resources to regions were made so as to move these closer to their targets. Thus if there were no changes in populations, a region which in the past had spending in excess of its target would have its share of the total reduced, and vice-versa. In practice, the process was more complex as account is also taken of changes in populations. This means that regions' relative claims as estimated by targets also change: for example,

the allocation of a region which has in the past exceeded its target, will move closer to target without the region changing its share of total allocations if the region's population is increasing.

RAWP methods (1) aimed to give better measures of geographical inequity than estimates derived by dividing the geographical distribution of supply by the geographical distribution of population. Populations' relative risk of needing health care was estimated by service components which typically use statistics on age, sex, and standardized mortality ratios (SMRs). Where data were available, estimates of populations' use of resources take account of cross-boundary flows. Figure 2 gives the structure of RAWP's approach. Six categories of expenditure on health services were routinely available: non-psychiatric in-patient services, day-patient and out-patient services, mental illness in-patient services, mental handicap in-patient services, community services, ambulance services. For most services data were available on national average use by age and sex, and standardized mortality rates (SMRs). The weights given to the geographical distribution of populations for each service reflected availability of data: with most details available for non-psychiatric in-patient services (which also accounted for most expenditure). The different services were weighted for resident populations as follows:

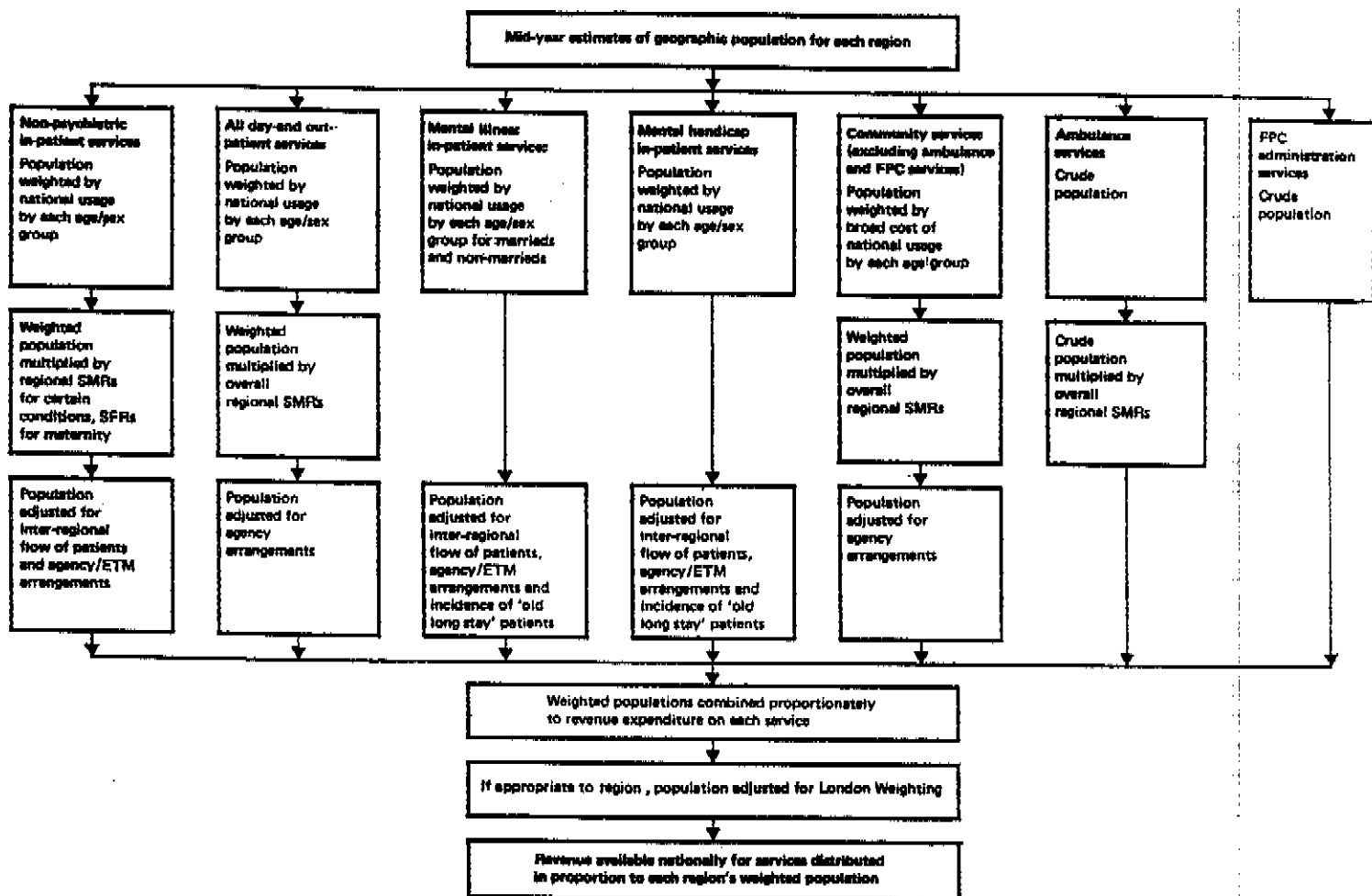
**Non-psychiatric in-patient:** population weighted by age and sex and by SMR by International Classification of Diseases (ICD) Chapter. Adjustments for cross-boundary flows were made using estimated national average costs by speciality. The data routinely available are mortality (by place of residence) and use of hospitals (by age, sex, condition, and place of residence). Hospital costs by case were not routinely available. From 1987-88, speciality costs have, however, been reported routinely. For RAWP these costs were estimated by regression analysis.

**Day-patient and out-patient:** population weighted by age, sex and overall SMRs. Details of use of these services is not routinely recorded in hospital. The source of age/sex weightings was a national survey (the General Household Survey).

**Mental illness and handicap:** population weighted by age, sex (mental handicap); and age, sex and marital status (mental illness). Data are available on use of services and cross-boundary flows for acute care. But no data are routinely collected on the original place of residence of long-stay patients (and this may not be known).

**Community and ambulances:** population weighted by SMR (ambulances); and SMR and broad cost by age (community).

Figure 2: The basis of regional targets



Data are not routinely available on use of these services. (RAWP used data on cost by age of community services from local authority data prior to the reorganization of the National Health Service in 1978.)

Since RAWP reported, the methods have been officially reviewed twice. The Advisory Group on Resource Allocation (21), established in 1978, identified a number of problems, but was required to report in 1980 without having been able to investigate these and recommend solutions. More recently, the National Health Service Management Board undertook a wide-ranging review, which recommended marginal changes only (22). Mays (23) has critically examined the basis of the main change: namely that of reducing the weighting of SMRs from 1.0 to 0.44. These recommendations have in turn been overtaken by a more fundamental review of the United Kingdom National Health Service (24), which is discussed later in this paper. None of these changes has, however, altered the principle that resources ought to be distributed according to the relative need of their populations, and that estimates of need will be based on population size, age, sex, and SMRs.

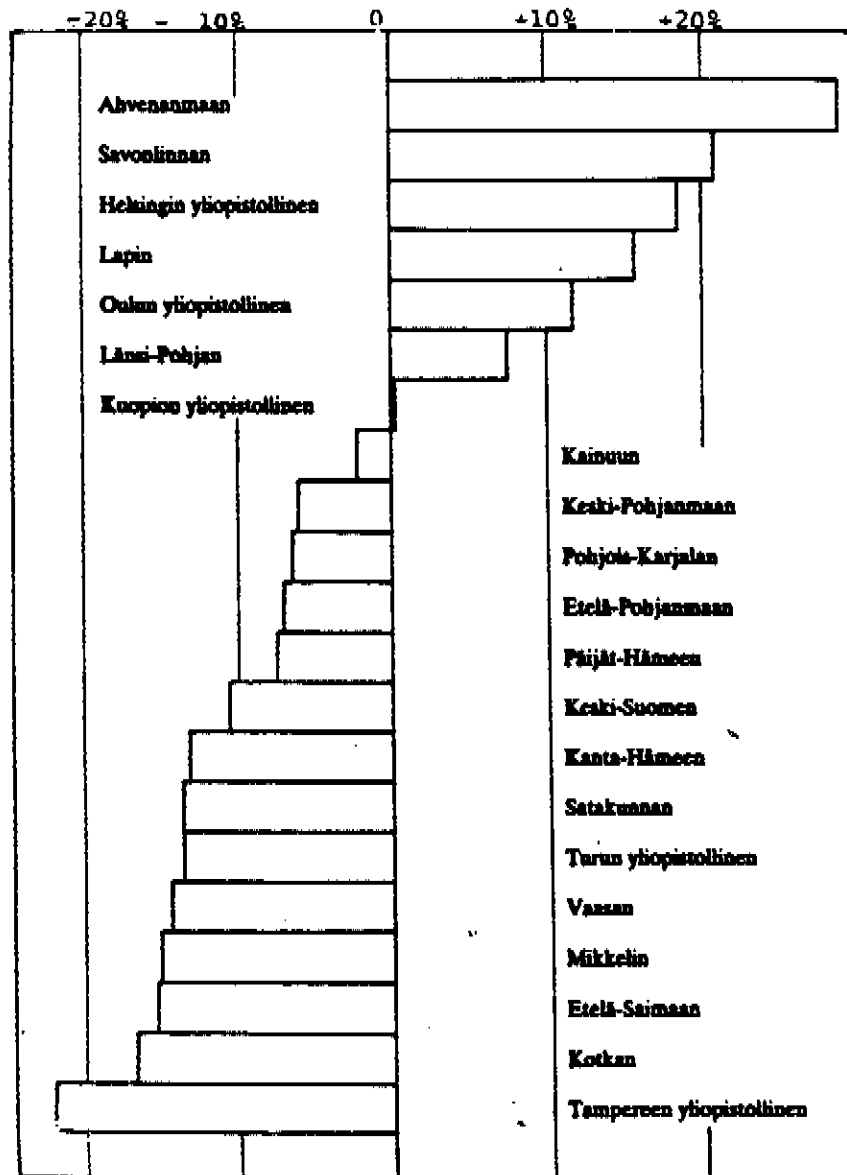
#### Inequity in different countries as estimated by RAWP methods

Maynard and Ludbrook (6) applied a RAWP-type formula to England (1979-80), France (1976), and The Netherlands (1977). They showed that inequity in England was much less than in The Netherlands or France. The best-off regions in England and the Netherlands were about 13% above their targets (estimated equitable shares). In France, however, the best-off region was more than 30% above its target. Whereas the worst-off region in England was less than 10% below its target, the worst-off regions in The Netherlands and France were more than 20% and 50% respectively below their targets. Figure 2 shows how the positions of English regions' have changed from 1977-78 to 1986-87, with considerable narrowing of the gaps between regions' allocations and targets. Andreani et al (25) observed that there was a trend to narrow geographical disparities in France up to 1977-78, but since then the position has stabilized.

Figure 3 illustrates the results of the analysis by Pekurinen et al for Finnish regions: in 1982, the best-off region was 30% over the target and the worst-off region more than 20% below target.

Analysis shows that inequality within regions of developed countries was greater than between regions. This is shown by comparing the movement towards targets of the most extreme English regions with that of the most extreme Scottish health boards (Figure 4: for this purpose, Scotland may be regarded as a region of the United Kingdom). The poorest health board was more than 20% below its target in 1980-81, and still more than 10% below its target in 1985-86. In Scotland, however, the best-off health board has always been less extreme than the best-off English region. This is not so within English regions where some

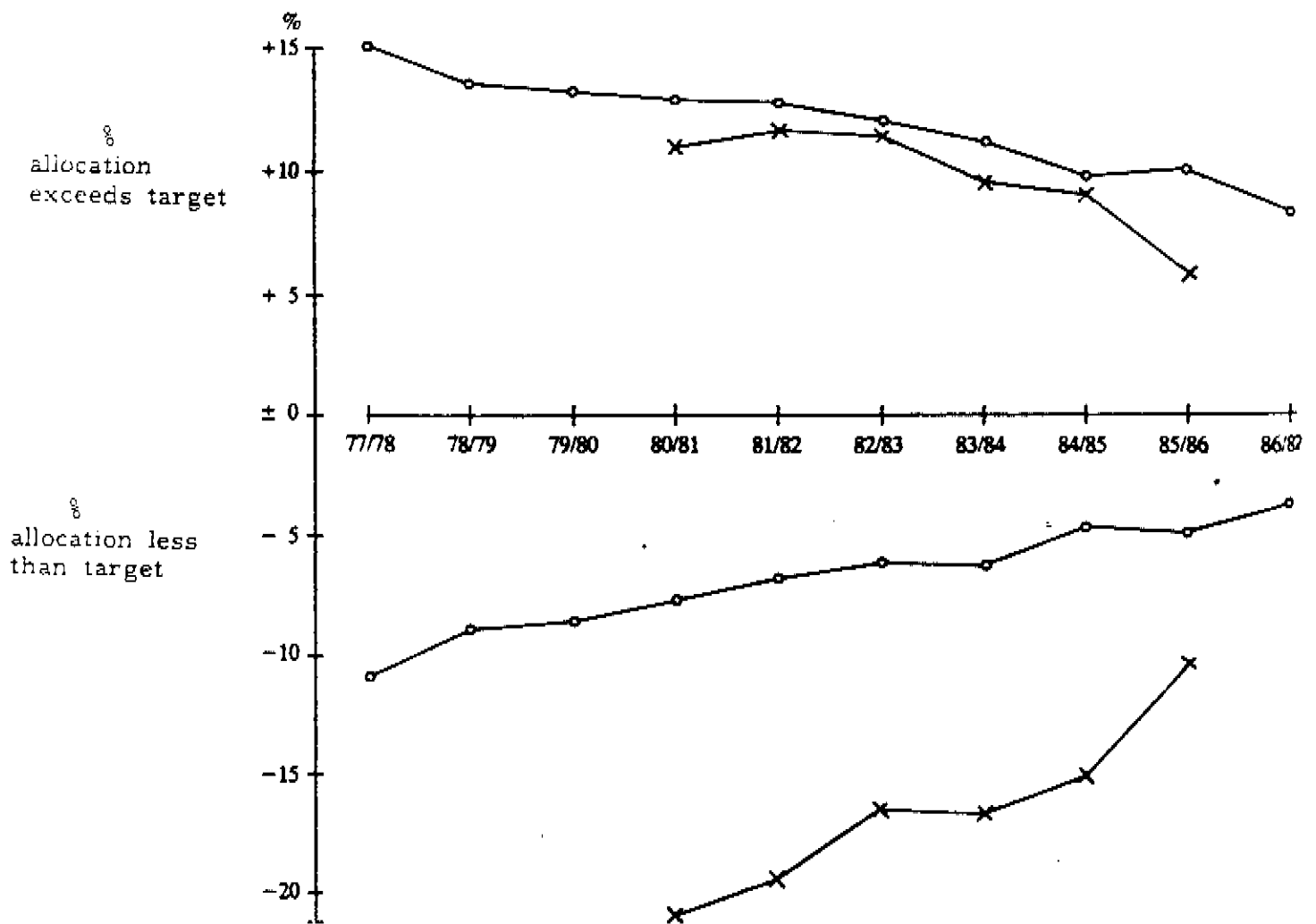
Figure 3: Differences\* between actual allocations and targets for central hospital districts in Finland in 1982



\* Percentage differences: positive % implies over-resourced; negative % under-resourced.

Source: Pekurinen M, Vohlonen I, Aro S (1987) Method of Estimating the Regional need for Health Care Resources. Helsinki: National Board of Health, 43.

Figure 4: Progress towards RAWP targets by English regions and Scottish Health Boards: 1977-78 to 1986-87



0: position of most extreme English Regions  
 x: position of most extreme Scottish Board.

Source: Pekurinen M, Vohlonen I, Aro S (1987)  
Method for Estimating the Regional need for Health Care Resources. Helsinki: National Board of Health.

health districts are currently spending 30% above their targets. Pekurinen et al estimated inequality within a Finnish region (Kuopio province) and found that municipalities ranged from less than 40% below their targets to more than 20% above. New Zealand is of the size of an English region, and there Barnett (4) reports estimates of inequity ranging from 30% above to 30% below targets for its hospital boards (from a report published in 1982).

#### The Effect of Adjustments for Risk to the Target Component for Acute Services

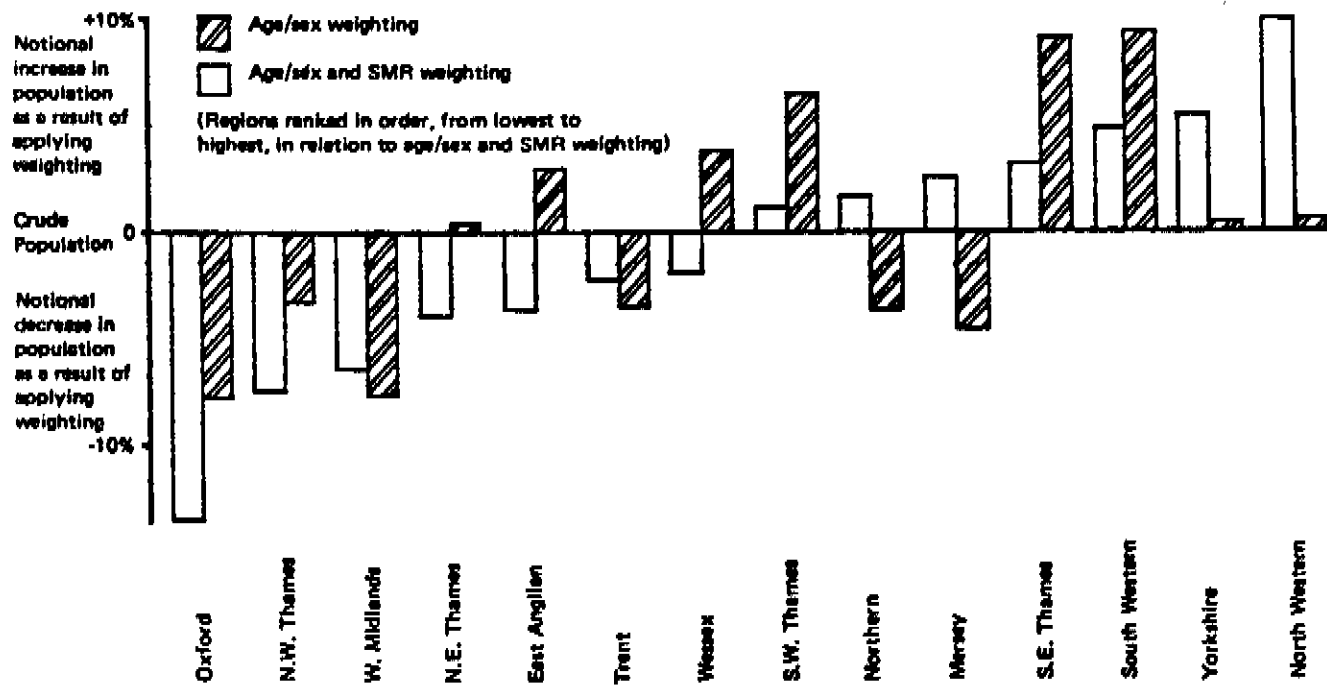
Weighting populations for their relative risk tends to widen the range of estimates of inequality. For example, weighting English regions' crude population for risk by age, sex and SMRs gave target populations ranging from 0.86 to 1.10 of crude population (1, tables C5 and C7). Figure 5 indicates the impact of these measures.

Pekurinen et al (7) estimated the impact of population weightings in Finnish regions for: age and sex; age, sex and all-cause SMRs; age, sex and cause-specific SMRs. Weighting for age and sex alone, the range was from 0.83 to 1.19 of the crude population figures; weighting for age, sex and all-cause SMR, the range was from 0.85 to 1.14; weighting for age, sex and cause-specific SMR, the range was from 0.86 to 1.20. These results are illustrated by Figure 6. This again shows that the gap between the best-off and worst-off regions is magnified by weighting for age, sex and SMRs: the best-off region (Ahveanmaan) loses and the worst-off region (Tampereenlyliopistolinen) gains notional population.

#### Adjustments for Cross-boundary Flows and Teaching

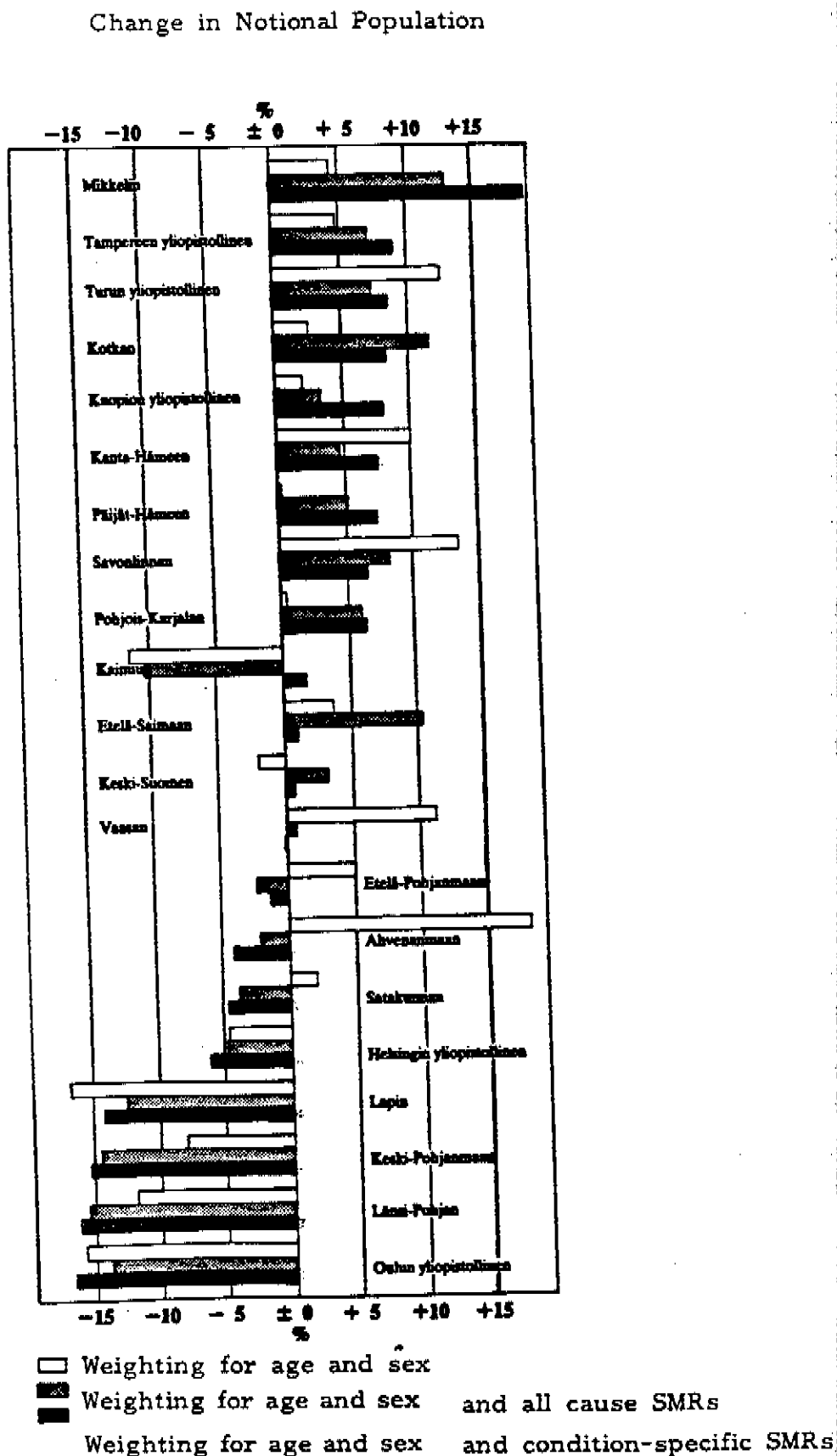
RAWP made adjustments for: cross-boundary flows, where residents of one authority are treated by another; the costs of clinical training of medical students; and agency arrangements, where one authority managed the services located in another. Examination has shown that adjustments for cross-boundary flows to targets of English regions were relatively little effected by large variations in the costs allowed for cross-boundary flows (26). And most of the evidence suggests that the approximate costs used are adequate for estimating equitable allocations (27, pp. 110-113). It has been argued that the allowance made for the additional service costs of teaching medical students errs, as RAWP intended, by being overgenerous (28). Pekurinen et al (7) showed that the impact of allowances for both teaching and cross-boundary flows had minimal impacts on regions' targets in Finland - of at most 5%. These adjustments are thus less significant than adjustments for age, sex and SMRs.

Figure 5: Chart illustrating the effects of age/sex weighting and age/sex/SMR weighting (applied to each region's crude population)



Source: Department of Health and Social Security (1976)  
Sharing Resources for Health in England. London: HMSO

Figure 6: Impact of weighting populations of Finnish regions for age and SMRs



Source: Pekurinen M, Vohlonen I, Aro S (1987)  
 Method for Estimating the Regional need for Health Care Resources.  
 Helsinki: National Board of Health.

### Accounting for Sparsity and Capital Stock

RAWP did not seek to account for the higher costs of delivering services in sparsely populated areas. The Scottish version (SHARE), did so for the extra time spent in providing community-based services: this only affected 7% of the total resources (29). SHARE did not consider the issue raised by Waddington and Newell (16): that to provide any service to remote populations may result in inequity. They cite the example of small isolated islands in Lau province, Fiji where if residents are to have permanent access to health staff, it is necessary to have a full-time worker for islands with a population as small as 200.

RAWP did consider a method for the equitable allocation of capital based on the revenue formula but faced the difficulty of valuing the existing distribution of capital stock. The method proposed was based on poor data and made a series of heroic assumptions (30). Without having good data on capital stock, it was not possible to produce good surrogate estimates and the stock valuation element was phased out so that the method used for allocating capital had a similar basis to that for revenue. Under the new system of financing United Kingdom health authorities (24), charges will be levied on the use of capital, and, for this purpose, capital values are being estimated. The Government intends to use these data to fund regions and districts equitably in terms of both capital and revenue costs (51).

### Degrees of inequality where spending per capita is adequate

In terms of the ratio of inequity, between best-off and worst-off regions as estimated by RAWP-type methods, France was the most extreme (ratio 3:1 in 1976), Finland second (ratio 1.6:1 in 1982), The Netherlands third (ratio 1.5:1) and England least (ratios 1.3:1 in 1977-78, 1.1:1 in 1986-87). Subregional estimates of inequality in the United Kingdom and Finland are comparable with the degree of inequality between French regions estimated by Maynard and Ludbrook (6). RAWP methods as compared with use of crude per capita estimates alter the non-psychiatric in-patient target component by 10-20% for demographic data (age and SMRs), and accounting for cross-boundary flows and costs of teaching medical students affects targets by about 5%. Thus such adjustments would be important if the use of crude population data (i.e. estimating fair shares in terms of total per capita expenditure on health care) resulted in ranges of +/- 20%.

### 3. REASONS FOR FAILURE TO PROMOTE EQUITY

Results reported here indicate considerable inequity in the geographical use of health care resources for France, India, and Ghana. Where such inequity exists, there is need for immediate corrective action. The question then is what action should countries take to achieve geographical equity in use of health care resources? There are two common reasons why countries which aim to achieve equity fail to do so.

### Failures from Inertia

Countries' systems of health care may still be products of the time when the distribution of services reflected the distribution of wealth: either because care was provided according to ability to pay or to meet colonial priorities. Countries rarely seize the opportunities of removing price as a barrier to treatment. Italy appears to be exceptional in having both created a state-funded National Health Service and introduced a complex capitation-based formula to achieve greater geographical equity in the allocation of resources (31).

In New South Wales, Abelson (5) observes that the creation of regions intended to lead to greater geographical equity did little to alter the geographical distribution of resources for health care which were generally allocated incrementally. The National Health Service in the United Kingdom was specifically created to lead to greater geographical equity in use of health care (30). The damning observation of the RAWP report (1) on the way resources were allocated characterizes common practice:

"... the methods used to distribute financial resources to the NHS have, since its inception, tended to reflect the inertia built into the system by history. They have tended to increment the historic basis for the supply of real resources (e.g. facilities and manpower); and by responding slowly and marginally to changes in demography and morbidity, have tended to perpetuate the historic situation".

### Failures from piecemeal attempts

Governments may strive to promote equity for some services only and fail to provide the basis for a comprehensive attack on the distribution of all resources. "Priority" services neglected hitherto are selected for equitable development, but partial measures fail to diminish the force of demands from relatively high-resourced acute care and teaching hospitals. Thus in England three piecemeal attempts to alter the distribution of health care resources failed because funds continued to be directed to teaching hospitals and to acute services. Similar failures can be seen in developing countries.

Two attempts were made to equalize the geographical distribution of resources: the 1962 hospital plan (32) for building new acute hospitals; and the "Crossman" regional revenue formula (33) which was based on population, beds and cases. Both attempts failed because they excluded teaching hospitals, which were only brought within the regional structure in 1974 (27, pp. 8-14). Indeed in the 1970s the resources allocated to teaching hospitals in the capital increased significantly and the use of health care became more unequal as a consequence (34). An attempt was also made to alter the balance of resources from acute care to "priority" services, again with little impact (27, pp. 120-128). It was made clear that more money should be spent on priority services, but this was not matched by explicit guidance on how money should be released from acute care. Health authorities

lacked a framework for incorporating changes in priorities in their budgeting processes.

Gish (19), Akhtar and Izhar (13), and Zaidi (35) identify a common problem for developing countries. They must not only alter the geographical distribution of resources, but also the types of services to meet the needs of each country: medical services concentrated in urban areas as in the West are inappropriate for the patterns of disease suffered by most people in developing countries.

#### 4. ACHIEVING EQUITY

The preceding analyses of failure to achieve equity provide lessons in what not to do, and thus clues as to what ought to be done. All show the vital importance of political will of governments to attain greater equity. Estimates of inequity assist vital in engendering the political momentum necessary to implement a more equitable distribution of resources. There are two important characteristics of using such estimates of equitable shares of resources for future allocations. Firstly, resources are allocated by capitation rather than for services actually delivered. Secondly, decisions need to be taken about how to translate an equitable distribution of resources most effectively into services to meet local needs. Achieving greater equity is easier when there is growth in the total resources available for health care. Few governments in the developed or developing world can, however, expect such propitious circumstances. The English experience described is thus all the more significant in that greater equity was achieved not during the long period of growth, but in the recent decade of restraint.

#### Using equitable measures of resources to decide future entitlements

There has been controversy over RAWP's choice of methods to measure resource use and risk: the capitation allowance which was based on estimated past national average use of resources, and measures of risk which were independent of use of services. The criticisms were that: as services were planned to change, targets ought to be based on future (and not past) patterns of spending; and that data on utilization of services could be used to produce improved measures of risk.

For pragmatic reasons, estimates of populations' fair share of resource use was based on recent data on the pattern of national average use. The magnitude of regions' targets is little affected if current patterns of services are used rather than planned changes in that pattern (36). These targets entail entitlements to fair shares of resources not maintaining past patterns of spending. Having received its fair share, each authority was expected to decide through planning how these resources were to be deployed. Typically, in developing countries, acute services will be concentrated in towns, be inequitably distributed and account for a significant share of resources. Following RAWP methods would not

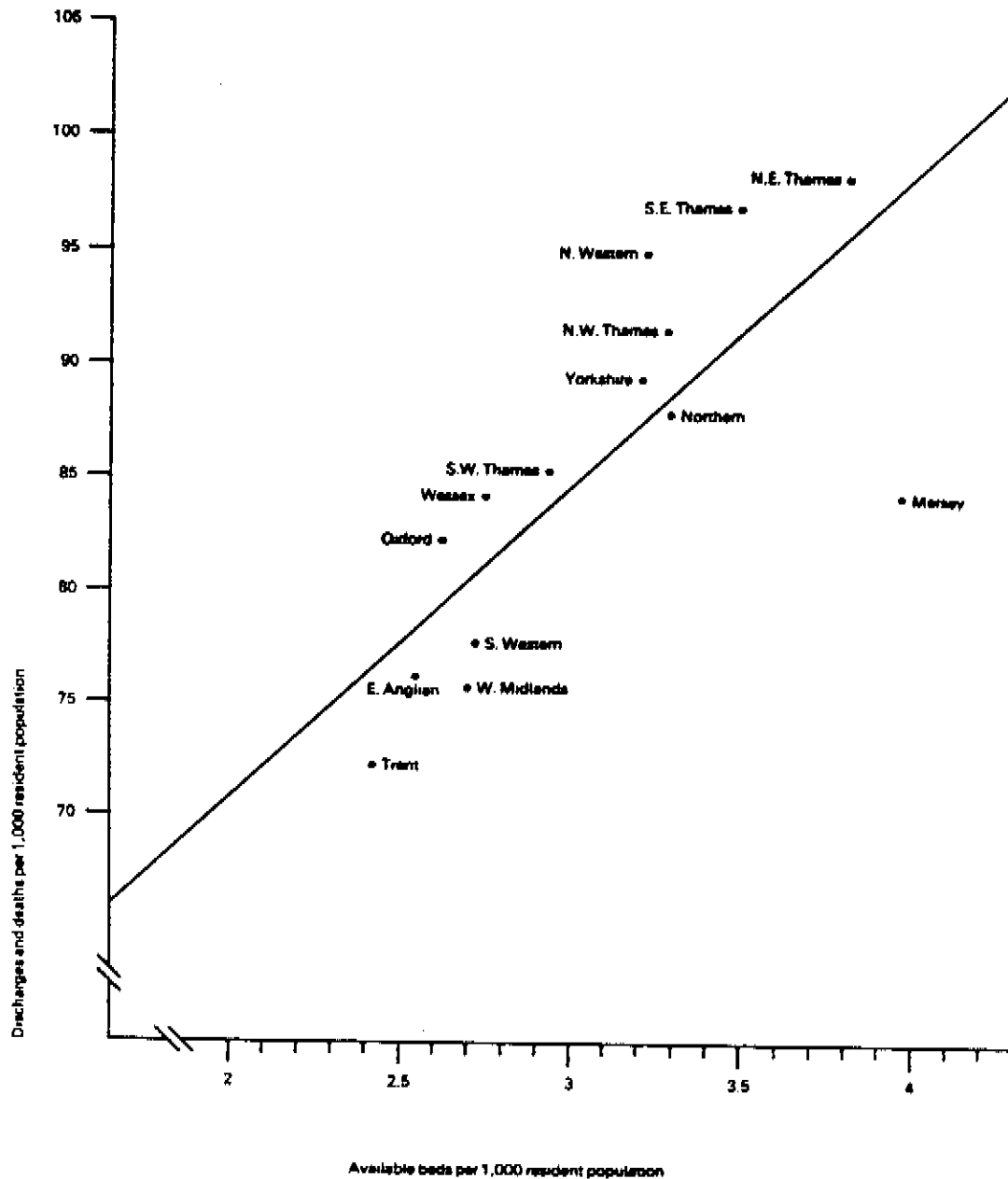
entail an equal distribution of these services, rather the resources entailed in such a distribution would be made available to rural areas for them to decide on their most effective deployment.

RAWP methods aimed at introducing a capitation-based system of finance because funding hospitals according to cases actually treated would perpetuate inequity in use. Figures 7, 8, 9 and 10 show how use of hospital services reflects the distribution of supply in England (37), Italy (38), and France (25). Figures 7, 8 and 9 show a close correlation between the geographic distributions of beds and admission rates.

Figure 7 uses data from English regions where resident populations provide a good denominator. Figure 8 uses data from districts of the four Thames (London-based) regions where, because of large cross-boundary flows, catchment populations were estimated. Figure 9 shows positive correlations between numbers of beds, admission rates, and lengths of stay in Italy. Figure 10 uses French data on the density of specialists and the use of specialist care. These results show how the distribution of supply affects the distribution of use. Thus RAWP sought to measure relative risk by data which were uncontaminated by supply: namely statistics on population, independent of use of services (17).

Figure 7

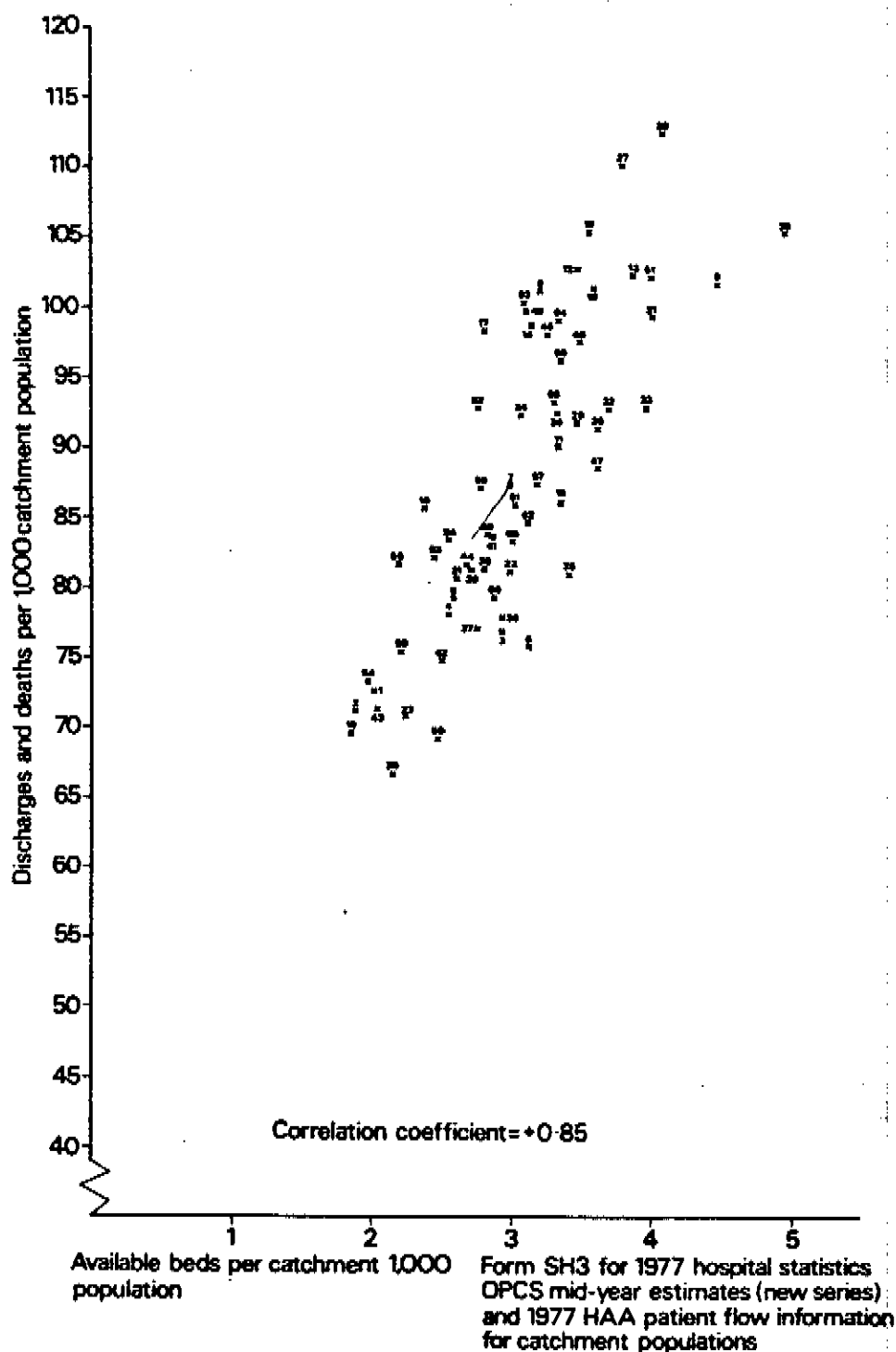
Relationship between hospitalisation rate and level of provision in the 14 health Regions in England: 1977, number of acute cases and available beds per 1,000 resident population



Source: Form SH3 for 1977 hospital statistics  
OPCS 1977 resident populations

Source: London Health Planning Consortium (1979)  
Acute Hospital Services in London. London: HMSO.

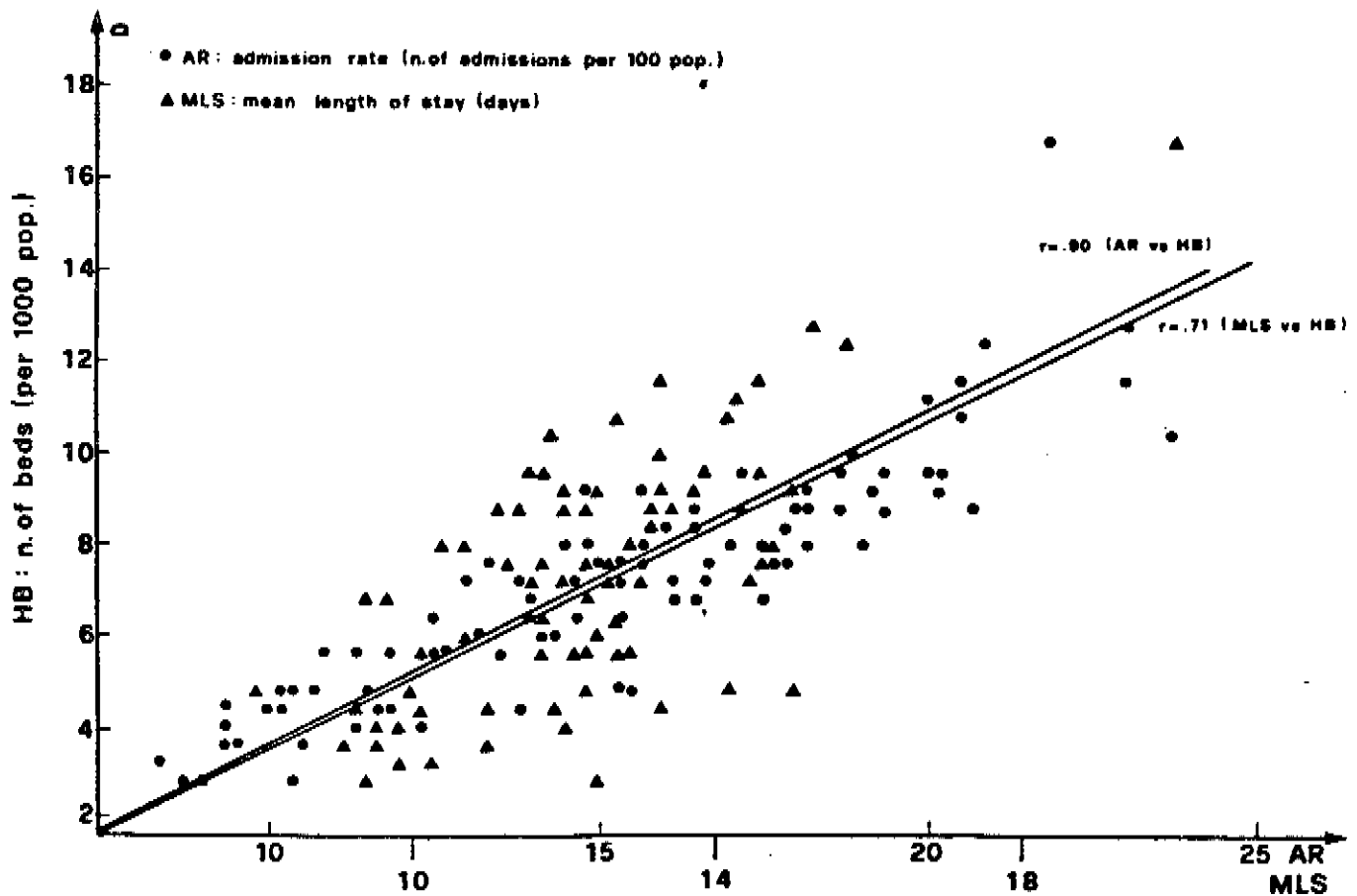
Figure 8: Relationship between hospitalisation rate and level of provision in health districts within the 4 Thames Regions: 1977, number of non-regional acute cases and available beds per 1,000 catchment population



Source: London Health Planning Consortium (1979)

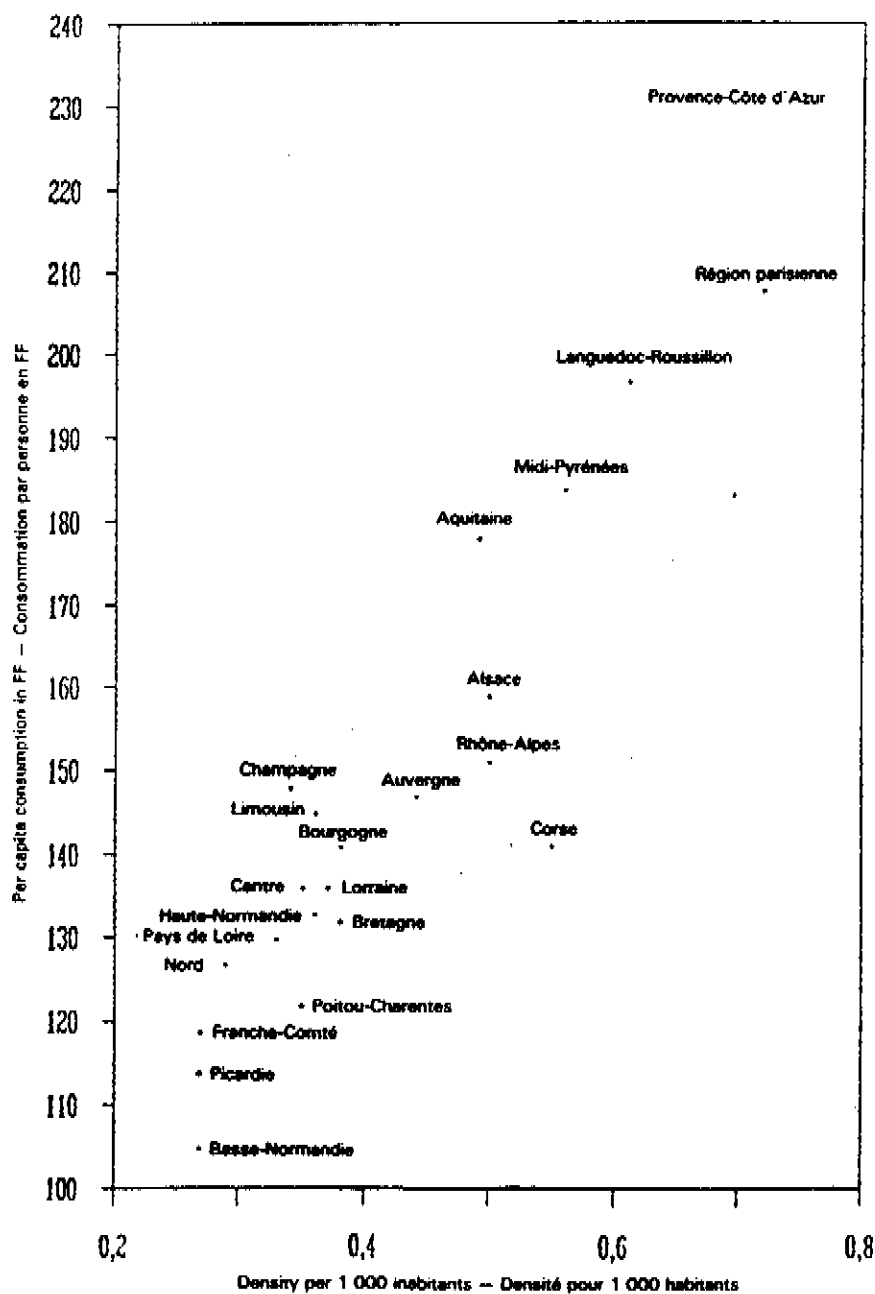
Acute Hospital Services in London. London: HMSO.

Figure 9: Relationship between public general hospital provision and use in Italy (1977)



Source: Berlinguer G, Rosis F (1983) Balance sheet of health organisation reform in Italy. Effective Health Care 1, 14, 145

Figure 10: Per capita consumption of specialist care and density of specialists in private practice, France 1978



Source: Andreani, S., Mizra, A. & Tonnelier, F. (1987)  
 Geographical Disparities in Health Economics: the case of France  
World Health Statistics Quarterly 40, 4: 304-312.

### The impact of a resource allocation policy in England

In England, the range of inequity between regions as measured by RAWP was halved from 1977-78 to 1986-87. As Figure 2 shows: in 1977-78 the richest region spent 15% over its target and the poorest region 11% below. By 1986-87, however, the richest region spent 8% over its target and the poorest 4% below.

Resource allocation targets have altered the basis of authorities' claims on future resources. Once targets which indicate fair shares exist, then existing budgets cease to provide legitimate claims on future resources; although existing budgets are relevant in setting a manageable pace of change of movement towards targets.

The success of RAWP in achieving equity between health authorities may be attributed to five distinctive characteristics. Firstly, health authorities were made responsible for teaching hospitals after the 1974 reorganization. Secondly, resource allocation covered all health authority spending and was not targeted on a subset of "priority" services. Thirdly, resource allocation was directed at decisions on resources rather than plans for change, which often encounter obstacles in their implementation. Fourthly, the methods used were adaptable and easy to apply. The methods were closely followed by Regional Health Authorities in England (2) and the health departments of other countries of the United Kingdom (3). Fifthly, the guiding principle was easy to understand. It was clear that these methods would lead to greater equity and this was a winning argument against which appeals from teaching hospitals to preserve "centres of excellence" sounded vague and guilty of special pleading.

It might be argued that greater equity in the distribution of resources can only be made in practice through growth in the total. But during the period from 1957 to 1974, when total National Health Service resources were increasing in real terms at about 4% per year (30), no progress was made in remedying the unequal use of health services (27). Effective policies for achieving greater equity between health authorities were implemented simultaneously with constraint on growth in the total. In the decade from 1976, cash limits were imposed on health authorities the planned total increase in real terms was reduced to less than 2% per year and this has rarely been achieved (39); and yet over this period the range of regional disparities has been significantly reduced. Indeed, the argument that equity ought to wait for growth could always be countered by the point that the obvious scarcity of resources makes their fair distribution more urgent.

Problems of translating movements in resources into services

The RAWP report recommended that a "ceiling" rate of annual growth of 5% be set for the poorest regions (spending below their targets). It also recommended that "floors" on rates of change for the richer regions (spending above their targets) ought to be related to "real" growth per annum in total resources: for real growth of 1% per year in the total, the floor was set at -1%; for the zero growth, the floor was set at below -1%; and for negative growth, the suggested floor was - 2.5%. Within these constraints, it was recommended that changes in allocations be in proportion to distance from

target. Behind these guidelines were two kinds of assumptions: about the rate of change in the total, and the capacity to translate financial resources into services.

Firstly, and most obviously, developing countries have experienced reductions in spending on health care much greater than 2.5%: e.g. in Tanzania (18) spending per capita was reduced by about 50% between 1973-74 and 1982-83 - from 17 shillings per capita to eight shillings (both at 1970 prices).

Secondly, there is a problem translating equitable financial targets into services. This is illustrated by the impact of subregional allocation of resources within the four regions which cover London. In these regions redistribution to below-target districts has had to be financed through reductions in resources for above-target districts. Savings were planned over a ten-year period in the over-target London districts by reducing the number of staffed beds, but not doctors. A report on health districts in inner London (40) showed that hospital doctors had used the resources remaining more intensively so that cases treated increased. This in turn meant that although in the first two years, three-quarters of staffed beds planned for closure had been closed, only one-third of the planned savings had been made. It thus appears that one strategy for achieving equity within the London regions, without growth in resources, would be to move doctors out of London.

The strategic option of planning changes to address London's problems implies: major reductions in acute services and doctors in London; and a coordinated strategy of movement of capital and revenue monies, to finance new buildings outside London, and their running costs when completed (41). Whilst there are complex technical issues in such an approach, these are not a reason for rejecting this approach. The major stumbling block is political as it involves hospital closures and movement of doctors. There is no direct experience of attempting to achieve an equitable distribution of hospital doctors. Experience of attempting to do this for General Practitioners (GPs) in England, has, however, not been encouraging. Butler et al (42) reviewed

attempts to encourage them to move into "under-doctored" areas, and observed that:

".. the situation in 1970 may be compared with the pre-NHS distribution of practitioners ... in 1938. The overall impression is that the basic patterns have remained largely unaltered over the past thirty years ... the National Health Service has not brought about any dramatic shift in the location of GPs, and the apparent chronicity of the problem in many places suggests that easy or quick solutions are unlikely to be found".

Klein (43) presciently observed that future equalization of resources for hospital and community health services would encounter problems in moving hospital doctors:

"... many of the deprived areas are socially unattractive; providing extra resources to improve facilities will not necessarily guarantee the skilled manpower required ... As the experience of general practice has shown, offering financial incentives to persuade doctors to move into areas of shortage does not necessarily work".

Thus for developed countries the main constraint on achieving equity may be the existing distribution of physicians, their contracts of employment, and opposition to change. Developing countries may not have such problems as their health needs are more basic, but redistribution will obviously be opposed by their physicians where this means withdrawing resources from physicians providing curative medicine in cities and towns.

Enthoven (44) sees such problems as the familiar obstacle to change in public services, namely "do no direct harm". It is for this reason that he advocated an "internal market" for the National Health Service. A modified version of Enthoven's proposal is now the policy of the United Kingdom government (24). The governments' "internal market" retains universal public finance, and capitation-based methods using the RAWP approach to determine each district's allocation. Charges will no longer be made automatically for cross-boundary flows; instead, districts will make contracts for services for their residents on grounds of price and quality. Measuring quality of care is, of course, a problem; and failure to do so cannot be explained, as Enthoven suggests, by the lack of a market (45).

A crucial difference between Enthoven's proposal and that of the United Kingdom government is that Enthoven proposed ending the separation between methods of financing primary care (provided by independent contractors) and hospital and community health services (provided by health authorities). In his scheme general practitioners would contract with health authorities. This separation was of concern to RAWP (1: pp. 80-81). The government's proposals have done nothing to resolve the problems caused by this separation. These include failures to achieve geographical equity in spending on all health services (46, 47); and, as family

doctors have free choice of hospital, the inability of districts to control their residents' use of services. The latter caused major problems in relying on RAWP methods to achieve subregional equity in England (48).

Perhaps the crucial concept underlying the proposed changes in the United Kingdom is not so much that implied by the word "market" (always a potential source of confusion in health services), but rather that of allowing local discretion in deciding the kind of services a local population actually wants (as opposed to this being decided centrally). This basis of devolved planning, using allocations based on populations, may appeal to developing countries. There is likely, however, to be a need to develop a planning process which allows local devolution within a framework in which national government makes decisions on rationing resources (49, 50).

## CONCLUSIONS

Geographical inequity in use of services can persist within countries that have abandoned market-based systems based on conventional economics. English experience provides a vivid contrast of failures to promote equity through inertia and piecemeal efforts and the success that followed from the comprehensive attack based on RAWP methods. These methods have been used to measure inequity in a number of developed countries (other countries within the United Kingdom, New Zealand, Australia, France, The Netherlands, and Finland). For developing countries the data necessary for estimating inequity by RAWP methods are unlikely to be available. For these countries, however, if the results reported of inequality in India and Ghana are typical, then resource use per capita is an adequate estimate of geographical inequity; indeed this surrogate is likely to be adequate where geographical inequality is found to be greater than +/- 20%.

Target measures of equity derived to indicate a fair geographical distribution of available health care resources are based on national average spending per capita. But using these measures for the future allocation of resources does not entail an even distribution of the current pattern of services. The guiding principle is that resources ought to be allocated geographically in terms of population, but that decisions have to be made about the pace of movement towards equity, and how in each locality these resources may be optimally translated into services. In developing countries an equitable allocation of resources is likely to result not only in moving resources from towns to rural areas but also a very different pattern of services with greater emphasis on primary as opposed to secondary care.

The greater precision of RAWP methods over resource use per capita is necessary for policies to promote regional equity in England, Finland, and The Netherlands; and essentially subregional equity in New Zealand and Fiji. In England, the narrow range of estimated regional inequity has prompted a review of RAWP methods to see if these estimates may be improved (30). For Peru and

France, crude per capita methods would appear to be adequate. Of the results reported here, the 17-fold and nine-fold differences observed in India and Ghana are exceptional but may be more typical of developing countries than those in Fiji. If so, then estimates of spending per capita will certainly suffice for policies to promote greater equity in use of health care resources. Where developing countries lack sound estimates of SMRs but do have reliable data on infant mortality, then these could be used instead (as the two are closely correlated) to weight populations, or give added force to the estimates of inequality in terms of expenditure per capita, by showing the operation of the inverse care law.

The management of change could be planned centrally or devolved through a system of resource allocation by capitation. In developed countries devolution could be through some form of "internal market", but whichever system is chosen, there are likely to be problems in altering the existing distribution of doctors. In developing countries, the movement of physicians may not be vital to making optimal use of an equitable distribution of resources. Although such change is difficult politically, the welfare gains would be immense.

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