A Needs-based Approach to Resource Allocation in Health Care*

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Dans ce texte, nous soulignons l'incohérence apparente entre les objectifs établis par la politique fédérale de soins de santé et les méthodes d'allocation des ressources en la matière au niveau provincial. Nous suggérons que, bien que la politique fédérale a mis l'accent sur le paiement aux fournisseurs de services en interdisant d'imposer des frais aux utilisateurs, on a accordé peu d'attention, tant au niveau fédéral que provincial, aux critères utilisés pour allouer les ressources en fonction des objectifs établis. Les approches utilisées actuellement pour faire l'allocation des ressources font l'hypothèse implicite que les fournisseurs individuels de services (médecins, administrateurs d'hôpitaux) sont désireux et capables d'allouer les ressources en fonction des objectifs nationaux. Nous montrons que c'est là une tâche difficile pour eux, en particulier lorsque l'on examine les méthodes utilisées actuellement pour financer les fournisseurs de services et les institutions. Une approche alternative pour faire l'allocation des ressources en soins de santé est suggérée. Cette approche est basée sur la population plutôt que sur les fournisseurs de services, et distribue les ressources en fonction des besoins relatifs en soins de santé des différentes communautés. L'approche proposée fournit une méthode pratique permettant de rendre compatibles les objectifs des politiques de soins de santé établis au niveau provincial et fédéral et la gestion des ressources limitées prévues pour ces soins. Les questions de politique économique liées à l'adoption de l'approche proposée sont également discutées.

In this paper we identify the apparent inconsistency between the stated objectives of federal health-care policy in Canada and the existing methods of allocating health-care resources at the provincial level. We argue that while federal policy has focussed on arrangements for the payment of providers of services and prohibiting the application of user charges, little attention has been paid at either the federal or provincial level to what criteria should be used to allocate resources in ways consistent with the stated objectives. Current approaches to resource allocation implicitly assume that individual providers (physicians, hospital administrators) are both able and willing to allocate health-care resources in line with the stated objectives. We show that this is likely to be difficult to achieve, particularly given the methods used currently for funding providers and institutions. An alternative approach to allocating health-care resources is derived which is population-, as opposed to provider-, based and relates resource shares to the relative needs for health care among communities. The proposed approach provides a practical method of aligning the stated objectives of both federal and provincial health-care policies with the management of scarce health-care resources. Policy issues arising from the adoption of the proposed approach are discussed.

I Introduction

The primary objective of Canadian health policy is to protect, promote and restore the physical and mental well-being of residents of Canada and to facilitate reasonable access to health services without financial or other barriers. (*Canada Health Act*, 1984)

A major challenge for health-care policy makers in Canada is to identify and implement methods of planning and allocating health-care resources which are consistent with the objectives of the 1984 *Canada Health Act* (Canada House of Commons, 1984). The purpose of this paper is to consider the approach to health-care resource allocation currently used in Canada with respect to this objective, and to propose an alternative, needs-based, approach which relates directly to the *Canada Health Act* objectives.

In section II we review the main thrusts of health-care policy at the federal level in Canada over the last 30 years. Implementation of federal policy has tended to focus on aspects of payments for care and the prohibition of certain methods of resource allocation (i.e. by use of a price mechanism), leaving provincial governments to identify alternative methods of resource allocation to achieve the stated policy goals. In section III we show that the current methods of allocation are based largely on past patterns of service provision and utilization. Yet these patterns may not be consistent with the distribution of relative levels of need for care in the population. Moreover, this current use-based approach to resource allocation perpetuates any existing inequalities in the allocation of resources with respect to relative needs for care. An alternative approach to resource allocation is described in section IV which applies provincial population level patterns of use of health-care services to demographic and health-related characteristics at the local community level. As a consequence, the resources are allocated among communities in ways which are independent of each individual community's current use of health-care resources. Section V discusses a number of policy issues that arise from the use of a needs-based approach.

II The Health-care Policy Framework

The *British North America Act* of 1867 gave jurisdiction over, inter alia, health care services to the provinces. Federal responsibility for health and social services was restricted to specified populations including native peoples, the armed forces and residents of the two Territories. As a consequence, the federal government had little influence over health-care policy in the early years of confederation. However, as R. Sutherland and J. Fulton (1988:50) note '... (as) the cost of ... health and social services increased, they became increasingly unaffordable for the provinces and the federal government became able to influence provincial policies through offers of financial aid'. Hence by 1981 a federal government task force (Parliamentary Task Force on Federal-Provincial Arrangements, 1981) identified the role of the federal government in health-care provision to be '... the formulation, monitoring and enforcement of conditions on its financial support of provincial programs' and recommended the consolidation of the existing legislation (the *Hospital Insurance and Diagnostic Services Act 1958* and the *Medical Care Act 1966*) as an important element of this role.

The *Canada Health Act* (CHA), which was essentially a response to the Task Force's report, focussed on consolidating the existing legislation and on restoring some federal influence over the direction of national health policy (Law, 1986), with particular emphasis being given to specifying conditions governing access to services in order for federal funding of a province's health-care delivery to be maintained. Five principles were outlined in the Act which essentially formed conditions for the continuation of federal funding. These principles were public administration of the insurance plan, universal coverage of the population, comprehensive coverage of services, portability of benefits between provinces, and accessibility to services. As M. Taylor (1986) notes, the first four principles were largely restatements of the earlier legislation and existing practice.[1]

The accessibility principle reformulated the federal government's position regard-

ing user fees. Although user fees had previously been identified as inconsistent with health-care policy goals (e.g., *Medical Care Act* 1966) there was no penalty or censure for provinces that charged for services, or permitted others to charge for services, at the point of delivery. Under the CHA, the level of federal contribution to a province's health-care costs is reduced where user charges are imposed on services covered by the Act. In particular, the Act states that:

> In order to satisfy the criterion in respect of accessibility, the health care insurance plan of the province:
> (a) must provide for insured services on uniform terms and conditions and on a basis that does not impede or preclude, either directly or indirectly, whether by charges made to insured persons or otherwise, reasonable access to those services by insured persons;
> (b) must provide for payment for insured health services in accordance with a tariff or system of payment authorized by the law of the province;
> (c) must provide for reasonable compensation for *all* insured health services rendered by medical practitioners or dentists; and
> (d) must provide for the payment of amounts to hospitals, including hospitals owned or operated by Canada, in respect of the cost of health services (emphasis in original, Canada, House of Commons, 1984).

Accessibility to services is thus interpreted as ensuring providers are reimbursed for delivering services and providing individuals with an opportunity to use services without facing charges or other impediments, i.e. accessibility is interpreted in terms of service availability per se.

The legislation was effective as a means of influencing provincial policy, with provincial governments protecting their federal contributions by passing legislation which abolished the right of providers to impose additional charges on patients for insured services (i.e. extra billing) (Naylor, 1992). However the legislation did not link the federal contributions to how, in the absence of charges, demands for services were to be 'rationed' other than that residents should have 'reasonable access' to services. In practice, provincial governments are sole purchasers of services from providers who respond to the demands for services presenting to them. But it is not clear that this approach provides the reasonable access that is the goal of current policy. Elsewhere access to health-care services has been defined in terms of utilization of services by designated populations for whom they are intended (Aday and Andersen, 1974). In the context of the CHA this would appear to imply that reasonable access requires use of services where there is an ex ante expectation that such use would 'promote, protect and restore ... well-being'. Although this differs from the more traditional, unconditional, definition of access as a 'right or means of approaching' (Fowler and Fowler, 1964), the former definition recognizes that health care is not demanded for its own use, but for its expected impact on health status.

Interpretation of access to care as 'use by those in need of care' appears to provide internal consistency to the primary objective of the legislation (i.e. it aligns the *means* of reasonable access with the *ends* of protecting, promoting and restoring well-being). Moreover, although the legislation provides no explicit definition of the term 'reasonable access' it implies strongly that '... medical necessity (is) the overriding determinant of reasonable accessibility ...' (Law, 1986:46; see also Manga, 1987). Moreover the federal government has adopted a similar approach in more recent interpretations of the accessibility principle as applying to '... necessary hospital and physician services ...' (Health and Welfare Canada, 1989:19). Such an interpretation encompasses aspects of both efficiency (allocating resources according to expected outcomes) and equity (equal treatment for equal need, unequal treatment for unequal need). This would imply that a population such as Manitoulin in Ontario, which has an incidence of high-risk births much greater than the average for all Ontario, has greater

needs for prenatal, obstetric and perinatal care than, say, the population of Metro Toronto, where the incidence of high-risk births is below the provincial average (Birch and Chambers, 1990). Resource allocations would reflect these differing needs both for reasons of fairness, but also because the potential benefits of allocating these resources to Manitoulin is greater.

The practice of reducing the relative contribution towards provincial programs such as health care adopted by the federal government in recent years implies that federal influence over health care policy may be diminished. But the provinces are still left with the issue of how to allocate the health care 'budget' irrespective of the size of the program and the source of the funds. The reports of task forces and working groups on the health-care systems of various provinces repeatedly draw attention to the need to use resources in ways which produce the greatest impact on health-related well-being (Nova Scotia Royal Commission on Health Care, 1989; Saskatchewan Commission on Directions in Health 1990; Ontario Premier's Council on Health Strategy, Integration and Coordination Committee 1991, Barer and Stoddart 1991, Southwestern Ontario Comprehensive Health System Planning Commission 1991, British Columbia Royal Commission on Health Care and Costs 1991). As such it seems that the changing roles of the two levels of government in the funding of health care has not led to any explicit change in the objectives of health care policy.

III Resource Allocation and Its Relationship to Policy Objectives

The Determinants of Use

As mentioned above, implementation of the CHA focussed primarily on the removal of user charges and on arrangements for payments of providers. Little attention was paid to other issues that would affect the responsiveness of the health-care system to health-care needs. In particular, under the earlier legislation provincial governments 'inherited' a stock of health-care providers (institutions and individuals), the quantity, mix and geographical distribution of which were determined largely by 'market forces' (ability and willingness to pay for care at prices providers were willing to accept). Moreover the CHA tended to reinforce this profile of providers by requiring provincial governments to allocate public funds to the delivery of services on the implicit assumptions that

1/ individuals would present for services only when they needed care,

2/ providers would provide services only where there was a need for care.

The effect of this was to leave most allocation decisions in the hands of individual providers and institutions, which tended to reinforce the existing mix and distribution of services. The assumptions also imply that there is no need to prescribe how resources should be allocated. By protecting providers and populations from financial considerations in making treatment decisions, at least at the point of delivery, the distribution of care would better reflect needs for care over time. Public funds would be provided for the delivery of services, as long as the services might be expected to 'promote, protect or restore well being'. Only unethical provision (i.e. provision which had no expectation of improving health-related well-being) would appear to fall outside the remit of the CHA. But this passive approach to resource allocation fails to address the *relative* needs for care between geographic populations (or communities). If resources are to be put to their most productive use, in terms of promotion, protection and restoration of well-being, then they must be allocated between populations on the basis of the *relative* needs for (or abilities to benefit from) care. There was no a priori reason why the 'inherited' supply of services *would* be allocated among communities in line with the current relative needs for those services (and hence consistent with the policy objectives). Moreover, providers of care generally see

only the needs of presenting patients, which may or may not reflect the levels of need in the communities in which they are located. Hence, providers of care would be unable to allocate resources in line with *relative* needs for care in the communities without information about these relative levels of need. Provincial health-care systems have tended to overlook this inability of individual providers, operating within a larger system, to assess the needs of presenting patients in the relation to needs in the population as a whole.

As a consequence, under current provincial approaches allocations of health-care resources are determined largely by past resource allocations and the existing distributions of health-care facilities and providers of care, as well as patient demand for care. In the institutional sector, global budgets are often used (although not necessarily enforced) to fund service provision but the budgets are set largely in accordance with past levels of provision (i.e. utilization) sometimes with adjustments for case-mix. Little consideration is given to the characteristics of the communities being served, as distinct from patient characteristics and utilization rates.

In the physician-service sector, reimbursement is based largely on fee-for-service provision, irrespective of the *relative* needs for care among patients receiving those services or of the *relative* needs of individuals not receiving services. Even where alternative funding arrangements are currently used or proposed, such as capitation for Health Service Organizations (HSOs) and Comprehensive Health Organizations (CHOs), the allocated funds are determined directly from utilization under fee-for-service provision (Birch, Lomas et al. 1990; Birch, Chambers et al., 1990).

The empirical research on utilization of health care under medicare supports the 'suspicion' that this passive approach to resource allocation at the provincial level may fail to address the principal concerns of the policy which it is meant to reflect. In particular much of the research has tended to focus on the relationships between use of services and income across groups of the population defined according to their incomes. In general, the results indicate that the positive correlation observed between service utilization and income before the introduction of medicare has disappeared in the period since the introduction of comprehensive public funding of hospital and physician services (see McDonald et al., 1973; Enterline et al., 1973; Beck 1973; 1974a; 1974b; Beck and Horne 1976; 1980; Manga, 1978; Siemiatycki, Richardson and Pless, 1980; Barer et al., 1982). But the principal policy objective, as discussed in the previous section, is concerned not with the income distribution of service utilization, but with meeting needs for care *irrespective of the ability or willingness to pay* for that care. As a consequence, the income-distribution of health-care utilization is of limited relevance to assess the performance of the provincial health-care systems with respect to the stated objectives. Indeed the distribution of needs in a population might indicate a distribution of care which is regressive from an income-distribution perspective. As Manga (1987:640) notes

> If there is in fact a negative relationship between the need for medical care and income class ... then a situation in which there is no statistical difference in the utilization of medical care by income class may still be inequitable.

Where need for care has been introduced into the analysis a different picture emerges. For example, Birch and Eyles (1992) show that although self-reported use of physician services among the adult population is similar across subgroups of the population categorized by household income, the self-reported levels of activity-limiting health problems decrease markedly as income increases. This suggests that the distribution of care may be determined, at least in part, by factors other than needs for care. Moreover multivariate analyses have found systematic relationships between

variations in service use and variations in socio-economic and demographic variables (Broyles et al., 1983; Manga, Broyles and Angus, 1983; Birch, Eyles and Newbold, 1992).

Although various need variables were also found to be important in explaining observed variations in use in these studies, in some cases the indicators of health status used give rise to ambiguous interpretations of the estimated relationships. For example, in analysing hospital use Manga et al. (1987) used the number of disability days as a measure of need. But this is not independent of the measure of utilization because hospitalization generally involves disablement for the individual. Hence, the estimated positive correlation between disability days and hospital utilization could be interpreted as hospital admission *causing* disablement or vice versa. Similarly, the use of prescription drugs is dependent upon physician-service use and so is not a measure of need independent of use. On the other hand, the number of previous illnesses and accidents are essentially measures of accumulated experience of, as opposed to current levels of, morbidity or need for care. It could be that past experience of such conditions gives individuals increased familiarity with using the system. So again use, in terms of responses to *previous* morbidity, may be confounding the observed relationships and clouding the interpretations.

Notwithstanding these limitations, factors other than (or as well as) needs influence the allocation of health-care resources which might be in conflict with the policy objectives (i.e. although with *other things equal*, greater needs receive more care, factors other than needs per se are associated with the differences in care received, both among those with differing needs and among those with similar needs).

Use, Access and Need

The main message emerging from this literature is that utilization of health services is the outcome of a complex interaction of several factors, each of which may differ among populations. Consequently, it is inappropriate to employ data on service utilization among populations as a surrogate (or proxy) for either access to, or need for care, although they are often employed in these ways. Inequalities in levels of utilization between individuals or populations need not imply inequalities in access, if needs for care differ between the individuals or groups. Yet observed inequalities in use might be interpreted in that way, and allocation of resources adjusted to deal with the perceived inequalities in access. Alternatively, inequalities in use might be interpreted as reflecting inequalities in need, in which case existing allocations are maintained in order to address the perceived inequalities in need when in fact this simply perpetuates the underlying inequalities in access to care. The limitations of using service utilization as a proxy for need for care and hence as a basis for future resource allocations are highlighted in several non-Canadian studies. Forster (1977; 1978; 1979) found that the allocation of health-care resources between regions in the UK was not correlated significantly with needs measured in terms of self-reported morbidity. J. Le Grand (1978) was able to show that within population subgroups homogeneous in levels of self-reported morbidity, health-care use increased with income (i.e. the poor received less care per 'unit illness' than the non-poor). Similarly Blaxter (1976) found that considerations of need indicated that the observed pattern of physician consultations was skewed towards high-income groups. More recent work indicates that this 'pro-rich' bias in use per unit illness has been reversed (O'Donnell and Propper, 1991), i.e. the poor receive a greater share of resources than is warranted by relative needs for care, although the authors suggest that this finding might be the result of income-related differences in severity within morbidity groups.

In a similar vein, several US studies have shown that service utilization differs in

both types and quantity for groups with similar needs or diagnoses (Hayward et al., 1988; Greenberg et al., 1988; Blendon et al., 1989; Wenneker and Epstein, 1989). P.T. Newacheck (1988) compared levels of use of ambulatory care among individuals above and below the poverty line. Although levels of use were not significantly different among the two groups, the non-poor had significantly more physician contact per 100 restricted activity days than the poor. Furthermore this difference was independent of age.

The implication of the results of each of these studies is that irrespective of the form of funding of health care, there is no natural tendency for health-care resources to be allocated in line with health-care needs. It is therefore unreasonable to expect a 'passive' approach to resource allocation which uses current allocations as a basis for future allocations, to lead to the satisfaction of the CHA objectives. Inequalities in use among those with similar needs may exist because of inequalities in availability (in terms of the opportunity cost of using a service) or information among those with equal need, between-person differences in preferences for health outcomes, or a combination of these. Although it may be tempting for policy-makers to 'explain' these inequalities in terms of individual preferences, this simply passes responsibility for the failure to allocate resources in line with needs for care onto the 'victims' of the system's poor performance. To what extent are observed differences between individual choices the outcome of differences in 'pure' preferences in the face of identical choice opportunities? More attention might be paid to why the 'more-needy' are not using more care (Birch and Stoddart, 1991) instead of accepting such observed phenomena as exogenous constraints which inhibit the performance of the health-care system. But whatever the explanation, performance of the system, vis-à-vis the objectives of promoting, protecting and restoring physical and mental well-being, would be compromised by inequalities in access.

IV An Alternative Approach to Resource Allocation

It is perhaps widely accepted that a society could never reasonably *expect* to meet all needs for health care, i.e. continue to provide care to the population until no more health benefit could be produced, no matter how small, from any further service provision. Moreover it is not clear that a society would ever *want* to meet all such needs. At some stage the expected benefit from further health-care provision may be so small, although positive, that what has to be given up to provide that extra care (i.e. the 'opportunity cost') is of more value to society than the small benefits produced. Providing such care, although effective, in terms of producing some benefits, and hence not unethical from an individual provider or consumer perspective, would be inefficient, i.e. low-yield medicine is not no-yield medicine (Fuchs, 1987).

If all needs cannot or should not be met, then some basis for sharing resources between needs is required. As we have shown above, existing methods of resource allocation, which are largely inherited from the pre-medicare era, tend to share on the basis of existing capacities to provide care within populations, irrespective of the *relative* needs for care and hence the expected impact on population well-being. An alternative approach is to allocate health-care resources in accordance with the relative needs for health care among geographically-defined populations (or communities). Such an approach incorporates aspects of efficiency and equity simultaneously. In terms of *efficiency*, communities with greater health-care needs, and hence greater expectation of improvements in well-being, are allocated greater levels of resources. *Equity*, on the other hand, introduces notions of fairness into the allocation of resources. A relative needs-based approach provides equal resources for communities with equal needs (horizontal equity) but unequal resources for communities with unequal needs (vertical eq-

uity). Hence a relative needs approach produces an allocation of resources which is both efficient and equitable among communities and hence relates directly to the stated objectives of current health policy in Canada.

Population Needs as a Basis of Resource Allocation

The method of resource allocation outlined in this section differs from this use-based approach to resource allocation by providing a practical approach to determining population-based shares of health-care programs which severs the link between current levels of utilization in a community and future levels of resource allocation to that community. In particular, as compared with current approaches, the methodology:

1/ uses *populations* as opposed to providers (individuals and institutions) as the primary unit for allocation,

2/ bases a community's allocation of resources on the demographic and health-related characteristics of the population and is *independent of the service utilization of that population*, and

3/ produces *shares* of a health-care budget which are based on estimated *relative* needs for care in the community. Changes in the total resource allocation to health-care services affect only the absolute level of funding, not the relative needs-based shares.

Under this approach the funds available to health-care providers and institutions are determined by the relative levels of needs of the populations served, which need not be limited to the community in which the provider or institution is located. Communities with greater relative needs would have more resources allocated for health-care delivery than similar sized communities with lesser relative needs. There is then an incentive for providers to give greater priority to, or for more providers to serve this community than for the community with lesser needs for care. Moreover, unlike under a use-based system, where the constraint on service provision is largely determined by availability of providers, under the needs-based approach total provision to a community is constrained by the relative level of need in that community irrespective of who provides the services and where they are provided.

It is important to note that the population-needs approach does not attempt to determine what an appropriate *total* allocation of resources to health-care would be. On the contrary, it recognizes that under the current publicly-funded system of provision, total provision for health-care will be determined as part of a political bargaining process (Evans et al., 1989). Although population health status might be an input into this bargaining process, it is unlikely to be the only input, as ministries 'compete' for available resources.[2]

The first stage of the proposed approach[3] allocates resources between communities on an equal-per-capita basis. But the needs for health care, in terms of potential to benefit from health-care utilization, are not the same for all individuals (see Eyles and Birch, 1993 for a review of the literature on inequalities in health in Canada) and adjustments to these equal-per-capita shares are made in order to be consistent with the objectives of the system. Three stages of adjustment are used to allow for the influences of between-community variations in factors affecting the relative resource requirements of a community in providing 'reasonable access'. These are:

1/ *Demography*: Equal per capita shares are adjusted according to the age and gender mix of populations (e.g., communities A and B might have the same size of population but A has more elderly persons and fewer women in childbearing years than B). This generates an *age and gender-adjusted resource share.*

2/ *Health risks*: Adjusting for the different health risks of populations *within the age and gender groups* (e.g., the population of community A might be at greater risk of respiratory conditions even after allowing for age and gender differences because of

environmental and/or lifestyle factors than the population of community B). This generates a *'health-risks'-adjusted resource share.*

3/ Relative costs: Adjusting for the different capacities of communities to provide health-care services from a given allocation of resources given similar needs for care (e.g., it might be more costly to provide a home-care service in a rural area than in an urban area because of (a) the greater distances travelled per client and/or (b) the higher price of some inputs, e.g., gasoline). This generates a *'relative cost'-adjusted resource share.* Without such adjustment, barriers to access (no use by those in need) remain which differ between communities and hence are incompatible with the stated policy goals of reasonable access.

These adjustments are cumulative, i.e. each stage adjusts for the particular factor of interest in addition to all previous adjustments. Hence the final share incorporates the differing age and gender mixes, differing health risks, and differing relative costs.

Application of a needs-based approach restricts the total amount of funds allocated to the provision of publicly-funded services for a community. As such it introduces considerations of the opportunity cost of service provision into decision-making more explicitly. By introducing or expanding a particular program, a decision-maker reduces the capacity to fund other programs and services *for that community.* This differs from a use based approach, where individual providers and institutions are allocated resources according to the quantity of services provided, irrespective of either the needs of the community receiving those services or how many services have already been provided to that community by the particular provider and other providers. Although the introduction of opportunity cost considerations does not guarantee that allocations will be made in accordance with efficiency criteria (i.e. equating marginal benefits with marginal opportunity costs) it does provide an organizational framework that permits such an approach and hence represents an improvement on existing use-based approaches. Moreover, efficient use of resources within communities could be encouraged by linking the needs-based approach to performance appraisal mechanisms in which expectations are made explicit regarding the use of efficiency criteria.

Population characteristics have been used as a basis of planning and allocating health-care resources in other countries and, to a limited extent, in other provinces. For example, in Quebec, the allocation of *additional* funds for the home-care program is based on the relative needs of the population (Secteur des services multiclientèles de première ligne, 1989). In contrast, in the United Kingdom (United Kingdom Department of Health and Social Security, 1988), Australia (Eyles, 1985), and New Zealand (Barnett, 1984) needs-based approaches have been used to allocate the entire budget for hospital-based services. In each of these settings target (needs-based) allocations of the budget are determined and compared to existing allocations. Partial adjustments towards target are then made and, over a period of years, actual allocations move closer to targets. Population-based approaches have also been proposed or used in Finland (Haro, 1987), the Netherlands (Rutten and Freens, 1986) and Portugal (Giraldes, 1990), although in each case the calculations have been compromised in one form or another by existing allocations (e.g., by focussing on only part of the health- care system, see Birch and Eyles, 1991).

V Implementing a Population Needs-based Approach

The population needs-based approach outlined above is proposed as a practical alternative to current methods of allocating health-care resources which is consistent with, and promotes the pursuit of, stated policy goals. In this section we identify and

discuss some of the issues that arise in implementing the needs-based approach.

The Scope of the Application

The barriers faced by policy-makers in adopting this type of approach might differ according to the particular programs being considered. As a consequence, support for the use of the needs-based approach may depend upon the particular program being considered. However limiting the application to individual programs or groups of programs, as opposed to on a comprehensive basis for all programs, risks generating incentives to providers and consumers to offload certain needs being presented for care onto non-needs based program budgets in order to protect the funding of the needs-based programs.

A comprehensive application of a relative-needs approach across the entire range of programs would help avoid many of these problems. However, it is important to recognize both the limited scope of public funding of health care and the interface between programs of the Ministry of Health and other Ministries. Access to services not covered by the medicare program (e.g., dental and optical care, ambulatory prescribed drugs for the non-elderly) would still be determined largely by ability and willingness to pay. This may not appear to be a problem because, by being excluded from the medicare program, governments have withdrawn from any role in the allocation of resources for these services. Yet there may still be some interface between these largely privately-funded services and the publicly-funded programs which generates incentives for shifting needs for care (e.g., outpatient versus inpatient dental-care procedures, drug utilization) and compromises equity of access to the publicly-funded programs among communities.

The existing applications of needs-based allocations have tended to be restricted to individual programs. For example, in the UK, access to hospital-based services is largely through referral by primary-care physicians. Because primary-care resources have not been allocated in line with relative-needs among populations, equitable and efficient access to hospital-based services has been compromised by inequities and inefficiencies in access to primary-care services (Birch and Maynard, 1987).

Applications of needs-based approaches in other countries have been compromised by the failure to enforce the resulting shares of the total budget (Barnett, 1984), by adjustments to take account of differential *availability* of privately-provided and funded hospital services (Rutten and Freens, 1986; Haro, 1987; New South Wales Department of Health, 1990) and by adjusting for existing regional levels of provision, irrespective of the region's population characteristics (Giraldes, 1990). In other words, considerations of equity in levels of provision (i.e. availability) seem to have overridden considerations of equity in access to care.

Measurement Issues

Applications of the proposed approach have shown that the major element in the adjustment to equal per capita shares is generated by the age and gender adjustment (Birch, Chambers et al., 1990; Birch and Chambers, 1990; Birch, Eyles and Chambers, 1991). However, this does not detract from the importance of identifying population indicators which can be used to represent, accurately, between-community differences in needs for care. In reviewing the epidemiological evidence on socio-economic differences in needs for health care Wilkins noted

> One policy implication ... is that in order to provide equivalent services for a given health need, not only age and sex but also some other indicator ... must be taken into account. Health planning based on mechanically applying the same age sex specific rates to populations of widely differing socioeconomic characteristics can result in serious underservicing of the disadvantaged, aggravating rather than to reddressing inequalities in health status (Wilkins 1987:7).

Appropriateness or acceptability of a particular measure for use in adjusting age and gender based allocations for relative needs for care is determined by both conceptual and practical considerations. From a conceptual point of view the measure must be a valid indicator of between-community needs for health care; from a practical perspective it must be available or easily collected. In discussing the characteristics of an ideal weighting formula for health-care resource allocation Anderson (1986) identified five criteria:

i. the resulting allocations should accurately reflect the predictable health-care costs of the units of allocation (i.e., communities)

ii. the predictable costs should vary as a function of characteristics of the communities

iii. the formula should be capable of being used for all communities

iv. the data collection and processing should be administratively feasible

v. the formula should be resistant to manipulation by providers and communities.

Satisfaction of these criteria may involve some trade-offs. For example, past use of health care has been shown to be the best predictor of future use (Eggers, 1981; McLure, 1982) but the quantity of health-care use is the result of provider and beneficiary decisions, and hence a formula based on past use of care is subject to manipulation. Furthermore, past use of care, where that care was delivered in a non needs-based system of allocation, is unlikely to reflect predictable costs of care delivered in accordance with relative needs. M. McClure (1984) therefore argued that risk factors (or weights) should include only characteristics of the individual or population that are independent of providers of care. In particular 'fair and accurate (allocation) requires a set of risk factors that will divide all beneficiaries into a set of mutually exclusive risk groups each with a specified risk value' (McClure, 1984:208).

Several approaches have been suggested for introducing variables into allocation formulae to help identify groups of the population which are homogeneous in their probability of health-care use (and hence help explain variations in expenditures). These fall under five broad headings: non-discretionary service utilization; self-perceived health status; functional health status; program entitlement; and mortality rates (Birch, Chambers et al., 1990 for a critical appraisal of the relative merits of each of these).

Two points are worth emphasizing in the context of population-based health-care resource allocation in Canada:

1/ The identification in the research literature of possible risk factors has been based on the ability of a variable to explain variation in past use. But use is an inappropriate 'gold standard' where concern is primarily with allocating resources among communities in accordance with needs for health care (Mays and Bevan, 1987).

2/ A major rationale for government intervention in the funding of health-care services is the need for risk-sharing in response to the unpredictability of needs for care. Consequently the failure of a particular formula to explain a large proportion of observed variation in health-care utilization in populations should not be interpreted as evidence of a poor performance.

The value of a needs indicator should not be assessed in terms of the proportion of the total variation in health-care use it explains. As a consequence of this unpredictability of need, three strategies have been suggested. Firstly attention can focus on identifying risk factors for chronic conditions in order to explain the permanent or non-random elements of observed variation in utilization. For example McLure (1984) argues that the needs adjustment should focus on risks of chronic conditions because these relate to continuing health-care requirements. Secondly by basing allocations at the population group level the

impact of the random component of variation is reduced (Lubitz, 1987). Hence, capitation rates calculated on a geographical basis remove the 'within-region' random component of variance (Sisk et al., 1987).

At a practical policy level, the standardized mortality ratio (SMR) seems to fit these strategies, as well as the criteria specified above. In particular the mortality and population data required to caculate the SMRs are already collected and are available in a timely fashion. Although the SMR has a poor correlation with health-care utilization, as noted above these findings do not imply that SMRs are necessarily a poor proxy for health-care need. Others have criticized the use of the SMR as an indicator of relative need for care in a population because it fails to allow for the impact of poverty, crowding and low socio-economic status on health-care needs (Fox, 1978). In particular, strong correlations between population-based measures of health status in specific surveys and socio-economic status and hence indicators of deprivation might be a more appropriate proxy for health-care needs. But health is the outcome of a complex interaction of factors, the consumption of health care being just one of those factors. While income is observed to be correlated with health at the population level it need not be the best indicator of those aspects of mortality and morbidity that are amenable by health-care interventions. The use of income as a proxy for health would therefore lead to health-care resources being allocated in response to income deprivation regardless of whether the health conditions associated with low income are amenable to health-care interventions and hence represent needs for health care as opposed to needs for other health-enhancing programs (e.g., income support). As such it is incompatible with the stated goal of promoting, protecting and restoring health. On the other hand, SMRs have been found to correlate closely with aspects of morbidity that are associated with considerable and continuing needs for care (Forster, 1977; Palmer, 1978; Ashley and McLachlan, 1985).

One could argue that more direct population-based measures of self-assessed health or morbidity should be used as an indicator of relative need. Indeed there are a number of large Canadian population-health surveys conducted in recent years which include such measures (e.g., Canada Health Survey, General Social Survey, Health and Activity Limitation Survey, see Birch and Eyles, 1991). But these data cannot be used in resource allocation for several reasons. In particular:

1/ the surveys are often 'once-off,' presenting a snapshot of the population at one point in time, and hence do not produce the data of interest on a regular basis;

2/ the execution, analysis and reporting of such surveys is typically a lengthy exercise meaning the data are often out of date by the time they are available;

3/ where surveys are repeated over time, the precise question asked often differs between surveys producing inconsistent data; and

4/ data are often collected at a level of population which does not coincide with, or cannot be analysed at, the level of the planning populations.

Although these survey-based data are unlikely to be suitable for use in a regular and repeated resource allocation exercise, they could be used as a method of periodic validation of more practical but indirect measures of relative need such as the SMR.

It is not suggested here that the SMR is a perfect measure of relative need for care, or even as an 'adequate' indicator for all health-care programs. Continuing research is warranted on developing population-based indicators of the relative risks or needs for care for the various health-care programs. Nevertheless, it seems that at this stage the SMR is a population-based measure that best proxies relative needs for care among communities for the major health-care programs (e.g., hospitals, physician services).

Adjustment Issues

The population-based shares of health-care expenditures resulting from a needs-based approach might well differ considerably from current levels of funding for services provided in each community. As a consequence some consideration should be given to methods of moving from current allocations to the more desirable (needs-based) allocations. One approach would be to apply the needs-based formula to increases in total resource allocation to health care, thus protecting communities from any reductions in the absolute level of resources available. This incremental approach has been used in applying a needs-based approach to the home care program in Quebec. However, restricting the application to additional funding only, fails to address the appropriateness (i.e. efficiency and equity) of existing allocations among communities. Levels of reallocation are therefore related to the levels of additional funding. In contrast, the needs-based approach could be applied to total program funds to produce target needs-based allocations. Each community's 'distance' from target could be calculated by comparing the target allocation with current expenditures with partial adjustments towards target being made. Over a period of years, actual allocations would move closer to targets. Under this approach levels of reallocation are not restricted by the size of new allocations but by political decisions concerning the proportion of distance from target that will be met in any one year. This approach has been used in the reallocation of hospital-based resources in the UK.

Management Issues

A population needs-based approach provides an explicit method of introducing efficiency and equity considerations into the allocation of resources among communities. In addition, by linking resources to communities, the approach permits and promotes the recognition of opportunity costs in planning and providing services within a community. New or expanded levels of services *within a community* can be provided only by reducing opportunities for providing other services *for the same community*. In this way, service provision can be managed and appraised in a community context in relation to stated goals or criteria for the allocation of resources within that community. For example, if efficiency is adopted as the 'desired' criteria, allocations can be judged in terms of the what is produced in comparison to what could be produced by alternative uses within the community of the (needs-based) allocation of resources.

Community needs-based allocations reallocate resources among communities on the basis of relative needs for care. But the impact on inequalities in access to care, both between and within communities, may be more modest if decision-making mechanisms for allocating resources within communities remain unaffected and in the hands of individual providers of care. Instead, responsibility for managing the allocation of resources within communities could be decentralized to some form of local health-care authority in line with the decentralization of the resource allocations. Such an approach is currently being considered by the Ontario Ministry of Health (Southwestern Ontario Comprehensive Health System Planning Commission, 1991). Decentralized responsibility alone may not produce allocations within communities in accordance with relative needs for care unless those parties responsible for managing resources are also being made accountable for how the resources are used to serve the community. In other words, complementary policies may be required to monitor and appraise the management of resources in order to promote efficiency and equity within, as well as among, communities (see Birch and Maynard, 1986 and Birch, 1988 for approaches to performance appraisal).

The efficiency of needs-based approaches relative to use-based approaches to allocations is further enhanced by the reduced opportunities for providers to 'game'

the system. In particular, under existing use-based systems there is an incentive to increase utilization in order to increase future allocations. Providers who respond to such incentives need not be acting *unethically*, i.e. the services provided may be effective, but they could possibly be used more effectively in different ways (e.g., by serving different communities or needs). Under the needs-based approach, the system can be 'gamed' only by increasing a community's needs weight (e.g., the morbidity or mortality of the community) which implies unethical behaviour and which is unlikely to be followed by providers. Otherwise allocations can only be enhanced by undertaking to provide services to populations with greater needs for care. Hence the needs-based approach avoids generating incentives inconsistent with the efficient use of resources as an inherent part of the allocation mechanism.

On the other hand, providers could argue that efficient use of resources, in terms of meeting needs of the community, is penalized under the needs-based system because the resulting reduction in needs for care feeds back into the needs-based allocations for future periods as a reduction in the appropriate share of health-care resources. Providers and those responsible for resource allocation at the community level will need to be confident that such reallocations only occur after careful appraisal of the use of existing resources among communities (i.e. resource allocations to communities served by efficiently-performing providers are not reduced in order to provide additional resources for communities served by less efficient providers).

Implications for Providers and Consumers

The relative-needs approach to resource allocation represents a major departure from existing resource allocation procedures which would have major implications for the various stakeholders. Needs for resources to provide care at the population level would be largely independent of physician activity at the patient level. However, this does *not* restrict the methods of remuneration for providers of care, it merely limits the total expenditure that can be made on particular services for a community whatever method of remuneration is chosen. With a cap on total resources related to the relative needs for care in the population, providers would be competing with each other. Earnings opportunities of providers within a population become determined by population characteristics and the existing level of provision in the community and there is a financial incentive for providers to follow needs.

Turning to consumers, the reallocation of resources implied by the relative needs approach would imply that for some, opportunities to use care, in terms of the range of options available to them, would decrease. Others will gain as resources are gradually redistributed more in line with equitable and efficient access to care. In addition a consumer's right to seek care outside the region of residence (as opposed to being referred for care outside of the region) would need to be considered carefully because this would place demands on resources which were allocated in accordance with another community's relative needs, at least at the population level. In the case of services for which it is neither feasible nor efficient to provide locally (i.e. specialized tertiary care), planning populations (communities) could be aggregated and resources for those services allocated on the basis of relative needs for care among those larger population units (e.g., regions).

Communities have to be defined carefully in line with traditional catchment areas in order to minimize cross-boundary flows of patients with the cost of referred services being 'charged back' to the community in which the individual is resident. In addition to cross-boundary flows arising from traditional patterns of referrals and sources of care, managerial mechanisms must be identified to deal with individual self-referral to providers outside of their usual location of care provision. A charge-back mechanism for self referrals creates

perverse incentives for providers to juggle with different types of care to attract non-resident patients (for whom additional resources are attracted) without losing resident patients to other areas as observed in the UK (Brazier, 1987). In particular, providers are 'rewarded' for deferring utilization by their own residents and hence preserving the 'community budget,' but thus enhancing the total resource pool. But this cross-charging between providers risks 'freezing in' existing differences in levels of service provision among communities. In addition, attempts to allocate resources in line with needs are compromised if resident individuals, deemed to be without sufficient need to justify immediate service provision, seek and receive services in other jurisdictions (i.e. the resident authority is then 'charged' for services it deemed to be unnecessary or unwarranted *relative* to other needs in the community but could not prevent being provided by others). One approach for dealing with the issue of self-referral across communities which avoid the problems of cross-charging is to provide a disincentive to meet the demands of self-referrals. The provider remains able to meet such demands but no resources would flow between communities on account of the service provision. In other words the treatment of self-referred patients from other communities reduces the resources available to provide care to the resident community for which providers and local management are held accountable. A similar approach is used currently in some provinces to deal with self-referrals to medical specialists whereby only the (lower) general practitioner fee is paid to the specialist where the patient goes directly to the specialist.

VI Overview

The needs-based approach to resource allocation described in this paper is presented as a practical alternative to the methods of used currently in Canada. It 'severs' the link between the resources currently used and the relative need for future resources by basing allocations on the characteristics of populations, and hence providing a method of resource allocation consistent with the objectives of the health-care system. As such it provides an important input into pursuing stated policy objectives and trying to reconcile the continuing increase in expenditures with the increasing demands for services.

Notes

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1 Under the *Medical Care Act* at least 95% of the province's resident population were required to be covered by the plan. This was increased to universal coverage under the *Canada Health Act*.

2 An alternative approach would be to quantify the health-care resource requirements to produce a target level of population health status, which may be 'full-health' (an *absolute* needs approach). Under this approach the total allocation of resources to health-care is assumed to be endogenous. Furthermore assumptions have to be made concerning the efficiency of *use* of health-care resources. Both of these assumptions limit the practical (and hence policy) relevance of the absolute needs approach.

3 An application and further details of the proposed approach are provided in Eyles et al. (1991).

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