

Using Resource Profiles To Guide Allocation and Purchasing Decisions

Anders Anell

September 2004



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Health, Nutrition and Population (HNP) Discussion Paper

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Health, Nutrition and Population (HNP) Discussion Paper

Using Resource Profiles to Guide Allocation and Purchasing Decisions

Anders Anell^a

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Paper prepared for the World Bank's Resource Allocation and Purchasing Project

Abstract: The provision of health care involves combining a considerable number of resource inputs to deliver a mix of services that will satisfy overall objectives. In theory, this sounds simple. For a number of reasons, however, allocating actual health care resources is challenging and imbalances seem to be the rule rather than the exception. This paper presents a simple framework for comparing resource profiles for a selection of low- and middle-income countries. The main purpose is to illustrate the importance of a multidimensional approach for the measurement and monitoring of health care resources that includes measurement of real resources, e.g. personnel, equipment and facilities, to supplement traditional expenditure figures. Data have been compiled for two groups of countries. Burkina Faso, Malawi, Mali, Niger and Tanzania comprise a set of low-income African countries. The Dominican Republic, Ecuador, El Salvador, Guatemala and Peru comprise a set of middle-income Latin American countries. A multidimensional approach for the measurement and monitoring of health care resources may supplement expenditure reviews such as National Health Accounts (NHAs) and thereby highlight important linkages between expenditures and the management of real resources.

Keywords: resource allocation and purchasing, health care financing, health expenditures; health resources; Latin America; Africa.

Disclaimer: The findings, interpretations and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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FOREWORD

Great progress has been made in recent years in securing better access and financial protection against the cost of illness through collective financing of health care. This publication – *Using Resource Profiles to Guide Allocation and Purchasing Decisions* by Anders Anell – is part of a series of Discussions Papers that review ways to make public spending on health care more efficient and equitable in developing countries through strategic purchasing and contracting services from nongovernmental providers.

Promoting health and confronting disease challenges requires action across a range of activities in the health system. This includes improvements in the policymaking and stewardship role of governments, better access to human resources, drugs, medical equipment, and consumables, and a greater engagement of both public and private providers of services.

Managing scarce resources and health care effectively and efficiently is an important part of this story. Experience has shown that, without strategic policies and focused spending mechanisms, the poor and other ordinary people are likely to get left out. The use of purchasing as a tool to enhance public sector performance is well documented in other sectors of the economy. Extension of this experience to the health sector is more recent and lessons learned are now being successfully applied to developing countries.

The shift from hiring staff in the public sector and producing services “in house” from non governmental providers has been at the center of a lively debate on collective financing of health care during recent years. Its underlying premise is that it is necessary to separate the functions of financing health services from the production process of service delivery to improve public sector accountability and performance.

In this Discussion Paper, Anell present data and resource profiles from selected low- and middle-income African and Latin American countries in an effort to illustrate the importance of a multidimensional approach for the measurement and monitoring of health care resources. Anell concludes by reminding the reader that health care delivery in low-income countries is confronted by a nearly bottomless pit of health problems and extreme shortages of physicians, trained nurses, medicines, and equipment. The importance of balancing and promoting efficient use of available resources is clear. So too are the negative consequences – in terms of life years lost – if this objective is not met. In practice, however, problems of inefficiency seem to be more pronounced in low-income countries. Working morale is often low due to inadequate pay and poor working conditions. Facilities and equipment are often not fully operational since capital investments and recurrent costs are poorly balanced. Institutions that promote accountability for overall objectives and transparency of actual resource allocations are usually weak. In this context, more strategic resource allocation and purchasing mechanisms could make a significant contribution.

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INTRODUCTION

The provision of health care involves combining a considerable number of resource inputs to deliver a mix of services that will satisfy overall objectives and priorities. In theory, this sounds simple. For a number of reasons, however, allocating actual health care resources is challenging. First, providers are required to respond to an extraordinary array of immediate health problems. Second, health care relies heavily on human resources and the quality of care ultimately depends on their skills, training and motivation. Thus, investments in facilities and equipment need to be balanced against investments in human capital, i.e., education and training. Third, the financial resources that pay for health care are often collected and pooled by a third party not directly involved in the provision of care. This third party could be a ministry or central board of health, a provincial government, a not-for-profit sickness fund or a commercial insurance company. While each approach is quite different, they all depend on the third party to act as a “good agent” on behalf of individuals in buying services from various providers. Fourth, good health has increasingly become close to a right in modern society, which with ever-expanding possibilities to treat and prevent conditions of bad health has universally raised the question of how to set and implement priorities.

The need to overcome the challenges of resource allocation in health care is greatest among middle- and especially low-income countries. Health care delivery in low-income countries faces a near bottomless pit of health problems and an extreme shortage of physicians, trained nurses, medicines, and equipment. The importance of balancing and promoting an efficient use of available resources is quite clear, and so are the negative consequences in terms of life-years lost if this objective is not met. In practice, however, problems of inefficiency seem to be more pronounced in low-income countries (WHO, 2000). Working morale is often low due to inadequate pay and poor working conditions. Facilities and equipment are often not fully operational since capital investments and recurrent costs are poorly balanced. Institutions that promote accountability for overall objectives and transparency of actual resource allocations are usually weak.

In this paper, data and resource profiles from a selection of low and middle-income African and Latin American countries will be presented for the purpose of illustrating the importance of a multidimensional approach for the measurement and monitoring of health care resources.

CLASSIFICATION OF RESOURCES AND TYPICAL IMBALANCES

Reinhardt (1998) has highlighted the importance of distinguishing between the management of real health care resources (personnel, equipment, pharmaceuticals and other real resource inputs) and the money transfer that these real resources receive from the rest of society. In a previous article, Anell and Willis (2000) borrowed this logic and developed a simple classification of different types of real and monetary resources. They also discussed the dynamic link between real and monetary resources and interdependencies across different types of real resources using data from six high-income countries.

In this paper, the same type of analysis is extended to two groups of low- and middle-income countries. Although income is substantially lower, the principal problem of resource allocation is

the same. First, resources from society should be allocated to health care so long as the marginal value of health services is greater than the value of resources in alternative uses. Second, resources within the health care systems should be allocated across different types of services and resource inputs so that their marginal value is equalized and output thereby maximized. The appropriate mix of resources will vary across health care systems, depending on availability of resources, relative prices on different resource inputs, and the nature of health problems to be solved. Low-income countries can afford only a minimum of advanced health care technologies, e.g., patented drugs and expensive diagnostic equipment, since the relative price on such resource inputs are very high compared to the price of, for example, consumables or drugs produced in the domestic market.

In practice, imbalances between different types of services and resource inputs seem to be the rule rather than the exception. This is equally true for high-, middle-, and low-income countries. Focusing on conditions in low and middle-income countries, some typical problems are highlighted below.

THE INFLUENCE OF PAST INVESTMENT PATTERNS

Resource allocation in health care is often heavily influenced by past investments in physical infrastructure and human resources. There are numerous reports of a persistent gap between the existing and preferred structure of resource allocation (WHO, 2000). Too much has been invested in secondary hospital services, too little in primary health care and public health programs. Moreover, additional imbalances in health care resources usually exist between urban and rural areas.

INVESTMENTS AND RECURRENT COSTS

Investments in highly visible physical infrastructure have often been made with little regard to cost-effectiveness and possibilities to cover the cost of operation and maintenance. To make matters worse, such investments have previously often been supported by multi- or bilateral agencies (Lee, 1989).

DIFFICULTIES IN ADJUSTING TO MEDICAL AND TECHNOLOGICAL ADVANCES

The optimal mix of resource inputs is strongly linked to the availability of effective health care interventions (Weisbrod, 1991). A new effective intervention within a specific disease area may completely alter the need for different types of resources. A radical example would be the introduction of a new vaccine that prevents a disease. Previously important facilities and human resources devoted to treatment would become less important, perhaps obsolete. On a more general level, the fast progress of knowledge related to diseases and health care interventions implies that providers need to adapt continuously to new options and demands. In practice, health care systems are often slow to restructure services, facilities, and human resources to technological advances.

HUMAN RESOURCE PROBLEMS

The performance of a health care system ultimately depends on the knowledge, skills, and motivation of its employees. A well-balanced mix of different staff categories and sufficient training are needed so that individuals, and thereby the total human resources, can perform at their best. In practice, both low- and middle-income countries often experiences shortages of

skilled human resources devoted to health care, especially in the public sector. In some countries, however, there seems to be a relative oversupply of physicians (and the services that physicians provide). Inadequate pay and poor working conditions are frequently reported problems in low-income countries (Berckmans, 1999), suggesting resource imbalances. Too little is spent on maintenance, equipment and other support functions, with the result that individuals cannot perform at their best. Imbalances that have a negative effect on working conditions are particularly problematic, since they affect not only the present performance of the health care system, but also possibilities to attract future human resources.

BALANCING RESOURCE INPUTS AGAINST OBJECTIVES

The data from low-, middle-, and high-income countries indicate wide variation in resource use (WHO, 2000). Variations exist even across countries with similar income levels and public-private mix of financing and delivery of services. In part, these variations may reflect differences in relative prices and priorities. More important, they are reflections of past investment patterns in physical and human capital and the vested interests that such investments have created. Finding a new balance across different types of resources requires commitment to normative objectives unrelated to the specific interests of various stakeholders. Normally, such objectives will include, but not be limited to, cost-effectiveness and equity, and it is against such objectives that future investments should be evaluated.

Shifting investment and purchasing patterns to favor an equitable distribution of cost-effective and essential services will no doubt encounter difficulty. Available resource inputs are usually not balanced toward this end. Specific interventions may be needed to increase or decrease intake for selected educational programs and create new categories of health professionals where training programs are matched specifically with functional needs. The same adjustment process applies for other type of resources. Correctly allocating resource inputs therefore requires not only data about actual resource levels, but also a set of references that can indicate whether there are “too much” or “too little” of each type of input. Since the correct level is hard to determine, a practical alternative is to compare existing levels of resources with those of other countries at similar income levels. In the following sections, resource profiles from a selection of low- and middle-income countries will be presented to illustrate an approach that may meet this objective.

DATA

Data have been compiled for a group of low- and middle-income countries. Specifically, Burkina Faso, Malawi, Mali, Niger, and Tanzania make up a set of low-income African countries. The Dominican Republic, Ecuador, El Salvador, Guatemala, and Peru make up a set of middle-income Latin American countries. Countries were selected to each group based on region, similar income levels (World Bank classification), and availability of data. Countries in the two groups face similar and difficult conditions for allocation of resources in health care but are heterogeneous in other dimensions such as political and socioeconomic context, demography, health problems, and organization of health care financing and delivery.

Data collection was a problem for all of the countries studied, particularly for the African group. As in many other low- and middle-income countries, households pay a large proportion of health

care expenditures directly to providers, and public expenditures in different forms are supplemented by donor contributions. This mix of financing sources makes the analysis of total health care expenditures more difficult, and estimates of private expenditure often require expensive household surveys. Moreover, records of real resource use are generally scarce and often outdated or of questionable validity. In this paper, easily available data from World Bank and World Health Organization databases was used. The reader should bear in mind that the principal aim is to illustrate an approach of resource measurement, not to make definitive statements about differences across the countries.

Table 1. Selected Health Care Expenditures and Resource Measures in Five Middle-Income Latin-American Countries

Expenditure/measure	Dominican Republic	Ecuador	El Salvador	Guatemala	Peru
Expenditures (% of GDP)	6.5	3.6	8.3	4.4	4.4
Expenditures per capita, 1998 (in international dollars)	240.0	119.0	343.0	168.0	197.0
Public expenditures per capita, 1998 (in international dollars)	68.0	55.0	146.0	80.0	112.0
Physicians per 100,000 people, ca. 1997	215.6	169.6	107.1	93.3	93.2
Nurses per 100,000 people, ca. 1997	29.9	70.1	34.9	27.0	115.2
Beds per 1,000 people, ca. 1995	2.0	1.6	0.8	1.1	1.3

Sources: WHO (2001, Annex Table 5). WHO (2002); PAHO (1998).

For the Latin-American group the analysis is limited to six variables representing both monetary and real resource measures (table 1). The three monetary measures are health care expenditures as a proportion of GDP, total health care expenditures per capita, and public health care expenditures per capita. The three real measures are physicians, nurses and beds per capita. Reliable data for nurses per capita was not available for the African group, so the analysis is limited to the other five variables (table 2).

Table 2. Selected Health Care Expenditures and Resource Measures in Five Low-Income African Countries

Expenditure/measure	Burkina Faso	Malawi	Mali	Niger	Tanzania
Expenditures, 1998 (% of GDP)	4.1	6.3	4.3	2.6	3.0
Expenditures per capita, 1998 (current U.S. dollars)	9.0	11.0	11.0	5.0	8.0
Public expenditures, 1998 (percentage of GDP)	1.3	2.8	2.1	1.2	1.3
Physicians per 100,000 people, 1993–98	3.8	2.8	6.3	3.3	4.1
Beds per 1,000 people, 1992–98	1.4	1.3	0.2	0.1	0.9

Note: Data *italics* are older than 1995

Source: Health, Nutrition, and Population Stats, World Bank.

CONSTRUCTION OF HEALTH CARE RESOURCE PROFILES

A desirable feature of expenditure data is that measures of resource use are condensed into a single number. Simultaneous comparison of an array of different resource measures such as those presented in tables 1 and 2 is more demanding. Spider-web diagrams can facilitate increased understanding, however, by summarizing information in a graphical format.

Based on the data in tables 1 and 2, spider-web diagrams for the two country-groups were constructed (figures 1 and 2). To facilitate intragroup comparison, the data are normalized to the maximum value for the group. For example, El Salvador spent the highest proportion of GDP on health care (8.3 percent) so the value for El Salvador in this category was set to 1.00, the “resource frontier.” The value for Ecuador, for example, was then calculated to $3.6/8.3$, i.e., 0.43.

The resource frontier in no way reflects best practice or the preferred position. The purpose of the procedure is only to provide information about the relative importance of different type of resources for a single country in comparison with the maximum for a defined group of countries. This approach is used as a second-best alternative, since information about “right” levels is usually not available. The definition of the resource frontier thereby heavily depends on the selection of countries and will possibly change as new countries are added to the group or as existing ones are omitted.

RESOURCE PROFILES FOR FIVE MIDDLE-INCOME LATIN AMERICAN COUNTRIES

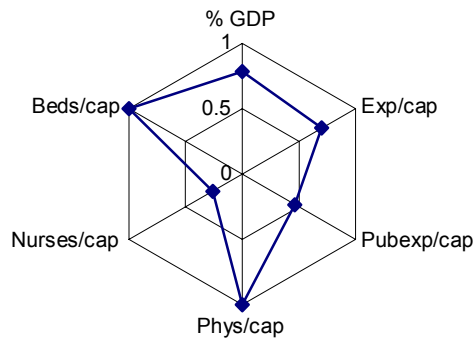
The health care resource profiles for the Dominican Republic, Ecuador, El Salvador, Guatemala and Peru are presented in figure 1a-e, respectively. There are several interesting features. For example, while El Salvador defines the resource frontier for all the expenditure measures, the underlying real resources (physicians, nurses, and beds per capita) are lower than in the other

four countries. In terms of real resources, El Salvador is similar to Guatemala, which operates its health care system with considerably less transfer of purchasing power from the society. In a previous National Health Accounts study it was noted that a high percentage of public health care spending in El Salvador went to labor compensation and operating expenditures of facilities (Partnership for Health Reform, 1998).

Figure 1a-e. Spider-web diagrams for five middle-income Latin American countries showing selected health care expenditures and resource measures around 1997, normalized by the group maximum.

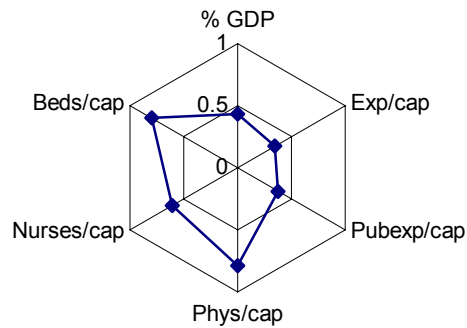
a)

Dominican Republic



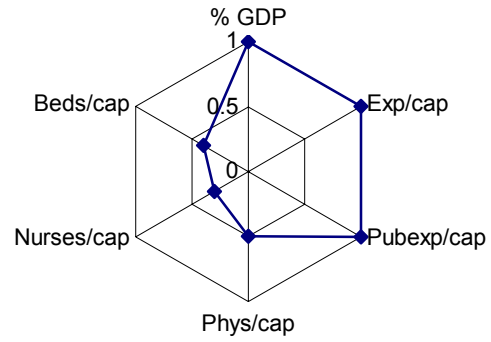
b)

Ecuador



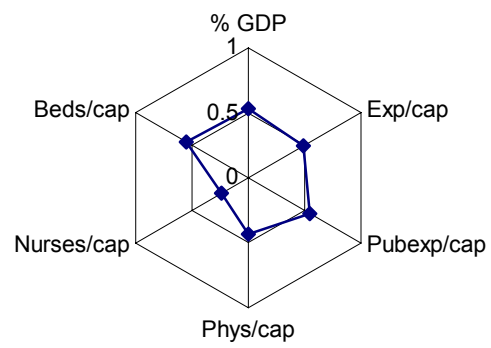
c)

El Salvador

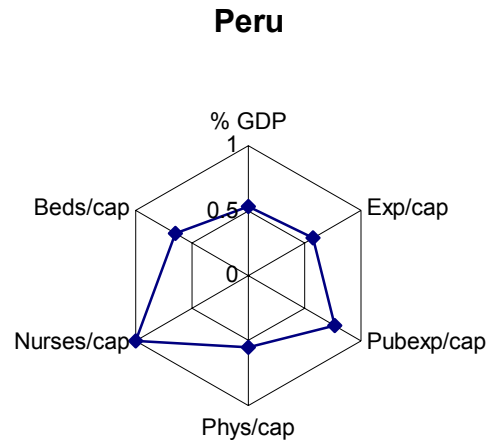


d)

Guatemala



e)



Source: Calculation from data in table 1.

Note: % GDP = health care expenditures as a percentage of gross domestic product; Exp/cap = Health care expenditures per capita in international dollars; Pubexp/cap = Public health care expenditures per capita in international dollars; Phys/cap = Physicians per capita; Nurses/cap = Nurses per capita; Beds/cap = Beds per capita.

All countries in the group rely heavily on private out-of-pocket funding for health care. This is particularly true of the Dominican Republic, with 72 percent private funding, compared to 57 percent in El Salvador, 54 percent in Ecuador, 52 percent in Guatemala and 43 percent in Peru (calculated from table 1). The relatively high use of private funding can also be seen in the resources profiles, as “exp/cap” (total expenditures per capita) for the Dominican Republic is closer to the resource frontier than the “pubexp/cap” (public expenditure per capita). The converse can be noted for Peru, with its relatively high use of public funding. The Dominican Republic and Peru display completely different patterns in terms of real resources. The Dominican Republic has more physicians and beds per capita, while Peru has more nurses. In fact, these two countries define the resource frontier for these three real resource measures. This pattern of resource use is quite possibly related to the private-public mix in funding. Private for-profit services have grown rapidly in the Dominican Republic, and surveys among users report a favorable opinion of private services in comparison with public facilities (PAHO, 1998, p.235). Nearly one third of the poorest citizens of the Dominican Republic are reported to use private clinics (Partnership for Health Reform, 1998). The combination of an expanding economy, low level of public funding, and lack of trust in the public health system seems to have encouraged private purchasing power to favor physicians providing curative services.

In all five countries, the availability of resources varies across urban and rural areas. In Guatemala, 80 percent of physicians, 56 percent of professional nurses, and 50 percent of nursing aides are located in the metropolitan region, while 65 percent of the population lives in rural areas (PAHO, 1998 p. 302). The availability of physicians in the metropolitan region, in fact, is about three times higher than the average number reported in profile 1b. The same pattern is reported for Ecuador, with about twice as many physicians per capita in the mountains as in the Amazon region (PAHO, 1998, p. 255). Also in the Dominican Republic, El Salvador, and Peru, wide variations in available resources across regions can be noted, to the detriment of rural

and less developed areas with a higher proportion of poverty. Separate resource profiles for different regions within countries could be used to summarize the existence and size of such variances.

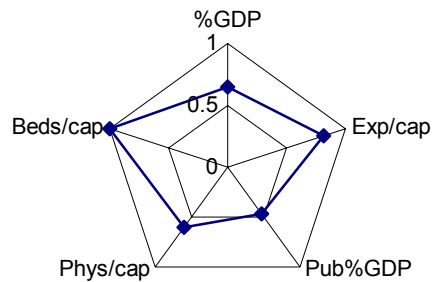
RESOURCE PROFILES FOR FIVE LOW-INCOME AFRICAN COUNTRIES

Health care resource profiles for Burkina Faso, Malawi, Mali, Niger and Tanzania are presented in figure 2a-e. Profiles are simpler than the profiles for the Latin American countries, as data for nurses per capita could not be found for the group. Further, some of the data used are fairly old (marked in table 2) and the reported number of beds per capita in both Mali and Niger seem unreasonably low in comparison with the number in Burkina Faso, Malawi and Tanzania. These data problems also mean that it is more difficult to compare profiles and explore potential explanations for differences. Gaps in the availability of health care systems data for low-income African countries have been noted elsewhere (Peters, et al. 2000) and hinder not only comparison of resource profiles but also improvement in the management of the health care sector.

Figure 2a-e. Spider-web diagrams for five low-income African countries showing selected health care expenditures and resource measures, 1998 or latest available data, normalized by the group maximum.

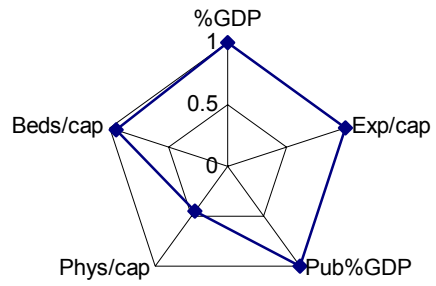
a)

Burkina Faso



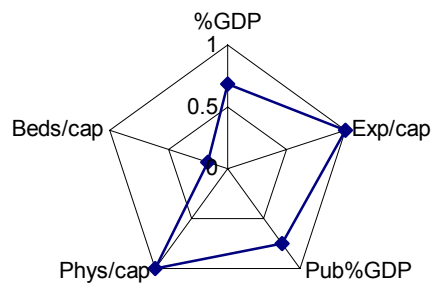
b)

Malawi



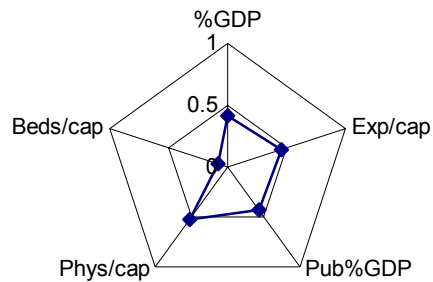
c)

Mali



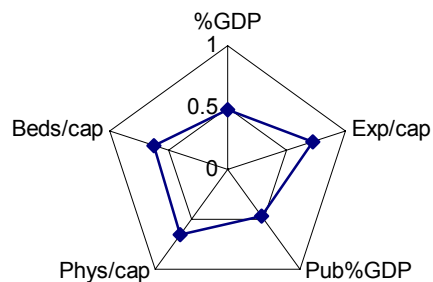
d)

Niger



e)

Tanzania



Source: Calculations from data in table 2.

Note: % GDP = health care expenditures as a percentage of gross domestic product; Exp/cap = Health care expenditures per capita in international dollars; Pub%GDP = Public health care expenditures as a percentage of gross domestic product; Phys/cap = Physicians per capita; Beds/cap = Beds per capita.

As with the Latin American countries, the five African countries report wide differences in resource use. Similar to conditions in the Latin American countries, the dependence on private expenditure is high, but with considerable variation. For instance, Burkina Faso is more dependent on private funding than the other four. A major difference between the two country groups is that the selected low-income African countries operate at significantly lower resource levels than the middle-income Latin American group. All countries within the African group are also associated with economic slowdown, falling life expectancy, extremely poor living conditions for a majority of the population, and severe shortages of health professionals, drugs, and other supplies.

Three different countries define the resource frontier for the group of African countries: Malawi for “%GDP” (total health care expenditures as a percentage of gross domestic product) and “pub%GDP” (public health care expenditures as a percentage of gross domestic product), Malawi together with Mali for “exp/cap” (total health care expenditures per capita), Mali for “phys/cap” (physicians per capita) and Burkina Faso for “beds/cap” (beds per capita). Tanzania and in particular Niger operate at a lower level of resource use for all of the five measures. For Burkina Faso, Malawi and Mali the relative importance of different types of resources are mixed. Malawi reports relatively high expenditures compared to the other four countries in the group, but a fairly low level of physicians. Malawi’s public spending on health has historically been high also relative to other Sub-Saharan countries and countries elsewhere with comparable GDP per capita (Picazo, 2002). For Mali, the reported number of beds per capita is very low (as in Niger) and may be associated with poor availability and accuracy of data.

An uncertain link between health spending measures and outputs of health services for African countries has been noted in a previous study. In comparing high-, middle-, and low-income African countries, McCarthy and Wolf (2001) found a positive association between spending levels and output measures defined by access and immunization rates, but the link was found to be quite unstable. Some low-income countries outperformed some middle-income countries with lower spending levels but still higher access and immunization rates. These results further highlight the importance of managing not only health expenditures, but also the mix of real resources, in order to reach optimal performance in terms of health output and outcome.

DISCUSSION

The annual purchasing power transferred from the society to finance the provision of health care is an important determinant of the output and performance of the health care sector. The link between health expenditures, output, and performance is, however, far from straightforward and depends greatly on incentives and the management of real resources. The measurement of health care resources should consequently focus not only on patterns of expenditures, but also identify the levels and use of real resources such as physicians, nurses, beds, facilities, and health care technology. There is a dynamic link between monetary and real resources and important interdependencies across different types of real resources. This link and these interdependencies need to be accounted for by both purchasers of health care and governments responsible for overall stewardship of the health care system.

Construction and comparison of resource profiles may be seen as a supplement to national health accounts and the main purpose is to facilitate the identification of potential imbalances across resource inputs. While resource profiles do not provide normative answers to questions about the optimal mix of resource inputs, they may identify relevant questions that should be analyzed in greater detail. They also highlight the fact that management of expenditures cannot replace management of the dynamic link between expenditures, real resources, and, ultimately, performance.

In a simple illustration using data from two groups of low- and middle-income countries, wide variances in resource use were detected and several issues for further analysis identified. Alternative approaches include comparison of resource profiles across regions in a specific

country or longitudinal comparison within a specific country or region. The profiles can also be further developed and refined. Potentially fruitful directions include development of additional real resource measures of particular relevance for low- and middle-income countries or even inclusion of data on output and performance.

Although resource profiles may facilitate the identification and enhanced understanding of existing and potential problems of imbalances, other interventions are needed to prevent or to overcome problems. It is important to remember that every dollar spent on health care is income for health care personnel or industries related to the health care sector. The vested interests created by past investment and resource allocation patterns is probably the most important obstacle when implementing new directions for investment and purchasing. In low-income countries, conditions may be worse as donors may have their own, potentially competing, agendas.

Past policies, including rigid budget-line thinking and separate planning for investments, recurrent costs, and human resources, need to be replaced by a strong commitment to cost-effectiveness and other explicitly defined objectives that guide decisions on what services to fund. If purchasers limit their funding to essential and cost-effective health services, an important signal will be sent to providers of services that they must organize their activities and balance their resource inputs accordingly.

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