PROVISION OF PERSONAL AND NON-PERSONAL HEALTH SERVICES: PROPOSAL FOR MONITORING

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1. **INTRODUCTION**

The provision function refers to the combination of inputs into a production process that takes place in a particular organizational or home setting, and that leads to the delivery of a series of interventions.

The inputs for health service provision are human resources, physical capital, and consumables. The outputs are personal and non-personal health services. Personal health services are delivered individually. They can be of therapeutic or rehabilitative nature, and may generate positive externalities. Non-personal health services are actions applied either to collectives (e.g., mass health education) or to the non-human components of the environment (e.g., basic sanitation) and usually produce significant positive externalities or reduce possible negative externalities from individual or collective actions (26).

**Figure 1. Health service provision**

The goal of health services provision is to improve health outcomes in the population and to respond to people’s expectations, while reducing inequalities in both health and responsiveness. The health care needs of the population should be met with the best possible quantity\(^1\) and quality of services produced at minimum costs. Types of inputs in health service provision largely determine production costs. The organizational structure and processes determine quantity and quality of outputs for a given quantity of inputs. The quantity and quality of services and their distribution, together with other health system non-health system factors, determine how much health gain can be achieved in the society.

In order to assess health service provision we can focus on three areas: (a) health system inputs, (b) organizational structure and processes, and (c) the quantity and quality of personal and non-personal health services in relation to health care needs of population. The outcomes of health service delivery process will be captured by the measurement of the overall level and the distribution of health.

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\(^1\) Appropriate quantity should be determined by the needs of population.
Inputs have direct implications for the cost of production. Some inputs are easily varied, such as drugs, other medical supplies, and health care personnel\(^2\), while other types of inputs, such as structures and expensive equipment, are fixed in the short-run and cannot be varied. In the long-run all inputs become variable inputs (21;32;35).

The production of the resources that will be used later as inputs in the service delivery process, can be considered as a domain of resource generation function. The management of inputs and their deployment in the production process can be considered a domain of the service provision function. The management and deployment of inputs could be assessed and monitored through: (i) the recurrent costs of service provision, (ii) the physical availability of inputs, (iii) the skill-mix of health care personnel, and (iv) utilization of medical equipment and structures.

Given the scarcity of resources it is vital to use the available inputs in such a way that could maximize the quantity and quality of outputs. This largely depends on the way the health service delivery systems are structured and organized, and the way processes are carried out. Organizational structure of the system and the process of health service delivery could be assessed through: (i) the level and type of autonomy and integration, and (ii) incentive structures.

Knowing the degree and locus of autonomy and the extent of integration in the health service delivery system will help in understanding how decisions are made about the deployment of different mix of inputs, how providers respond to market signals, public regulations, or expectations of consumers and the society, and how efficient the links between different levels and domains of health service delivery are.

Incentive structures have an impact on the way health care providers behave or can be expected to behave in different settings.

The outputs of the health service provision process can be monitored by the degree to which systems achieve effective coverage of the population with critical health interventions. Effective coverage of a health system can be defined as the ratio of the realized health gain from a set of interventions (weighed by the health risk) over the total potential health gain possible if providers performed at their optimal level for a given health system. This applies to both personal and non-personal health interventions. The outcomes of the service provision function will be reflected on the overall level and distribution of the health of population.

Provider performance measures the contribution of the professional actions of providers to the outputs and outcomes of service provision. In a sense, provider performance measures the direct consequences of providers' professional actions for individual patients. The assessment of provider performance helps understand to what extent one can attribute the outputs and outcomes of health service provision to the professional actions of providers. For instance, effective coverage of population with health services is determine by factors such as accessibility, availability, affordability and acceptability, all of which are influenced by elements of provider performance. The assessment of provider performance can inform policy decision with the evidence on the expected or the actual contribution of providers' professional actions into the attainment of the intermediate and final goals of health systems.

The framework for the assessment of health service provision function is described graphically in Figure 2.

\(^2\) Health care personnel is less variable than drugs and consumable. However, at the institutional provider level, skill-mix can be varied. The extent to which this is possible is determined by the degree of autonomy of health care provider institutions.
2. **RECURRENT EXPENDITURES**

Recurrent expenditures, as mentioned above, are most closely associated with variable inputs. The bulk of recurrent expenditures is composed of variable costs, that are directly related to the scale of production and to how much output is produced (35). They include salaries and wages, drugs and other supplies, utilities, operating costs of structures and equipment, etc. Proportions of these different elements as part of total recurrent expenditures vary from country to country (32;35). Usually the wage bill and expenditures on pharmaceuticals and supplies constitute the bulk of recurrent expenditures (8;28;35). The following table shows the expenditure shares to salary and drugs and supplies in eight Latin American and Caribbean countries. In all except one country (Peru) the salary and drugs shares exceed all other. However the costs of operation and maintenance of physical assets might also reach significant proportions depending on the magnitude of the stock of physical assets and maintenance practices (32;35).
Table 1: Expenditure shares to salary and drugs and supplies in eight LAC countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Agency</th>
<th>% of Expenditure</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Salary</td>
<td>Drugs supplies</td>
<td>All other</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Bolivia</td>
<td>Ministry of Health</td>
<td>58.3</td>
<td>8.8</td>
<td>32.9</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
<td>44.7</td>
<td>21.2</td>
<td>34.1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>Ministry of Health</td>
<td>66.9</td>
<td>16.6</td>
<td>16.5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
<td>71.3</td>
<td>16.5</td>
<td>12.2</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ecuador</td>
<td>Ministry of Health</td>
<td>72.2</td>
<td>4.7</td>
<td>23.1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
<td>50.3</td>
<td>29.3</td>
<td>20.4</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>El Salvador</td>
<td>Ministry of Health</td>
<td>47.3</td>
<td>11.5</td>
<td>41.2</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
<td>51.3</td>
<td>20.6</td>
<td>28.1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Guatemala</td>
<td>Ministry of Health</td>
<td>52.0</td>
<td>21.1</td>
<td>26.9</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
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<td>30.9</td>
<td>19.1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>Ministry of Health</td>
<td>47.9</td>
<td>12.3</td>
<td>39.8</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
<td>74.4</td>
<td>9.0</td>
<td>16.6</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Nicaragua</td>
<td>Ministry of Health</td>
<td>37.7</td>
<td>23.5</td>
<td>38.8</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
<td>35.7</td>
<td>50.2</td>
<td>14.1</td>
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<td></td>
</tr>
<tr>
<td>Peru</td>
<td>Ministry of Health</td>
<td>11.1</td>
<td>8.2</td>
<td>80.7</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Insurance Organization</td>
<td>28.0</td>
<td>9.4</td>
<td>62.6</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

(Source (8))

Usually the maintenance of structures and equipment is considered as part of recurrent expenditures. In relation to human resources the equivalent of maintenance could be continuing education and training. However, since the purpose of maintenance is to sustain productivity and quality of assets regardless the amount of their utilization, we suggest assessing the maintenance costs under the framework of resource generation. However, another component of recurrent costs, operating costs, which are directly linked to the intensity of utilization of assets, could be assessed under the framework of service provision. This division is suggested only for the purpose of conceptual classification of different measurements of health system functions, and does not necessarily represent established accounting norms and standards.

Measurement of different elements of recurrent costs could provide a reasonable estimation of the input mix used in the production of health services. The data on recurrent expenditures can be obtained from national health accounts. From a long list of potential indicators, the following key indicators could be suggested for indirect assessment of the use of inputs:

- The share of recurrent expenditures as a % of total health care spending
- The share of the wage bill as a % of total recurrent expenditures
- The share of expenditures on drugs and other medical supplies as a % of total recurrent expenditures
- Operating costs of structures and equipment as a % of total recurrent expenditures
In relation to the last indicator, it should be noted that the life cycle costs of physical capital is often neglected, and problems associated with this are not sufficiently perceived. Given the importance of medical technologies for the delivery of health services, life cycle cost analysis, as part of investment decision making process requires more attention.

3. **AVAILABILITY AND UTILIZATION OF DRUGS AND OTHER MEDICAL SUPPLIES**

With a set of essential drugs, vaccines, and other consumables (needles, bandages etc) the majority of communicable and non-communicable diseases can be successfully treated, prevented or controlled. The availability of quality consumables is therefore a crucial factor in health service provision and an important determinant of the effectiveness of the services provided. There is evidence that reform processes in the health sector and economic changes have profound effects on access and use of drugs (14).

The following indicators can be proposed for measuring the availability of drugs in the health service provision system:

- The proportion of health care facilities and central/regional stores or warehouses that have essential drugs in stock.

This indicator will measure the current availability of drugs to treat common health problems in health facilities and supply depots. A list of 10-15 key essential drugs or health items for common health problems is needed.

- The average number of stock out days for 10-15 essential drugs during a certain period (number of days in a year or half year).

This indicator will measure the historical availability of drugs to treat common health problems.

The data for these two indicators can be obtained from facility surveys. The monitoring of these indicators have already been tested (10;29).

4. **SKILL-MIX**

Health care is labour intensive. The cost of labour accounts for a high proportion (sometimes reaching 70% or more) of total costs (8;11;12). The following graph (fig. 3) shows the variation in OECD countries between the numbers of different types of health professionals employed.

![Figure 3](image-url)

**Figure 3**

*Physicians, nurses & dentists per 1,000 population, in selected OECD countries (1998)*

- Practising nurses - Density / 1 000 population
- Practising physicians - Density / 1 000 population
- Practising dentists - Density / 1 000 population
The wide variation is evident: what is not known is how this variation affects service provision and health outcomes. To confuse matters further, there is no consensus about what is meant by skill mix or personnel mix. The term skill mix can refer to the mix of posts in the establishment; the mix of employees in a post, or alternatively the combination of activities that comprise each role, rather than the combination of different professionals, as is shown in the table above (11;12).

The effectiveness of a particular skill mix of healthcare personnel could be measured both by its costs and by the effect it has on patient outcomes. It is possible to evaluate skill mix by directly linking skill mix ratios, costs of inputs, and outcomes (27), though most existing studies are descriptive (11). In the comprehensive assessment of health system functions and goal attainment, the measurement of direct or indirect determinants and results of skill mix will be helpful in understanding the implications of different skill mix for effective health service delivery.

For the assessment of skill mix, the following indicators are proposed:

- The ratio of skilled to unskilled staff per unit of health gain
- The ratio of nurses to doctors per unit of health gain

5. **Utilization of Structures, Medical Equipment, and Information Technologies**

It is not only the physical availability of structures and technology which is important, but also the extent to which they are utilized. Empty hospital beds and idle technologies are frequent picture in many places. While systematic evidence is lacking, two documented examples serve to illustrate the situation. In Georgia, a hospital survey showed that in 1996 the average bed occupancy was as low as 15%, and almost 30% of X-ray imaging equipment have been idle for more than 4 months (2). In one Latin American country the stock of equipment was valued at around US$5 billion, 40 per cent of which was not functional (worth of almost US$2 billion) (34).

The utilization of Information and Communication Technology (ICT), is playing and increasingly important role in health. Greater application of ICT has the potential for dramatic reduction in medical errors, more knowledgeable workers, greater worker retention, improved patient care at the point of care, improved health system management, and evidence-based care through best practices (33). The movement to wireless and mobile Internet applications will lead to migration from desktop platforms to wireless and mobile configurations, with a significant impact on future healthcare delivery systems (24).

The Agency for Healthcare Research and Quality (AHRQ) reviewed 455 studies relating to Telemedicine programmes, 362 of which were in the US. Thirty medical specialties were represented (3). Their report shows that Telemedicine is a growth technology which can be used for clinical benefit.

Although more studies are needed, evidence points to beneficial use of Telemedicine: simple call centres that provide health information and advice demonstrate the demand for such services (40), estimated hospitalization cost savings per episode for diabetic patients in a large urban home health agency in the United States - $87,327 for telehomecare compared to $232,872 for the control group (20); 72% of patients scheduled for hospital admission because of cardiac risk factors discharged after normal Dobutamine stress tele-echocardiography; unnecessary cardiac patient transfer avoided in 23% of cases, 5.4-day reduction in length of hospital stay in neonatal ICU (30).

The following indicators can be proposed for the assessment of the utilization of structures, equipment, and health technologies.
- Bed occupancy rate at first referral level, to include both public and private facilities

Bed occupancy has been commonly used in health services assessment. The information can be obtained from provider surveys.

- The proportion of medical equipment underutilized

We propose obtaining information from provider surveys about the proportion of medical equipment that has been idle in the past month. (Duration to be determined through key informant surveys).

6. **Autonomy**

The literature on decentralization in health systems identifies a number of different constructs (23). The main stated objective of the different forms of decentralization resulting in different degrees of autonomy of decision-making is to place the locus of decision making closer to the point where decision becomes operative (9). Decentralization in health systems can be viewed from both stewardship and service provision points of view. At the macro level, when decentralization entails deconcentration of power from central offices to peripheral offices of the same administrative structures (i.e. Ministry of Health), or devolution of responsibility and authority from central offices of the Ministry of Health to separate administrative structures, it seems more appropriate to view these processes from the lenses of the stewardship function. In these situations, the decentralization of power and decision making affects the way health systems are steered as a whole.

At the micro level, decentralization may have more direct implications for the service provision function when decision-making is delegated to semiautonomous agencies (i.e. hospitals, provider networks, etc.) usually with boards of directors representing separate corporate interests, or when the shift of decision making is combined with privatization, creating contractual relationships between public entities and private providers. Therefore, within the domain of service provision function, we should focus on these types of decentralization and autonomy.

In reviewing 5 country case studies of hospital autonomy (Kenya, Zimbabwe, Ghana, India and Indonesia) Govindraj and Chawla (22) identified two major organizational models of provider autonomy: the corporate, individual facility model, found in 4 countries, and parastatal, multi-facility model found only in India. Govindraj and Chawla were impressed by the parastatal model, as it means that the government only has one organization to deal with, it is simpler to monitor and regulate one organization instead of many smaller units, and one organization requires only one good management team (22). The parastatal model they discuss has 162 hospitals and 9,646 beds.

However, Govindraj and Chawla also point out that individual leadership may be the key to success of autonomy. They note that some managers were able to bring about significant improvements in their hospital sites, while others were not, despite similar positions of autonomy for the hospitals. They propose that improved management structures may be more important than autonomy.

It has been suggested that the autonomy of service providers may lead to technical and allocative efficiency for the following reasons: (i) the incentive structures and other reforms that usually accompany autonomy; (ii) the assumption of greater responsibility by autonomous providers; and (iii) the greater freedom of autonomous providers to choose their optimal production function (4;15;22). However, when autonomy is not associated with incentive structures, or the incentives are inadequate, potential benefits of autonomy may not be realized. Furthermore, autonomy may lead to a loss of benefits of economies of scale and scope (5).
Autonomy is expected to increase accountability because when vested with greater authority, providers may better respond to local community needs. This, in turn, is expected to increase public support and acceptance, and greater community participation in hospital decision-making. However, it is also quite possible that freedom from central control can allow hospitals to pursue their self-interest or the interests of local politicians (4;5;15).

Evidence on the benefits of autonomy is controversial (9;15;18;23). Often investment in autonomy in public sector hospitals has not yielded many of the hoped-for benefits in terms of efficiency, quality of care, and public accountability, with rare exceptions.

Autonomy can be assessed along two dimensions: the type of policy and management decisions relevant to operating hospitals, and the extent to which decisions are made at the central level (9;15;22). This is displayed in the following matrix:

Figure 4: Matrix of decision autonomy

<table>
<thead>
<tr>
<th>Nature of Autonomy - Policy and management functions</th>
<th>Extent of autonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fully Centralized</td>
</tr>
<tr>
<td>Identification of organizational goals</td>
<td></td>
</tr>
<tr>
<td>Strategic management &amp; administration</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td></td>
</tr>
<tr>
<td>Staffing decisions and human resource management</td>
<td></td>
</tr>
<tr>
<td>Investment decisions</td>
<td></td>
</tr>
<tr>
<td>Financial management</td>
<td></td>
</tr>
<tr>
<td>Revenue generation</td>
<td></td>
</tr>
</tbody>
</table>

(Adapted from (22))

We propose the following measures to capture information on the degree of autonomy:

- The proportion of institutional providers who have full autonomy in human resource management and labour market issues.

The ability to hire and release health care workers is one of the most critical elements in the management of health services. The wage bill is often estimated to be between 50 and 70 per cent of total health expenditures (12). In order to change the balance between different inputs, the manager at the institutional level must have this authority both legally and in practice. In countries where all government workers are part of the civil service and are bound by rules of a Civil Service Commission, the decentralization of human resource management to the individual institutional level has proven difficult. Ghana is an example of a country in the process of separating the link between health service workers and the civil service. This measure can be captured by provider surveys and validated through random national policy analysis. Autonomy will be assessed by review of the national legal framework conferring autonomy on provider units and by reviewing management and labour market procedures actually carried out at a unit level.

- The proportion of institutional providers with an autonomous budgeting process.
The ability to develop budgets autonomously is important as it allows institutional health care providers to better reflect the current and required capacities in their budgets, in addition to the needs of population to whom they provide services. As with the previous indicator, a comparative analysis will be carried out between the legal position and what is done in practice.

- The proportion of institutional providers with the authority to independently contract out services

Sometimes it is much more efficient for institutional providers to contract certain services out, such as laundry, provision of food, some diagnostic procedures, rather than carry those functions themselves. The ability to find the best contractor and contract those services out, could enable institutional providers to better respond to market forces, and reduce production costs.

- The proportion of institutional providers who can autonomously decide on the type and volume of services to provide

The ability to choose the volume and type of services enables health care providers to better respond to market signals and the needs of populations whom they serve. It will also help them better align their activities with their capacities.

These indicators can be obtained from provider surveys.

7. **INTEGRATION**

Integration has been defined in a variety of different ways (25;31;37). The following working definition can be used: Integration is a variety of managerial or operational changes to health systems to bring together inputs, organization, management and delivery of particular service functions. Integration aims to improve the efficiency and quality of service provision. Integration is a way to provide an optimum level of care. It brings together the tasks and functions within health services and mobilizes health-related activities in other sectors as well as with the activities of families and communities, and links them with health services. The integration of health services is the process of bringing together common functions within and between organizations to solve common problems, by developing a commitment to a shared vision and goals, and by using common technologies and resources to achieve these goals (36).

Various examples of integration include (i) the integration of service tasks within a given setting (multipurpose clinics providing primary health care together with antenatal and infant care; pharmaceutical stores used for other purposes, i.e. condoms; etc.); (ii) the integration of management and support functions (i.e. comprehensive planning for family health, rather than separate planning for single-purpose programmes; in-service staff training designed to upgrade staff skills in several areas of a service responsibility in a single course rather than many short, specialized courses; collecting and sharing health information, etc.); (iii) the integration of organizational components (integration of the efforts of different resource providers operating at various administrative levels through coordinating mechanisms such as health committees or councils; making district hospitals an integral part of the district health service instead of discrete institutions, so that district hospitals serve not only as referral centres but also resources for support services, etc.)

Integrated health care is believed to have the following advantages (25;31):

- Allows the delivery of a range of services selected to suit national health policies and local needs
- Incorporates inputs from different components of the health system
- Allows multipurpose use of resources
- Makes it easier to respond to user needs
- Allows more holistic approach to health

For example, in Zambia, local hospitals have taken initiative to improve the vertical and horizontal integration of health services. The hospital partners included all health centres and charity institutions in the district, and all "vertical" programmes were under the jurisdiction of the district medical officer. The strategy was based on joint planning, problem solving and decision making. This initiative led to: better community support for action decided by the "health development group" and spearheaded by the local hospital; better visibility of the district at the level of regional and central government and donors; and a better bargaining position on the part of regional health authorities for necessary funds and supplies (25;31).

WHR 2000, distinguishes between three types of integration: vertical, horizontal and virtual (37).

Vertical integration usually denotes a hierarchical structure in which one level of care provision takes directions from a higher level. The norms that must be followed may lead to lack of ability of a facility at a lower level of the hierarchy to respond to local conditions.

Horizontal integration occurs when different organizational structures with no hierarchical relationships are involved in the delivery of care to the same individual or population. They may be integrated through the use of common managerial structures.

Virtual integration uses communication technology and other systems to share information between providers quickly, and without cumbersome controls. WHR 2000 argues that this is particularly valuable for referrals and can help to include non-governmental providers who have proved hard to integrate under other organizational approaches.

Integration in health service delivery can be assessed by examining (i) planning and budgeting processes; (ii) internal organization; (iii) staff roles and responsibilities; (iv) training; (v) supervision; (vi) logistics and vehicles; (vii) management information systems and monitoring; (viii) and client services (25).

For the assessment of integration in health service delivery the following indicator is proposed:

- The proportion of local health care facilities in which management and delivery of a selected set of essential services are fully integrated.

This indicator will provide information about the provision of an integrated primary health care package of services versus an approach of service provision through vertical programmes.

It will be necessary to develop criteria for selecting services which will serve as tracers of the assessment of integration. The degree of full integration can be assessed along the eight elements of integration discussed above (25). The data for this indicator can be obtained from provider surveys. The potential of population surveys to supplement the information from provider surveys should also be explored.

8. PROVIDER INCENTIVES

Incentives can be characterized as all the rewards and deterrents that providers face within the organizations in which they work, within the institutions under which they operate, within the existing systems of provider payment, and in relation to the specific interventions they provide (WHR,2000). Literature on incentives is primarily focused on the impact of specific incentives on individual provider behaviour, especially that of physicians. There is a noticeable preoccupation
among researchers with financial incentives. There is a need for more evidence of how a range of non-financial incentives affect motivation, including factors such as loyalty to an employer, perceptions of control or empowerment in the job environment, and professional satisfaction from the job (13).

From the point of view of an individual provider, incentives can be classified as financial (pay, pensions, different allowances, subsidies, etc.) and non-financial incentives (flexible working hours, holidays, educational opportunities, career perspective, etc.). From the point of view of the organizational behaviour (institutional providers), the WHR 2000 distinguishes between internal and external incentives. Internal incentives include: rights to make autonomous decisions, accountability, financial responsibility for losses and right to profit, unfunded mandates. External incentives refer to methods used by the health system as a whole to control the activities of health care organizations (institutional providers). Regulation is used, for example, to place limits on the right to make autonomous decisions so that the public interest is not jeopardised (37).

In the analysis of institutional provider behaviour in relation to economic incentives, it is very important to look at the specific methods of provider payment and options providers have to deal with financial risk associated with providing care, and the health risk of the population whom they serve. Providers have different options to reduce or control their financial risk: (i) to select low health risk populations (if the institutional provider and the payer/insurer are the same entity), which is called cream skimming; (ii) to shift the financial risk associated with the provision of services to other providers (increased referrals between providers), and (iii) to reduce production costs by skimping on the services provided or deploying a cheaper combination of inputs without reducing the intensity and quantity of services. The ability and propensity of providers to choose any of these strategies depends on the integration of different functions (purchasing, insuring, service provision) and different types of services (preventive, curative, primary, secondary, tertiary).

The economic approach to incentives for purchasing health services was discussed in the WHR1999 and WHR2000 under the heading of "strategic purchasing". The focus there was on purchaser provider relationships, and the objective was to develop relationships in which appropriate packages of health care services could be purchased. In these relationships capitation or fundholding and contracting involve risk sharing in the sense that the provider agrees to accept responsibility for providing a negotiated bundle of services according to agreed standards of care at a fixed rate; the purchaser undertakes to finance care for insured populations and to be accountable to the public (or clients if the purchaser is a social security plan or private insurer.

The motivation of individual health care providers is a strong factor determining their behaviour. Motivation is directly linked to financial and non financial incentives. Bennet and Franko (6) propose a conceptual framework for analysing individual provider motivation.

- Individual level determinants: individual needs, expectations of outcomes or consequences of work activities.
- Organizational context: salary, benefits, human resource management systems; feed back about performance; and organizational culture.
- Social and cultural context: community expectations and feedback.

The following measures are proposed to provide policy makers with insights into the type and nature of the both individual and institutional provider incentives in order to assess their impact on the health service provision function.

- The proportion of health care providers by different mode of payment, salary, capitation, fee-for-service, or blended payments.
This measure will provide information to test the behaviour of providers in relation to outcome measures such as coverage and responsiveness. Barnum et al. (1995) provide the following description of advantages and disadvantages of different payment methods:

**Table 2: Incentives**

<table>
<thead>
<tr>
<th>Payment method</th>
<th>Main advantages</th>
<th>Main disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget</td>
<td>Allows strong central control, Predictable expenses</td>
<td>No direct financial incentive for efficiency, Provider may under-provide services</td>
</tr>
<tr>
<td>Capitation</td>
<td>Predictable expenses, Provider has incentives to operate efficiently, Eliminates supplier-induced demand, Low administrative costs</td>
<td>Financial risk may “bankrupt” provider</td>
</tr>
<tr>
<td>Fee-for-Service</td>
<td>Increase health system productivity</td>
<td>Cost-escalating: strong incentives for supplier-induced demand, Higher administrative costs</td>
</tr>
<tr>
<td>Case-based</td>
<td>Strong incentive to operate efficiently</td>
<td>Provider has incentives to select low-risks within case categories, Case-based payment less suitable for outpatient care</td>
</tr>
</tbody>
</table>

- The proportion of individual providers who hold both public and private sector jobs.

In countries where individual providers have the opportunity to work in both the public and private sector there is a conflict between their public sector obligations and their private sector activity. In Egypt, most physicians work multiple jobs and earn income from different sources (7). As surveyed in the national provider survey, only 11% of Egyptian physicians in private practice reported having only one job. Of the 89% holding more than one job, about 60% reported having a government or a public sector position in addition to their individual private practice. This example suggests that motivation and incentives assessment is needed in order to account for the multiple objectives of individual providers.

- Motivation of health care providers

This measure would be similar in its nature to the measure of the responsiveness of the health system to patients' legitimate expectations. While motivation is not easy to measure, several domains of individual provider motivation can be developed based on the typology of incentives. Each domain would carry different weight, which can be determined by provider surveys. It would be possible to develop a composite measure of individual provider motivation and its distribution among public and private sectors, inpatient and outpatient facilities, rural versus urban settings. (5)

The data for the above proposed indicators of incentives can be obtained from health care provider surveys.

**8. PROVIDER PERFORMANCE**

The provision of health services is the ‘combination of inputs in a production process that takes place in a particular organisational setting and that leads to the delivery of a series of interventions (26). In order to assess the impact of provider performance on the provision of health services and on the performance of health systems a number of key determinants of the quality of performance within the health system will have to be addressed. They will include: knowledge and skills of
health care providers, satisfaction with care received; effectiveness of process, degree of public participation; quality of educational Institutions; quality of medical education, methods of improving quality -- development of accreditation processes.

Provider Performance Assessment was initially developed for acute hospitals in several developed countries, such as the United States, Canada, the United Kingdom and Australia (1; 19). In the latter years, however, it has been expanded to encompass other types of care, such as various forms of long-term care and primary care. The development of specific instruments has, for the most part, followed in-country extensive and complex consultation processes, including academic and scientific research. This process takes into consideration a series of issues such as the relevance of the measure combined with specific objectives of the provider unit, the technical characteristics of the measures or its scientific soundness (supported on clinical evidence, reproducible, valid, accurate), and its feasibility (at a reasonable cost, allowing for confidentiality, logistically feasible, precisely specified, and measurable).

A great deal of work remains to be done before we are in a position to proposed measures that will be comparable across countries and give policy makers the information they need to assess the performance of providers. This is a critical area of work and is being pursued actively.

9. **Coverage**

The degree to which the health system carries out critical activities that have an impact on people's health can be examined through determining how effectively populations are covered by health interventions (38; 39).

Effective coverage of a health system can be defined as the ratio of the realized health gain from a set of interventions (weighed by the health risk) over the total potential health gain possible if providers performed at their optimal level for a given health system. Effective coverage of an individual with a set of interventions can be represented by the following notation:

\[
EC_i = \frac{\sum_j HG_{ij} C_{ij} d_{ij}}{\sum_j (HG_{ij} | P_k = P_{opt}) d_{ij}}
\]

where \( HG_{ij} \) is a health gain from intervention \( j \) for an individual \( i \); \( C_{ij} \) is the probability of getting effective intervention \( j \) for individual \( i \) conditional on the presence of a health problem; \( d_{ij} \) is the probability that individual \( i \) has a specific health problem that requires intervention \( j \); \( P_k \) is the provider characteristic or performance (technical quality); and \( P_{opt} \) is the optimal provider characteristic or performance possible for a given health system. In this notation \( d_{ij} \) is used as a weighting factor to give more importance to the interventions against more likely health conditions.

For the entire population composed of \( n \) number of individuals, health system coverage would be:

\[
HEC = \sum_{i=1}^{n} \frac{\sum_j HG_{ij} C_{ij} d_{ij}}{\sum_j (HG_{ij} | P_k = P_{opt}) d_{ij}}
\]

Besides effective coverage we distinguish four other domains of the coverage measure: 1. Availability coverage; 2. Accessibility coverage; 3. Affordability coverage; and 4. Acceptability coverage.

Effective coverage is the ultimate domain and the most inclusive construct of coverage, linking the individual health risk, probability of coverage, and effectiveness of interventions to each other.
However other domains of coverage could be also very helpful for the diagnosis of problems precluding the attainment of a desired level of effective coverage.

**Availability coverage**

Availability coverage for an individual \( i \) can be represented by the following notation:

\[
A_{Vij} = C_{ijk}(B_{jk} = 0, Z_{jik} = \theta, Q_{ijk} = 0) \forall k, k = 1, ..., n
\]

This notation defines availability coverage for individual \( i \) as the probability of coverage with an intervention \( j \) given that there are no constraints in terms of affordability, cultural acceptability, physical access, and availability of necessary technology, that is (a) the price for intervention \( j \) offered by provider \( k \) is zero (\( B_{jk}=0 \)); (b) the cultural acceptability of intervention \( j \) delivered by provider \( k \) to individual \( i \) is equal to a certain threshold value \( \theta \) of the latent variable of 'cultural acceptability' \( Z_{jik} = \theta \); and (c) the distance for individual \( i \) to the provider \( k \) who delivers intervention \( j \) is zero \( Q_{ijk} = 0 \).

**Accessibility coverage**

Accessibility coverage for individual \( i \) can be represented by the following notation:

\[
A_{Csi} = C_{ijk}(B_{jk} = 0, Z_{jik} = \theta, R_{jk} = 0) \forall k, k = 1, ..., n
\]

This notation defines accessibility coverage for individual \( i \) as the probability of coverage with intervention \( j \) given that there are no constraints in terms of affordability, cultural acceptability and the availability of the required technology, that is (a) the price for intervention \( j \) offered by provider \( k \) is zero (\( B_{jk}=0 \)); (b) the cultural acceptability of intervention \( j \) delivered by provider \( k \) to individual \( i \) is equal to a certain threshold value \( \theta \) of the latent variable of 'cultural acceptability' \( Z_{jik} = \theta \); (c) provider \( k \) has required technology to deliver intervention \( j \) \( (R_{jk} = 1) \).

**Affordability coverage**

Affordability coverage for individual \( i \) can be represented by the following notation:

\[
A_{fij} = C_{ijk}(Q_{ijk} = 0, Z_{jik} = \theta, R_{jk} = 1) \forall k, k = 1, ..., n
\]

This notation defines affordability coverage as the probability of coverage for individual \( i \), given that there are no constraints in terms of the cultural acceptability, physical access, and availability of technology, that is (a) the cultural acceptability of intervention \( j \) delivered by provider \( k \) to individual \( i \) is equal to a certain threshold value \( \theta \) of the latent variable of 'cultural acceptability' \( Z_{jik} = \theta \); (b) distance for individual \( i \) to the provider \( k \) who delivers intervention \( j \) is zero \( Q_{ijk} = 0 \); and (c) provider \( k \) has required technology to deliver intervention \( j \) \( (R_{jk} = 1) \).

**Acceptability coverage**

Acceptability coverage can be represented by the following notation:

\[
A_{cpij} = C_{ijk}(B_{jk} = 0, Q_{ijk} = 0, R_{jk} = 1) \forall k, k = 1, ..., n
\]
This notation defines acceptability coverage for individual $i$ as the probability of coverage with intervention $j$ given there are no constraints in terms of affordability, physical access, and availability of the required technology, that is (a) the price for intervention $j$ offered by provider $k$ is zero ($B_{jk}=0$); (b) distance for individual $i$ to the provider $k$ who delivers intervention $j$ is zero ($Q_{ijk} = 0$); and (c) provider $k$ has required technology to deliver intervention $j$ ($R_{kj}=1$).

We propose to measure effective coverage through household surveys. For this purpose a coverage module is being designed, which will be added to WHO's World Health Survey, and will be piloted in several countries before rolling it out on a global scale. More detailed description of the coverage measure and its conceptual framework is provided in "Measuring the Coverage of Critical Interventions Through Household Surveys", by B. Shengelia, C. Murray, O. Adams, M. Thieren, P. Berckmans, Y. Kwankam.
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Table. 2. Matrix for the assessment and monitoring of health service provision function.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Question</th>
<th>Indicator</th>
<th>Potential Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent Expenditures</td>
<td>How efficiently are the inputs used in the production function, estimated through the magnitude and composition of recurrent expenditures?</td>
<td>The share of recurrent expenditures as a % of total health care spending</td>
<td>Facility surveys, National Health Accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The share of the wage bill as a % of total recurrent expenditures</td>
<td>Facility surveys, National Health Accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The share of expenditures on drugs and other medical supplies as a % of total recurrent expenditures</td>
<td>Facility surveys, National Health Accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operating costs of structures and equipment as a % of total recurrent expenditures</td>
<td>Facility surveys, National Health Accounts</td>
</tr>
<tr>
<td>Availability and utilization of drugs and other medical supplies</td>
<td>Are the necessary supplies available to deliver services and sustain the patient flow?</td>
<td>The proportion of health care facilities and central/regional stores or warehouses that have essential drugs in stock</td>
<td>Facility surveys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The proportion of expired essential drugs in facilities, warehouses and private retail outlets</td>
<td>Facility surveys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The proportion of generic drugs in the essential drug stock of facilities</td>
<td>Facility surveys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The expenditure on drugs and other medical supplies as a % of total health expenditure</td>
<td>National Health Accounts</td>
</tr>
<tr>
<td>Skill-mix</td>
<td>How efficiently different types of health care personnel are used?</td>
<td>The ratio of different categories of health care personnel per 100 hospital beds</td>
<td>Provider surveys, Labour force surveys, The Ministry of Health, The Ministry of Labour, Professional registries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The proportion of health care personnel costs in the total cost of one inpatient day</td>
<td>Facility surveys</td>
</tr>
<tr>
<td>Utilization of structures, medical equipment, and information technologies</td>
<td>How different physical resources are utilized?</td>
<td>Bed occupancy rate</td>
<td>Facility surveys</td>
</tr>
</tbody>
</table>
### Provision of personal and non-personal health services: proposals for monitoring

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicator</th>
<th>Survey Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td>The proportion of medical equipment underutilized</td>
<td>Facility surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of health care providers who keep computerized patient records</td>
<td>Provider surveys/Facility surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of institutional providers who have full autonomy in human resource management and labour market issues</td>
<td>Provider/Facility surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of institutional providers with an autonomous budgeting process</td>
<td>Provider/Facility surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of institutional providers with the authority to independently contract out services</td>
<td>Provider/Facility surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of institutional providers who can autonomously decide on the type and volume of services to provide</td>
<td>Provider/Facility surveys</td>
</tr>
<tr>
<td>Integration</td>
<td>The proportion of primary care facilities in which health services are fully integrated</td>
<td>Facility surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of health care providers by different modes of payment</td>
<td>Providers surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of individual providers who hold both public and private sector jobs</td>
<td>Provider surveys</td>
</tr>
<tr>
<td></td>
<td>The proportion of professional income monthly derived from private sources for the individual providers engaged in public sector</td>
<td>Provider surveys</td>
</tr>
<tr>
<td>Provider Incentives</td>
<td>How incentives facing health care providers determine their motivation?</td>
<td>Provider surveys</td>
</tr>
<tr>
<td></td>
<td>Motivation of health care providers</td>
<td></td>
</tr>
<tr>
<td>Provider performance</td>
<td>How can providers’ professional actions explain the outputs and outcomes of service delivery?</td>
<td>Population surveys, Exit surveys</td>
</tr>
<tr>
<td></td>
<td>Patient satisfaction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medical mistakes</td>
<td>Provider surveys, population surveys</td>
</tr>
<tr>
<td></td>
<td>Hospital readmission</td>
<td>Facility surveys, population surveys</td>
</tr>
<tr>
<td>Effective coverage</td>
<td>How well health systems meet health care needs of the population?</td>
<td>\textit{The proportion of the population in need of interventions, who receive effective interventions}</td>
</tr>
</tbody>
</table>

| Effective coverage | How well health systems meet health care needs of the population? | \textit{The proportion of the population in need of interventions, who receive effective interventions} | Population surveys (WHO’s World Health Survey) | Facility surveys, population surveys | Providers surveys, population surveys | Return to operating theatre | Facility surveys, population surveys |