

# **DELIVER**

## **Impact of Decentralization and Integration on the Performance of Health Logistics Systems:**

### **Concept Paper and Applied Research Protocol**

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## **Introduction**

In an effort to provide for contraceptive security and improved availability of affordable health commodities, most notably, essential drugs, the DELIVER Project is concerned about the impact on logistics systems of new initiatives of health reform, especially decentralization of health systems. In collaboration with Harvard School of Public Health, DELIVER is developing a comparative applied research approach that is expected to be applied to six case countries, two each in Latin America, Africa and Asia. This concept paper is designed to lie out the basic research question, concepts and approach that are proposed to accomplish this research. It is designed to be a basis for discussion with USAID, country officials and other researchers to obtain input for the final research design.

Findings of the study will help in designing interventions aimed at enhancing the performance of health logistics systems as management systems are decentralized and / or integrated. The findings will increase the body of knowledge available both locally in the study countries and publicly to the international public health community, and an appropriate mechanism will be found to disseminate the findings to the international community.

### **Central Research Questions:**

1. How does health reform involving decentralization of health systems and management impact on the performance of logistics systems?
  - a. Are different types of decentralization (devolved vs. deconcentrated) likely to have different effects on logistics system performance? How?
  - b. Are different degrees of “decision space” likely to have different effects on logistics system performance? How?
  - c. Are some elements of logistics functions, such as product selection, forecasting, procurement, storage, distribution, use, and logistics information management affected in different ways by decentralization? And if so how? (See Decentralization Decision Space Map for other functions)
  - d. Are some elements of logistics system performance (e.g., availability vs. efficiency vs. affordability) more likely to be impacted by decentralization than others?
2. Is integration of logistics systems a complicating factor that exaggerates or modifies the effects of decentralization on logistics system performance?

Why are these questions important? The recent history of health reform initiatives that were promoted by the *World Bank Development Report: Investing in Health 1993* has raised doubts about the effectiveness of early prescriptions for reforms. In particular, early enthusiasm for decentralization has given way to more critical assessments of the effectiveness of this reform. Generally speaking, decentralization was seen as advantageous because it places decision making closest to those who have the best local information and have to live with the consequences of the local trade-off decisions.

Decentralization was also seen as requiring high maintenance because it requires a supportive infrastructure of information flow, education, and decision guidelines, along with appropriate incentives and reinforcement to yield informed and balanced local decision making.

While there have been few systematic efforts to assess the general impact of decentralization, little has been done to assess the impact of decentralization on specific priority programs (immunizations, family planning, TB, malaria) and on key support systems (logistics, information, training). At the same time many technical advisors in logistics systems have observed anecdotal cases of increasing difficulties when they are confronted by major system changes like decentralization. Therefore, we have chosen the first research question as a means of orienting a systematic research into this increasingly practical issue.

The need to apply limited resources more effectively has spawned a number of other initiatives in the management of health systems. Integration is one such initiative in the area of health commodity management that seeks to share logistics resources among vertical logistics systems, whether this occurs at only select levels of the systems, or completely folds several systems into one integrated logistics system. Many cases of decentralization are accompanied by or impact on processes of integration. We have therefore chosen the second research question to examine the issue of integration, in part because so little is known about this often hotly debated organizational issue and in part because it is likely that integration by itself will have a separate impact on logistics system performance.

This concept paper presents an approach to addressing these research questions through comparative case studies of up to six countries. The paper first reviews the approach to decentralization and integration that will be used to frame the studies. It then reviews the approaches to assessing the performance of the logistics systems. Finally it presents a research protocol for the comparative studies.

### **Decentralization of Health Systems – Current Approaches and Existing Studies**

Decentralization of health systems is a major policy reform that has been promoted by many international agencies and by national governments. In recent years there have been several studies to assist in defining the character and variety of types of decentralization and to assess the impact of decentralization on the general performance of the health system. One of the traditional definitions of decentralization has focused on the location of new authority and responsibility. This approach differentiates between systems which decentralize within the Ministry of Health to its regions or districts (*deconcentration*), those which transfer authority and responsibilities to other instances of government such as municipalities, provinces, or states (*devolution*) and those which transfer responsibilities to semi-autonomous agencies such as a Board of Health (*delegation*). (Mills) Harvard School of Public Health has developed an approach to defining decentralization by the “decision space” that is available to the local level decision makers. (Bossert, 1998) Decision space defines the range of discretion that is

allowed for different functions in the health system – financing, service delivery, human resources, targeting and governance.

This approach has been used in primary studies in Chile, Bolivia, Colombia, Zambia and Nicaragua and has been applied to secondary data in Philippines, Ghana, and Uganda. (Bossert 2000) These studies assessed the degree to which decentralization in its different forms contributed to the financial equity and efficiency of the health systems examined. Data was not available to assess other measures of performance – such as quality of services. The studies also did not assess the impact of decentralization on specific priority programs such as family planning, immunizations, malaria, or TB. Nor did the studies assess specific systems such as information systems, logistics and supply systems. Some studies have assessed the impact of decentralization on general immunization programs finding generally a decline in performance at least during the initial phases of decentralization. (Hutchinson (1998), Maceira et al. (2000))

An initial assessment of the impact of health reforms, including decentralization, on logistics and supply systems was implemented in 1999 and 2000 by the USAID funded Family Planning Logistics Management project. The study was implemented in Zambia, Ghana, Kenya and Tanzania, however only Ghana and Zambia had decentralized their systems. The studies suggested a hypothesis that systems with stronger logistics systems might be more successfully decentralized than centralized logistics systems that are not effective to begin with.

While there has not been much literature on the role of different economic-social and political context on the adoption and implementation of decentralization it is likely that context issues affect the process. There have not been sufficient comparative studies to assess the impact of different contexts on the performance of decentralization. Nevertheless, resource scarcity (both in terms of funding and human resources) in low and low-middle income countries is likely to affect the performance of decentralization. In addition, types of political regimes (authoritarian vs. democracy and different types of democracies) may also influence the effectiveness of decentralization since democracy may introduce additional groups to which the system must be accountable, especially in systems of “devolution” where local elected officials have a new role in the health system. Also, the politics of the decentralization process itself – which stakeholders were involved, their sense of “ownership” and who opposes – may also influence the implementation process and the effectiveness of the new system.

## **Conceptual Framework to Assess Impact of Decentralization on Logistics Systems**

The DELIVER Project proposes a rigorous comparative study of the impact of decentralization reforms on logistics systems in six countries – two each from Africa, Asia and Latin America.

The conceptual framework for this study will be based on the “decision space” approach to decentralization. This approach starts with a principal agent framework used by economists and political scientists to study diverse institutional issues involving central and peripheral actors such as businesses with CEOs and line managers or central and local governments.

In this perspective, for the analysis of the decentralization of health systems, the Ministry of Health, as “principal,” sets the goals and parameters for health policy and programs.<sup>1</sup> This principal then grants authority and resources to local “agents”—municipal and regional governments, deconcentrated field offices, or autonomous institutions—for the implementation of its objectives.

This approach acknowledges that local agents often have their own preferences for the mix of activities and expenditures to be undertaken, and respond to a local set of stakeholders and constituents, that may have different priorities than the national-level principal. Local institutions, therefore, may have incentives to evade the mandates established by the central government. Moreover, because agents have better information about their own activities than does the principal, they have some margin within which to “shirk” centrally defined responsibilities and pursue their own agendas. The cost to the principal of overcoming this information “asymmetry” is often prohibitively high. Within this context, the central government seeks to achieve its objectives through the establishment of incentives and sanctions that effectively guide agent behavior without imposing unacceptable losses in efficiency and innovation. Diverse mechanisms are employed to this end, including communicating program rationale and benefits, involving local parties in planning, oversight bodies, monitoring, reporting, soliciting feedback and making improvements, inspections, performance reviews, contracts, grants, etc.

One of the major mechanisms that the principal may use to influence the agents is to selectively broaden the formal “decision-space” or range of choice of local agents, within the various functions of finance, service organization, human resources, targeting and governance (Bossert 1998). The central principal voluntarily transfers formal authority to the agents in order to promote its health policy objectives. The degree and nature of this transfer differs by case, and shapes the function of principal-agent relationship and the characteristics of the decentralized system as a whole. The case studies presented in this paper do not seek to quantify formal decision-space, but rather to offer a preliminary characterization of its range—narrow, moderate, and broad—within an array of health system functions. The nature and extent of decision-space is presented through “maps,” such as Standard Decision Space Map shown below, which are complemented by an analysis of the history and context of decentralization reforms.

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<sup>1</sup> this section is taken from Bossert and Beauvais, 2002

**Standard Decision Space Map**

Function	Range of Choice		
	Narrow	Moderate	Wide
<b>Finance</b>			
Sources of revenue	⇒	⇒	⇒
Allocation of expenditures	⇒	⇒	⇒
Income from fees & contracts	⇒	⇒	⇒
<b>Service Organization</b>			
Hospital autonomy	⇒	⇒	⇒
Insurance plans	⇒	⇒	⇒
Payment mechanisms	⇒	⇒	⇒
Contracts with private providers	⇒	⇒	⇒
Required programs/norms	⇒	⇒	⇒
<b>Human resources</b>			
Salaries	⇒	⇒	⇒
Contracts	⇒	⇒	⇒
Civil service	⇒	⇒	⇒
<b>Access rules</b>			
Targeting	⇒	⇒	⇒
<b>Governance rules</b>			
Local government			
Facility boards	⇒	⇒	⇒
Health offices	⇒	⇒	⇒
Community participation	⇒	⇒	⇒

Source: Bossert, 1998

## **Application of Decision Space Analysis to Logistics Systems**

The objectives of the study will start with the principal's assumed objective of achieving contraceptive security and a sustainable access to essential drugs, immunizations, and TB drugs. The central question will be to assess the impact of different types of decentralization (deconcentration, devolution and delegation) and different "decision spaces" allowed on the achievement of these objectives.

While the decision space approach has developed a range of functions for the whole health system, in this study we will focus on the range of functions that are performed in a logistics system. Our questions are what degrees of choice over what functions in health logistics systems are allowed by decentralization and what is the impact of that range of choice on performance of the logistics system.

The following chart is an initial attempt to define the crucial functions of a logistics system in "decision space" terms – based in part on a conceptual framework, defined by JSI's Family Planning Logistics Management project, used for defining and assessing logistics systems for contraceptive and drug supply. This approach uses "the logistics cycle" which identifies a cycle of logistics functions, starting with product selection; forecasting and procurement; inventory management, storage and distribution; and product use or serving customers. Quality monitoring and a logistics management information system involving pipeline monitoring, organization and staffing, budgeting, supervision and evaluation lie in the middle of the cycle and create the link between all of these components.

## Decentralization Decision Space

FUNCTIONS	NARROW	MODERATE	WIDE	ADEQUATE RESOURCES?	PERFORMANCE INDICATORS
Financing	All must be funded from central sources	Limited local financing is allowed for drug purchases (and local financing is a low source -- <25%)	No limits on use of local financing (and local financing is a significant source -- > 25%)	None Marginal Adequate	% of facilities with local financing (<25%, 25%<x<50%,>50%) [Q47] % of facilities using revenue for facility-based costs [Q43,46]
Cost Recovery	User charges are defined by center and receipts are returned to central budget	User charges are defined by center but majority of receipts are retained by local level. Limits on what can be purchased with user fees	User charges are determined locally and fully retained. No significant limits on what can be purchased	None Marginal Adequate	Av. cost per consultation [Q45]  Av. % of each product's cost recovered [Q42]
Product selection	No local choice	Choice within Essential Drug List, Contraceptive Drug List, or price restricted	Few or no limits on local choice/local formularies	Trained personnel?	% of facilities who order according to a defined list [Q35] Is there a local list? [Q36] Av. # of products on the list,nat'l or local [Q35-37] Number of products beyond standard list (Compare local and national drug lists) [Q39]
Forecasting	Central offices do all forecasting	Some local and some central forecasting	Local offices do all own forecasting	Trained personnel?	Forecasting accuracy [T34, col 4] % of facilities using logistics data to forecast requirements [Q22]
Budgeting	Central budgeting	Central guidance and review of Local budgeting	Local budgeting without central guidance and review	Trained personnel?	Budgets/actual expenditures
Work Planning (including procurement planning)	Centrally planned	Local planning with central guidance and review	Local planning with little guidance	Trained personnel?	% reported stockouts due to late order [T32, col 9] Ratio of order interval to actual order frequency [Q18/19]
Procurement	Only central procurement	Central procurement supplemented by local purchasing	Only local procurement	Procurement sources?	Order fill rate [T34, col 9] Av. order lead time [T34, col 8-6] % of reported stockouts due to insufficient amount ordered [T32, col 9] % of reported stockouts due to insufficient amount received [T32, col 9] % of last 4 orders/ procurements received according to schedule [T34, col 10]



FUNCTIONS	NARROW	MODERATE	WIDE	ADEQUATE RESOURCES?	PERFORMANCE INDICATORS
Third Parties	NGOs are not allowed to be contracted by local authorities for supply or delivery	Local authorities are allowed, under some conditions, to contract NGOs as suppliers and/or recipients of drugs and/or contraceptives	No restrictions on local authorities contracting with NGOs	Available NGOs?	% product provided by or for NGOs [calculated from DHS data or national survey and through facility visits at lower levels]
Storage	Central warehouses and uniform local warehouses	Some local choice over warehousing	Locals can choose how to warehouse different items	Available facilities?	Storage condition indicators defined in LIAT [T48] % of facilities meeting each criteria [T48] % of facilities meeting cold chain storage conditions [Q49-53]
Inventory Control	Centrally defined control system	Some local choice over inventory control	Locally defined inventory control systems	Trained personnel?	% Discrepancy [T33 col 7] Stockout rate by product [T32] Av. # of days of stockout duration [T32, col 6] Stock status: % of facilities maintaining stock according to established levels [T31] % of products on shelf or in storeroom that are expired [T31,col 10]
Transportation	Vehicles centrally controlled and provided	Some central transport and some local transport	Local motor pool or payment for other means of transport	None Marginal Adequate	% of facilities with facility-managed vehicle for product pick-up/delivery [Q25] % of facilities with an alternative means of transport [Q25] Av. order lead time [T34, col 8-6] % orders delivered on schedule in last year [T34, col 10 or T32, col 9] Ratio of facilities that collect own products vs. receive a delivery [Q24] % of reported stockouts due to late delivery [T32, col 9] % of reported stockouts due to inability to pick up products [T32, col 9]
Logistics Management and Information Systems	Centrally defined system with required reporting defined and enforced by center	Reports defined by center (or vague) but can be modified or changed by local decision	Locals can report or not report. No enforcement from center.	Hardware? Trained personnel?	% facilities reporting [Q12 and Q16/17] % of facilities reporting that send reports according to schedule [Q14/15 and Q17] % discrepancy between usable stock according to stock card vs. LMIS report [T33B, col 4]

FUNCTIONS	NARROW	MODERATE	WIDE	ADEQUATE RESOURCES?	PERFORMANCE INDICATORS
Personnel allocation	Center defines, assigns, recruits, and fires local logistics staff	Center defines position but locals choose <u>who</u>	Locals can assign or not assign personnel to logistics	Personnel available  Clarity of roles and responsibilities between levels	Av. # personnel assigned to each facility of the same level to manage logistics tasks [Q9] % staff trained in different areas [T9a, col4] Av. length of time in current logistics position [Q9]
Supervision and Staff Development	Centrally defined supervision rules and staff development protocols for logistics	Selected central rules, and development protocols but generally applied by locals	Local decision on who, when and how to supervise logistics and develop staff	Trained personnel?	Av. # of months since conducted last supervisory visit [Q26] Av. # of months since received last supervisory visit [Q27] % visits where logistics tasks were assessed [Q29] % visits include OTJ training [Q29] % staff trained in logistics [Q9] # of staff who report learning logistics form use during training or OJT [Q23], [Q23b], [Q23c]
Organizational Support *	Centrally defined organizational processes	Select central guidelines with local discretion to apply	Local decision to design and implement	Trained personnel?	% staff participating in at least one communications meeting in past year [Q58], [Q58b] # of staff who report learning logistics form use during training or OJT [Q23], [Q23b], [Q23c]
Monitoring and Evaluation	High level of central monitoring and evaluation of logistics system	Moderate or incomplete monitoring and evaluation system-or some monitoring activities are carried out, but the local level does not recognize these as monitoring activities	No monitoring and evaluation or only done at local initiative	Trained personnel?	Are they monitoring stock status, stockout rates, order fill rates, on time deliveries, etc. [collected from multiple questions as noted above and Q29]
Product Quality Assurance	Central system of quality control (prequalification, compliance testing, inspection)	Quality control for some products and not others	Local quality assurance.	Trained personnel?	% of facilities with a mechanism for testing the quality of products [Q30] % of products on shelf or in storeroom that are expired [T31, col 10]
Regulation and Registration	Only central regulation and registration	Some local role in regulation and/or registration	Regulation and registration delegated to local authorities	Trained personnel?	% of facilities limited to procuring commodities on a defined list [Q35] % of facilities limiting their procurements/orders to a defined national list [Q36] % of facilities procuring/ordering commodities not on the defined list [Q39, 40]

FUNCTIONS	NARROW	MODERATE	WIDE	ADEQUATE RESOURCES?	PERFORMANCE INDICATORS
Client Contact and Product Use	Centrally defined detailed prescribing practice	Vague or not enforced	Locals allowed to prescribe according to own professional judgment	Trained personnel?	% of facilities with a copy of standard treatment guidelines available [Q54]
Total Decision Space for Drugs and Contraceptives					Stock out rate Stock on hand % Expiry

\*(coordination, communications feedback, resolution, performance improvement processes)

**Financing:** The role of central and local financing is an integral part of decentralization. Central authorities may allocate resources according to a needs based formula or historical budgets resulting in varying degrees of equity (see Bossert 2000). If central funds are used for the purchase of drugs then we need to assess the sufficiency and the equity of the funding available from this source. The degree to which local funding (local taxes and cost recovery) is allowed to complement central funding is also likely to influence both the adequacy of resources available and the equity of health resources among localities. Since adequacy of funding is likely to have an impact on performance we have added this element to the decision space map for financing.

Categories for this function are:

- “No local choice” if all financing comes from central sources and local funds are not allowed to complement this source;
- “Moderate choice” if less than 25% of total funding for drugs and contraceptives comes from local sources;
- “Wide choice” if more than 25% of total funding for drugs and contraceptives comes from local sources.

**Cost Recovery:** Cost recovery has been a major element of health reform proposals for more than a decade. One of the major issues about cost recovery has been the recommendation that user fees be retained at the local level in order to maintain incentives for collection and to assure that the funds are used for local priorities. In many systems fee schedules are determined by the central authorities but increasingly local authorities are being allowed to set their own fees, often within a range of guidelines. In addition, some systems restrict the products which can be purchased with fee revenues.

Categories for this function are:

- “No local choice” if all fees are set by the central authorities and fees must be sent to the central government budget;
- “Moderate choice” if local authorities are allowed to set some fees (within a range defined by the center) and can retain a substantial portion of the fees but there are some limits on what can be purchased with fees;

- “Wide choice” if local authorities are allowed to set their own fees and retain all of the receipts and there are no restrictions on what can be purchased with fees.

**Product Selection:** Many advocates for centralized decision making in product selection point to the benefits of having a standardized treatment based on the selected products at all levels and at all locations within that health system. This is said to make for more uniform quality of care and makes referrals or transfer from one facility to the other simple. Training of healthcare personnel could then be tailored to meet the commodity choices and it is easier to implement other health policies such as essential drugs programs when there is centralized product selection.

On the other hand, decentralization has the benefit of allowing prescribers and local authorities control over the choice of products for use in health care delivery. The benefits are said to include the fact the local conditions can be taken into account quickly and choices made to be consistent with these. For instance, in countries where the sensitivity of certain diseases, such as malaria, to drug therapy varies from one region to another due to the existence of resistant strains, local choice would ensure that effective medicines are selected to meet the local needs.

However product selection can have tremendous effects on the logistics performance. The type of products could impact upon the ability of the logistics system to procure, store and distribute these commodities effectively and efficiently. The varying logistics demands imposed by different commodities would require that product selection be made in tune with the total logistics system and vice versa.

For this function, three categories of choice can be defined as:

- “No local choice” for situations in which the local authorities are not granted any role in product selection. A national level selection is made which is binding on all the lower levels;
- “Moderate choice” when local authorities are given guidelines for product such as a general guide in the form of a National Drug Policy which gives criteria for inclusion. However, Selection is periodically reviewed by and at times overruled by central authorities;
- “Wide choice” when local authorities are allowed to perform these functions without central supervision or right to reverse local decisions.

**Forecasting:** The arguments in favor of centralized forecasting usually depend on the lack of capacity (skills, knowledge and training) of local authorities to perform these tasks. By contrast arguments against centralized forecasting stress the lack of capacity of the logistics information system to provide information on stockouts and utilization in a timely fashion to the central authorities. Logistics systems in developed countries usually have advanced computer capacity to provide the center with sufficient timely information for these functions (see Wal-Mart) but in most developing countries, the effort to implement information systems that are sufficiently reliable, agile and timely as to provide this information to the central level is usually great (Kenya, Nepal, Bangladesh). In this case, it would be useful to assess these conditions as part of a survey:

- training, skill levels and turnover of local logistics staff in these functions
- reliability and timeliness of logistics information

Again these functions can be defined in three categories:

- “No choice” for situations in which the local authorities are not granted any role in forecasting;
- “Moderate choice” when local authorities are given guidelines for forecasting, and are supervised and periodically overruled by central authorities;
- “Wide choice” when local authorities are allowed to perform this function without central supervision or right to reverse local decisions.

**Budgeting:** Budgets are one significant means for the central level to control activities at the local level to ensure that a consistent range of services is available to the entire population. Those who argue for decentralization often see centralized budgets as too restrictive for local variations and for effective and flexible management. Those who fear decentralization often fear that local authorities will not make appropriate choices for priorities. Budgeting processes are often centralized so that the general rules for developing budgets are well defined by central authorities even if local officials develop their initial budget proposals. Central authorities often assign budget ceilings based on historical budgets and make the final decisions on the actual budget that is approved by the Ministry or the legislature with little or no review by the local officials. In addition, central budgets usually have rigid categories and allow no flexibility of expenditures by local authorities. As budgetary processes evolve in a decentralized structure, they often increase local participation in the development and implementation of the budgets, allowing local authorities more range of choice over what to budget for and over the processes of expenditure during the year. In decentralized systems, local authorities are given a predictable central budget grant (based on a transparent formula) and can develop their budgets (often including local resources) with little or no guidance from the center. There can be separate budgets for commodity supply and for operational functions including logistics functions.

Again this function can be defined as:

- “No choice” if the budgetary process is fully determined by the central authorities and local officials have no role in final budget assignments and expenditures;
- “Moderate choice” if the center provides some guidelines to local authorities but local choices are respected in the final approved budget. Local authorities also have a range of flexibility in expenditures during the year;
- “Wide choice” if local authorities can make up their own budgets within a ceiling determined by a predictable and transparent method and they have significant flexibility in expenditures during the year.

**Work Plans:** Annual work plans defining programmatic activities and procurement plans are another method by which the center controls the activities at local levels. Centralized work plans can impose central priorities and initiatives and not be responsive to local priorities and needs. On the other hand, without work plans the center may not have a means of monitoring local activities or of initiating and monitoring national public health

programs and local officials may not develop adequate planning skills. Procurement planning also requires specific skills to match forecasted commodity requirements with public health priorities and budgetary and logistics capacity constraints.

This function can be defined as:

- “No choice” if work plans are defined by the center with the local officials following strict guidelines about priorities and activities;
- “Moderate choice” if work plans are developed in interaction between local officials and central authorities and there is some variation in plans from locality to locality;
- “Wide choice” if work plans are not developed, ignored in implementation and/or only developed locally.

**Procurement functions:** It is often argued that drug and contraceptive procurement should be centralized so that the central purchaser can exercise market power and obtain the products at a lower price than many local purchasers of smaller quantities. However, those who favor decentralizing procurement point out that the inefficiencies and delays of central purchasing mean that supplies often arrive long after they are needed and that local purchasing could at least provide drugs on time.

There are potentially at least two different local choices about procurement. Local authorities can be allowed some choice over procurement with central budget funds. They may also have a different range of choice over procurement with their own sources of funds (local tax revenue or cost recovery from drug sales). These choices may be different for drugs and contraceptives (indeed they may be different for selected drugs or contraceptives with some choice being allowed for low cost drugs and contraceptives but no choice for expensive drugs and contraceptives). While the range of choice allowed could be a continuum it will be difficult to establish criteria for placing procurement functions on that continuum so we have established three categories:

- “No choice” for situations in which the local authorities are not allowed to procure any important product;
- “Moderate choice” when local authorities are allowed to procure on their own either from local sources or by purchasing from an outside supplier a limited set of products and other products are purchased by the central authorities;
- “Wide choice” when local authorities are allowed to procure most products on their own.

It will also be useful to know the degree to which these choices are embodied in laws and regulations that may require more than a Ministerial decree to change.

**Third Parties:** Logistics systems often involve the interaction between the public sector and third parties from the private sector. In some cases private NGOs such as IPPF affiliates provide products to the local public health services that are then responsible for delivering the products to patients. In other cases, the government services provide products to the NGOs who are responsible for distribution and delivery. In centralized

systems, the decisions to work with third parties are centralized while in others local authorities are allowed to decide whether and how to work with third parties.

The choices associated with this function can be characterized as follows:

- “No local choice” when local authorities are not allowed any choice to contract with NGOs for supplies or delivery;
- “Moderate choice” when local authorities are allowed, under some conditions defined by the central authorities, to contract with NGOs;
- “Wide choice” when there are no restrictions on local choice to contract with NGOs.

***Storage:*** Storage is a very important function within the logistics cycle. Among other things, it serves to maintain the quality of commodities until they are used. Unlike some other aspects of the supply chain, storage happens at various locations in the system, and centralized storage has its limits. However for storage to be effective, key aspects that have quality implications would have to be managed well. These include aspects such as quality of physical storage space, stores layout and shelf arrangement, receiving and issuing routines and stock control procedures. This also includes procedures such as First-to-Expire-First-Out (FEFO) relating to which set or batch of commodities will be released from storage for use first and in which order. Too much variation of or lack of control over these aspects of storage could have significant implications on the quality of the products.

The choices that could be associated with this function can be characterized as follows:

- “No choice” when central authorities impose standard practices for building maintenance, stores layout, shelf arrangement, receiving and issuing and stock control;
- “Moderate choice” when local managers are expected to observe standard routines for receiving and issuing and stock control, but left to their own devices for building maintenance, stores layout and shelf arrangement;
- “Wide choice” when local managers have discretion over if and how to carry out all of these directives.

***Inventory Control:*** Inventory control relates to the set of procedures, records and reports that are maintained as part of the physical management of the stocks, including how much stock will be maintained and at what levels or intervals more stock will be ordered. There are also a number of issuing procedures that are considered to be aspects of inventory control. In a decentralized system, inventory control procedures, including setting and monitoring stock levels and order intervals is left to the discretion of local authorities. In a centralized system, these decisions are made centrally and enforced through supervision and required reporting of stock levels and consumption.

Again these functions can be defined in three categories:

- “No choice” for situations in which the local authorities are not granted any role in selecting inventory control methods;

- “Moderate choice” when local authorities are given some flexibility in modifying the inventory control system as long as they have minimal standards established by central authorities;
- “Wide choice” when local authorities are allowed to select any form of inventory control and warehousing options without central supervision or right to reverse local decisions.

**Transportation:** Transportation is an essential element of the distribution system, over which some local choice is often given. The arguments for centralizing these functions again rest on the lack of local skills and adequate infrastructure but also on the lack of local private sector options for delivery and vehicle maintenance. Arguments for decentralizing this function rest on the inefficiency and inappropriateness to local conditions of centralized transportation systems, as well as the flexibility and capacity of local transportation options to adapt to meet local needs.

The local authorities can be allowed some choice over whether the logistics transportation system uses transport owned and maintained by the facility or whether to outsource distribution to local private options. Similarly they can be required to follow strict centrally defined distribution process, possibly using transportation owned and operated or funded by the central level.

Again these functions can be defined in three categories:

- “No choice” for situations in which the local authorities are not granted any role in decisions about transportation;
- “Moderate choice” when local authorities are given some flexibility in assigning transportation to logistics system needs but have defined and enforced guidelines which prioritize logistics system needs;
- “Wide choice” when local authorities are allowed to assign transportation to any priority and therefore logistics system needs compete with other priorities.

**Logistics Management Information System:** Routine reporting and monitoring of usable stock on hand and consumption is essential for managing stock to ensure consistent product availability. Centralized information systems can be effective and essential means of providing key information for planning, forecasting and selection of drugs and contraceptives as well as monitoring the distribution system. However, large logistics management information systems are often a cumbersome burden demanding too much information that is not used or useful to those who are expected to provide the information. Often, feedback is not provided to the lower levels. Centralized systems can also be unreliable and untimely if they are not well designed and managed. It is likely that a centralized core system is needed, where facilities are required to report stock levels and consumption to the higher level, but that it must be also useful to local decision-makers to be effectively maintained and utilized. Local control and modifications that do not remove essential data needed by the center may be useful.

Again this function can be defined in three categories:



- “No choice” for situations in which the central authorities define the forms, reporting schedules, provide training and supervise the system with no local participation other than filling in forms;
- “Moderate choice” when local authorities are allowed to modify the reporting forms and schedules within guidelines provided by the center but central authorities may reverse local decisions;
- “Wide choice” when local authorities are allowed to define how they report to central authorities.

**Personnel allocations:** It is often argued that local choice over human resources allows local managers enough latitude to improve efficiency and to reward more motivated and skilled staff. Those who argue against local control point to patronage and favoritism that might undermine efficiency and quality of service. Control of human resources is a key function that is seldom decentralized since civil service systems in most developing countries are fairly rigid.

In places where local choice in personnel allocation is allowed, the choice allowed local managers may be characterized and studied as below:

- "No choice" for situations in which the central authorities define positions, recruit, select and fire personnel in the logistics system;
- "Moderate choice" when local authorities are allowed to hire and fire personnel but central authorities define the logistics position staffing requirements and may reverse local decisions;
- "Wide choice" when local authorities are allowed to define staffing positions and hire and fire or transfer staff from and to logistics system positions without central supervision or right to reverse local decisions.

**Supervision:** Supervision of the logistics system can be performed by central and/or local authorities and supervision protocols can be defined by central authorities or left to local authorities. The arguments for centralized supervision and staff development are that they impose a standard of quality that can be missing if local authorities perform and define the protocols and tools. Also, resources might be more readily available through central authorities. Those in favor of decentralized systems argue that local authorities have better knowledge of local conditions and of local staffing and development needs so they can tailor activities and tools to identify and address problems more quickly and effectively.

Again this function can be defined in three categories:

- “No choice” for situations in which the central authorities send central teams to perform supervision and staff development at the local level and define the protocols for supervision and development by central and local supervisors;
- “Moderate choice” when there is no significant supervision and staff development by central teams and where the supervision and development protocols for local

- teams are vague allowing local authorities some choice about supervision of the local logistics system;
- “Wide choice” when there are no significant supervisory and development guidelines from the center, no central supervision teams or centrally-prepared development activities, and where local authorities are allowed to define their own supervision and development protocols or to have no system of supervision and development.

**Organizational Support:** Certain management practices can be systematized into standard organizational processes for coordination, decision resolution paths, communications flow and feedback, and performance improvement. These processes enable the logistics system to move in a coordinated fashion and improve upon itself. While historically not recognized or simply assumed to be part of supervision, it can be argued that the logistics system is more robust if these are not all dependent on the particular skills and interests of supervisors.

It also can be argued that decentralization will be hampered if the processes in use are designed for a centralized system. Further, these processes, along with other logistics system components, must be rethought if they are to serve a decentralized approach. Whether it is more useful for some or all of these to be either centralized or local processes is an interesting point of study.

The choice categories are:

- “No choice” if processes for coordination, resolving stalemates, communications flow and feedback, and improvement processes are determined from the central level;
- “Moderate choice” if certain processes are centrally mandated, local authorities have the authority to design other processes to meet their needs. In other settings, central guidelines may be general or vague signaling local discretion to apply or elaborate;
- “Wide choice” if local authorities decide processes for coordination, communications and collecting feedback, and also for resolving stalemates and making improvements.

**Monitoring and Evaluation:**

Monitoring and evaluation are major means by which central authorities as “principals” attempt to overcome the information asymmetry and assess the performance and activities of their “agents.” While resources are seldom sufficient for a sophisticated monitoring and evaluation system, routine reporting of key indicators and periodic data collection from non-routine sources (surveys, focus groups, etc.) often provide information needed for assuring that the local authorities are implementing the activities required by the central authorities. Monitoring and evaluation may also be useful for the local authorities to assess their own performance.

Categories for this function are:

- “No local choice” if monitoring and evaluation methods and processes are imposed by the central authorities and are frequently implemented;
- “Moderate choice” if infrequent and inadequate monitoring and evaluation by central authorities;
- “Wide choice” if no central monitoring and evaluation and local authorities may choose their own methods or none.

**Product Quality Assurance:** Quality assurance is another means by which the central authorities can control local choices and activities. Centralized systems often impose quality norms and procedures and monitor quality by pre-selection of suppliers, compliance testing and inspection using central laboratories for evaluation. Without centralized quality controls, there is likely to be no quality control or only some localities will enforce their own disparate quality processes.

Categories for this function are:

- “No choice” if there is a central system of quality control;
- “Moderate choice” if there is a central system for only some products;
- “Wide choice” if there is no central system and localities may choose to have their own systems or no system.

**Regulation and Registration:** Registration of products and regulations on quality, labeling and use of products are usually functions that are retained by central authorities. However there are some systems, for example in large countries like India, in which these functions are devolved to state or local authorities.

Categories for this function are:

- “No choice” if only the central authorities register and regulate products;
- “Moderate choice” if there is some local role in regulation and registration;
- “Wide choice” if there is no central registration and regulation and local authorities do their own registration and regulation.

**Client Contact (Product Use):** Recent efforts to promote rational prescribing practices and evidence based medicine have often led to centrally defined prescribing protocols. These practice protocols can be defined and enforced by the central authorities or they can be promoted in a process of exchange between local providers and central authorities. While central authorities may have the best technical information for defining the protocols, it is usually argued that physicians need to be convinced through a participatory process rather than given strict rules.

Again this function can be defined in three categories:

- “No choice” for situations in which the central authorities define rational prescribing protocols and enforce these protocols by reviewing practices and/or significantly limiting the essential drug list;
- “Moderate choice” when there is a significant effort to involve local providers in the development and implementation of practice protocols and the rules vary from place to place and change over time;

- “Wide choice” when providers are allowed to prescribe according to their expertise and there are no attempts to impose practice protocols.

In order for choices to be realizable by local authorities there needs to be some assessment of the availability of adequate resources. We have added for each of the functions questions about the availability of adequate financial, human or material resources that would be needed for the local authorities to have the minimal capacities to make the choices they are allowed. We will also assess the level of important support that is offered by the central authorities in terms of guidance, technical assistance, and coordination.

In addition, we have added a list of potential indicators for each of the functions that will be used in the selection of variables for study.

For comparative purposes, we will attempt to quantify the relative overall decision space in each country by totaling the number of functions in each of the three categories. After assessing the effectiveness of different degrees of decision space for each function, we may also assess the overall decision space based on the number of more appropriate levels of decision space. For instance if we find that “wide” space is associated with better performance on the financing function but “narrow” is associated with better performance on storage function then we would give the country a score of 2 for having the “best” degree of decision space.

### **Integration of Logistics Systems – Current Approaches and Evidence**

Decentralization of health systems is often accompanied by or follows another major organizational change – integration of health services – that may have an important impact on the effectiveness of a logistics system. We will therefore include an analysis of integration as a potentially complicating factor influencing the impact of decentralization on logistics system performance.

Organizational theory in general assesses the issues of “span of control” and multiplicity of tasks as important constraints on integration of diverse organizational activities. Span of control suggests that managers should not have too many separate officers or units reporting to them but rather have sub units combine activities under a limited number (often not more than 5) integrating units. Multiplicity of tasks constraints suggest that a single manager or provider not be expected to perform too many separate tasks or the quality of their performance of those tasks will decline. Research has shown that integration approaches have grown in usage in the developed world because organizations, especially those that are highly complex, have found vertical approaches inadequate to address coordination needs in a timely and cost-effective manner (Mohrman 1998). General organizational theory however does not guide practice in specific task systems such as the health system.

Unfortunately, the literature on integration of health systems, and logistics systems in particular, is not as well developed as that of decentralization. In the health sector the issue of integration has focused on the contrast between vertical and integrated programs initially raised by the debate over selective primary care and the development of vertical family planning programs in the 1980's.<sup>2</sup> Advocates of vertical programs stressed the simplicity of organizational forms, the strengthened ability to control and supervise a vertical program, the concomitant capacity to provide better quality service (Walsh and Warren 1979). Advocates of integrated programs stress the disruption of routine services that vertical programs may entail, the lost opportunities for several important interventions if only one is provided and referrals or different schedules are required for other services, and the inefficiencies and duplication of several fragmented vertical services (WHO 1996). Despite the fevered debate, there has not been clear empirical evidence unambiguously favoring either vertical or integrated programs (Schierhout and Fonn 1999).

Much of the literature on integration focuses on the facility and community level activities. It assesses the combination of family planning and Maternal and Child Health services with other primary care services, or the introduction of new activities such as HIV/AIDS and TB into the primary care package (Lush, et al. 1999, Dehne, et al. 2000). Other studies assess the integration of health services into other local development services and into community action committees. Finally some attention has been given to integrating primary health care services with hospital care – through district planning or through improved referral systems.

In some cases, the issue of integrating services has addressed the organizational issues of integration of ministry of health divisions – the creation of Integrated Management of Childhood Illness (IMCI) is a recent example. In addition, information system integration has been proposed to reduce the number of forms and to provide a single integrated system. Unlike the facility level integration, there have been almost no empirical studies of the performance impacts of these efforts.

Experiences from a number of countries, including Mali and Tanzania, indicate that initiatives to achieve structural integration by combining the management of different commodities (e.g., essential drugs with contraceptives) into a single supply chain can disrupt the delivery of family planning services if the efforts are not carefully planned and coordinated, building on existing strengths (Barraclough et al. 1999; Kinzett and Lunt, 1998).

### **Assessing Integration in Logistics Systems**

The analytical approaches and case study evidence does not yet allow us to predict how integration will affect the performance of the logistics system and even less how it would strengthen or weaken a centralized or decentralized system. Furthermore, we can expect that integration will interact with decentralization in a variety of ways. Some functions

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<sup>2</sup> Earlier debates were generally won by vertical programs resulting in the long history of vertical immunization programs, separate malaria agencies and separate water and sanitation agencies.

may be vertical at a central level and integrated at local levels and vice versa. This interaction will complicate our analysis. Therefore, at this stage in our analysis we will have to develop a framework of categories to define possible differences between vertical and integrated systems and assess their relationship to decentralization and performance in our empirical cases.

In the absence of effective frameworks for assessing integration of logistics systems we will use a framework for categorizing integration that is similar to the “decision space” approach we are using for decentralization. This framework defines a series of functions – based on the “Logistics Cycle” – and the degree of separateness or integration for each of those functions. The following chart defines the key functions and three degrees of integration.

## INTEGRATION of Logistics Functions for Drugs, Vaccines, Contraceptives

FUNCTIONS	VERTICAL	PARTLY INTEGRATED	FULLY INTEGRATED	COMMENTS
Product selection	Separate systems for drugs, vaccines, contraceptives	Some systems are combined	Coordinated selection process leading to a common essential commodities list for all products	
Forecasting	Separate systems for drugs, vaccines, contraceptives	Some systems are combined	Drugs, vaccines and contraceptives included in same forecasting exercise	
Budgeting	Separate budgeting exercises for drugs, vaccines, contraceptives	Budgets for some products are combined and others are separate	All products budgeted in same exercise	
Work Planning (including procurement planning)	Work plans for each program is different	Work plans for some programs are combined	One work plan for all programs	
Procurement	Separate Systems for Drugs, Vaccines, Contraceptives	Some systems are combined	One body responsible for all procurement for all programs	
Inventory Control	Separate Systems for Drugs, Vaccines, Contraceptives	Some systems are combined at all or some levels	Drugs, vaccines and contraceptives managed under one inventory control system	
Transport	Separate Vehicles	Some local flexibility under defined conditions or at certain levels	One Motor Pool for distribution of all commodities	
Storage	Separate Systems for Drugs, Vaccines, Contraceptives	Some systems are combined at all or some levels	Drugs, vaccines and contraceptives under one warehouse and are functionally managed together	
Personnel allocation	Each Director (Drugs, Vac., Cont.) selects own staff and each has separate staff	Partially Integrated; some combined at all or some levels	Personnel Decision Makers (at central and local levels) decide and make tradeoffs among different staffing requirements	
Logistics Management Information Systems	Separate reporting forms sent directly to separate central logistics managers	Separate reports for drugs, contraceptives, vaccines but results are aggregated at some levels	Fully integrated forms at all levels	

FUNCTIONS	VERTICAL	PARTLY INTEGRATED	FULLY INTEGRATED	COMMENTS
Supervision and Staff Development	Separate systems for Drugs, for Vaccines, and for Contraceptives	All logistics and associated staff development supervised by one supervisor at all or some levels	Logistics is only one partial responsibility of a single supervisory teams' activities or a single staff development approach	
Organizational Support (coordination, communications, feedback, resolution, performance improvement processes)	Separate processes for Drugs, Vaccines and Contraceptives	Some processes are combined at all or some levels	One set of processes serve the integrated system	
Monitoring and Evaluation	Each vertical program has its own monitoring and evaluation system	Central level integrated analysis of vertical reports	Monitoring and evaluation system is fully integrated for all programs	
Client Contact and Product Use	Separate providers or facilities for different vertical programs	Some providers or facilities combine services at all or some levels	Integrated services provided to all clients in the same facilities.	
Total Score for Integration (sum of each column)				

In the following section we will define the three categories of integration for each of the major functions.

**Product Selection:** “Vertical” systems would have separate processes for product selection for the major contraceptive, vaccine and drug purchases. In some cases it is international donors who select the products without participation of national authorities. An “integrated” system of product selection would have choice of products made by the same authorities and product selection based on the appropriate mix of products. “Partially integrated” system would have some products selected together and others selected in separate processes.

**Forecasting:** “Vertical” systems would have separate mechanisms or processes for forecasting the requirements in the different program compartments. In some systems, resources are shared for the functions of the logistics cycle and would therefore have the same systems and mechanisms for determining needs. Personnel and other resources responsible for forecasting are shared with other programs. Integrated systems would have all forecasting under the same system and “partially integrated” would have some products integrated and others vertical.



**Budgeting:** Budgeting for different products can be done in separate vertical budget processes such as one for contraceptives, one for vaccines and one for essential drugs. “Partially integrated” budgeting occurs when some products are integrated and others are separate. When all products are in the same budget as other items such as equipment, salaries, etc. the system is integrated.

**Work Planning:** As with budgets, work planning exercises can be vertical for separate health programs, partially integrated for several programs or fully integrated into one comprehensive work plan for all health program activities.

**Procurement:** “Vertical’ systems would have separate procurement processes for major contraceptive, vaccine and drug purchases (and for some specific drugs such as treatments for TB and malaria). In some cases, particularly contraceptives and vaccines, the products are provided directly and without charge by the donors. An “integrated” system would have all products procured through a single procurement process either at the central or the local levels, depending on the degree of decentralization. A system which has some separate procurements but most products are procured by a single integrated system would be defined as “partially integrated.”

**Inventory Control:** As with other aspects of logistics, inventory control procedures and guidelines as well as the day to day activities of inventory control could be handled separately or in an integrated fashion. In a vertical system, inventory control activities are specific for each product category, and may have separate staff to handle the different commodity types. Integrated systems would have the same procedure and staff applied for management of all product categories.

**Transport:** Transportation offers one of the key areas where program resources in logistics could be integrated or not. In a number of health systems, transportation resources may “belong to” one program or the other. Vehicles for one program may or may not be deployed to services deemed to be that of another program, or level. In some instances, some programs may have to look beyond the “system” for transportation resources while some vehicles lie idle, because they are for other programs or purposes. Proponents of integration have cited transportation as one key area of benefits to be derived from an integrated management. Where there is integration, transportation is harmonized and vehicle requirements synchronized to ensure that opportunity for sharing resources are maximized. Vehicles belong to a pool and are assigned for purposes based on priorities and agreed schedules.

**Storage:** Storage facilities may exist for separate purposes. Both the physical spaces and the personnel responsible for the storage function may be managed separately or in an integrated manner. These may be physically together but functionally separate. The important measure of integration in this instance will be those functional in orientation. Whether stores personnel or facilities are in separate locations or not, are they functionally one unit, or separated by the health program they are responsible for and commodities that they manage? The level of integration can be analyzed as per the chart above. These functions will be “partially integrated” if most of the functions are

performed by a single system but there are a small limited number of drugs, contraceptives and/or vaccines that have separate systems

**Personnel Allocations:** “Vertical” systems will have separate personnel assigned to different products -- e.g. there will be contraceptive logistics personnel with specific recruitment and management systems from the pharmaceutical logistics personnel. This function will be “integrated” if all personnel are managed in a single system and central or local authorities can assign logistics personnel according to their own choice of priorities. This function will be “partially integrated” if a limited number of positions remain as separate assignments but most logistics system personnel decisions are made by the authorities who have decision space over human resources for the rest of the system.

**Logistics Management Information System:** The LMIS will be defined as “vertical” if records and reports of each product category are different, reporting to different Units at different times, perhaps with different information being reported for the different products. The “integrated” LMIS would have the same forms used to collect the same data, reported to the same Unit at the same time. Under the integrated system, the reports would be aggregated at all levels.

**Supervision and Staff Development:** Supervision and Staff Development will be defined as “vertical” if there are separate supervisors and staff development programs for contraceptives, drugs and vaccines. It will be “integrated” if there are a single supervisory system and a single development system for all activities at facilities. It will be “partially integrated” if there are a limited number of separate supervisory and development systems but a single team responsible for most supervision and staff development is done by a single team at all or some levels

**Organizational Support:** Organizational support will be defined as “vertical” if each major product group has its own processes for communication and feedback flow, resolution paths, and performance improvement. It will be “integrated” if one set of processes serve the integrated system. It will “partially integrated” if processes are integrated at certain levels of the system or if some processes (e.g., communication lines) are integrated while others (e.g., resolution paths) are not.

**Monitoring and evaluation:** Monitoring systems can be separate for different products, partially integrated when they cover several product types and fully integrated when there is one logistics monitoring and evaluation system for all health program commodities.

**Client Contact and Product Use:** Client contact can be for separate products such as separate providers for family planning, immunization and MCH services. It can be partially integrated if some of these activities are provided by the same provider or fully integrated if the same provider is responsible for providing contraceptives, immunizations and essential drugs.

## **Other Factors that might influence logistics system performance**

In addition to decentralization and integration there may be other factors that affect the change in performance of the logistics system from before decentralization to after and we need to take into account these factors:

- 1) Prior effectiveness of the centralized system
- 2) Prior effectiveness of vertical systems
- 3) Variation in funding levels (national and donor) and or in kind contributions of contraceptives, essential drugs, immunizations etc.
- 4) Other reforms that may be implemented at the same time:
  - a) Cost recovery requirements for contraceptives, drugs etc.
  - b) Privatization
- 5) Market Segmentation efforts and the role of the private/NGO sector.

## **Comparative Study Methodology**

### Country Selection

We have initially decided to do a comparative study of six countries to provide sufficient experience to assess the impact of decentralization on logistics system performance. Comparative studies must carefully select the cases so that they will provide key elements of similarities and differences needed to answer the research questions. We need to select cases that will show different types of decentralization and integration and different degrees of decentralization and integration so that we can compare the effects of these organizational forms on the performance of the systems. We should try to control for other factors that may influence system performance – such as socio-economic conditions, emergencies and disasters, broad system characteristics (such as public vs. private mix).

The selection of countries to be studied will in part depend on the availability of routine data and prior system assessments made by DELIVER and/or other logistics management projects. We should ideally have data on system performance from before the decentralization occurred or a series of years during the period the system is decentralized to determine a trend. Without this longitudinal data, we might want to select countries that have not decentralized but have similar characteristics to decentralized countries although controlling for all factors is unlikely. The data and indicators that are available for periods prior to decentralization should be used in follow up surveys for this study.

We have tentatively assumed that we will have sufficient data to do longitudinal assessments in selected countries so that we can compare the decentralized system to the centralized system in each country. Therefore, we will initially select countries that have some degree of decentralization of their logistics system. To select these countries we needed input from experts who know the characteristics of country logistics systems. We canvassed the field experts of DELIVER using the charts of decentralization and integration presented in this paper. This process resulted in a tentative selection of two countries from each of the major geographic areas served by DELIVER – Latin America, Africa, and Asia. In Latin America we have initially selected Guatemala and Bolivia, for Africa Uganda and Ghana, and for Asia Philippines and Indonesia. These selections will be reviewed as we develop more information on each country's logistics system and data availability. Country selection will be finalized in coordination between HSPH and DELIVER with additional information from other experts and projects.

While it is unlikely that we will have sufficient cases to assess the impact of different political, economic and social contexts, we will describe these contexts for each case so that some hypotheses may be generated and so that future assessments take these factors into consideration.

## Proposed Survey Instruments

The key objectives of any health system are to provide services in an equitable, efficient manner with at least a minimum of quality as defined by client satisfaction and clinical requirements. In evaluating the performance of the logistics system, we should address how well the system delivers key commodities needed to address priority health services ultimately to the client, including drugs, immunizations, contraceptives and essential medical supplies.

A conceptual framework is used for defining and assessing logistics systems for contraceptive and drug supply. This approach uses “the logistics cycle” which identifies a cycle of logistics functions, starting with product selection; forecasting and procurement; inventory management, storage and distribution; and product use or serving customers. Quality monitoring and a logistics management information system involving pipeline monitoring, organization and staffing, budgeting, supervision and evaluation lie in the middle of the cycle and create the link between all of these components.

Two key instruments will be used as guides for country surveys: one to assess the degree of decentralization and integration of the current system and one to assess the current performance of the system (where possible, this assessment should be done in coordination with LSAT/LIAT surveys). These first instruments will be developed initially by HSPH and then reviewed and modified in collaboration with DELIVER staff in Washington. It will involve a semi-structured qualitative interview survey (based on the decentralization and integration “maps” above) of the key participants in the logistics system at the central and local levels. The second instrument will be designed by HSPH and DELIVER staff using a number of existing assessment tools for evaluating logistics system performance. Instruments for each country will then be modified in-country in collaboration with the local DELIVER staff, MOH staff and local research teams.

The instruments to measure the degree of decentralization and the degree of integration within the health programs to be studied will be based on the tables found in this document. These tools will also follow the components of the logistics cycle so that links can be made between the degree of decentralization and integration and logistics system performance. These instruments will collect information on key officials’ assessment of their degree of control over key functions and the degree of integration as defined in the tables above.

For the second instrument, DELIVER has developed a “Logistics System Assessment Tool” (LSAT), which focuses on the components of the logistics cycle, to assess the logistics management of any health program and to monitor progress towards achieving commodity security. The LSAT is a primarily qualitative diagnostic and monitoring tool which uses a focus group methodology to carry out a comprehensive assessment of the processes involved in logistics management, plus some outcome measures. The LSAT can also be used as a questionnaire-type guide for conducting key informant interviews at all levels of the system. Each section of the LSAT has a series of indicators that can be used to evaluate the performance and the effectiveness of the logistics system. The LSAT

is useful for identifying key strengths and weaknesses or constraints of the logistics system and for providing an overall picture of commodity security.

DELIVER also developed another assessment tool, the Logistics Indicator Assessment Tool (LIAT), to collect quantitative data on logistics system performance, including both process and outcome measures. The LIAT requires a facility-based survey and provides useful objective measures of logistics system performance and commodity availability at health facilities. In countries where LIAT data is available, this may provide good longitudinal data to determine the performance of the logistics system over time.

Questions from both the LSAT and LIAT were reviewed and supplemented by HSPH and DELIVER to produce an expanded performance survey for this project.

Commodity security involves client ability to choose, obtain and use the products they require for their health, which is supported by a well-functioning logistics system. Key elements of performance of the logistics system that should be evaluated using an integrated instrument based on these tools are:

- Availability of usable products – absolute
- Availability of usable products to different regions, socio-economic levels
- Efficiency of logistics functions:
  - Forecasting
  - Procurement
  - Storage
  - Inventory control
  - Delivery of product
  - Information management and systems
- Affordability (cost) to patients: measured as the percentage of the average out of pocket payment (or other payment mechanisms that are direct client costs) for health commodities of the national per capita GNP
- Affordability (cost) to health system: potential of cost recovery and other funding sources to cover health commodity and operating costs.

The Performance of a Health Logistics System is measured by its ability to ensure useable product availability to support service delivery at each level of the health system. This can only be achieved if the logistics system enables to program to forecast its requirements, finance, procure and distributes these to the user points.

These systems will be evaluated using specific indicators for Contraceptives, Essential Drugs and TB drugs.

## Possible Hypotheses

The following are a first approximation of the possible hypotheses that could be examined in this study along with potential indicators that would be used if available. These hypotheses are presented only for illustrative purposes. Specific and detailed hypotheses will be developed for each country study based on the type of system assessed and the data available. The detailed justification for null or directional hypotheses will be developed.

### General Propositions (Null hypotheses):

1. As a logistic system implements higher degrees of decentralization there will be little or no change in indicators of logistic system performance. This effect will not be influenced by the degree of integration.
2. Logistic systems in countries of similar socio-economic conditions but with different degrees of decentralization will have no significant difference in their logistic systems. This effect will not be influenced by the degree of integration.

### Measures:

- a. Total scores for “Decision Space” (DS) and “Integration” based on Maps
- b. Index of logistic system performance variables (change in stockout rate, change in stock on hand, change in % expiry, change in cost of products to patients, change in proportion of health budget devoted to drugs—see Indicator column in Decentralization Decision Space Map for a more detailed list of performance variables)

Specific propositions (based on plausible hypotheses about the impact of decentralization and integration):

1. Financing
  - a. Wider decision space will be related to higher levels of local financing and higher levels of total funding (because local responsibility will mobilize more resources)
  - b. Wider decision space over cost recovery will be related to higher costs to patients (because local authorities will charge as much as they can and not be restricted by political considerations) and lower availability (because fewer people will be able to afford the higher charges)
2. Product Selection, forecasting, procurement
  - a. Wider decision space will be related to more products selected and procured (because local authorities will not be limited by centrally defined essential lists) and at higher costs to system (since they will purchase from higher cost local providers)
  - b. Greater integration will be related to fewer products procured (because duplication will be reduced)
3. Storage, Inventory Control, Transportation
  - a. Wider decision space will be related to less of procured products available at facilities (because local capacities will not be uniform and will not be as effective as centrally defined programs)

- b. Greater integration will lead to fewer of the procured products available at facilities (because integration will reduce the priority for any one set of products )
- 4. Personnel, Supervision, Organizational Support, Information system
  - a. Wider decision space will be related to less supervision, support and inadequate information system (because local officials will not be as interested in supervision and information and will not have as much organizational support capacity as the central authorities)
  - b. Greater integration will be related to less supervision, support and inadequate information system (because vertical systems will collapse)



## Country Protocols

After a country has been tentatively selected for study, the DELIVER staff (Washington and local) will investigate the interest of the USAID mission and of the Ministry of Health and will set up an initial visit by the HSPH Principal Investigator and at least one DELIVER staff member. This first visit will be to explain to USAID and Ministry of Health officials the objectives and the processes of the study and to gain their approval and if possible formal collaboration. This visit will also be used to collect any existing documentation of logistics system performance and of the characteristics of the logistics system and its changes over time. It will also be used to evaluate and if possible select and train research teams that could collect existing data and carry out surveys described above. It is expected that the research will be done by an outside local contractor in collaboration with local officials and local DELIVER project staff.

The research team will be responsible for continuing to collect existing and routine data on the health system in general and on the logistics system in particular and forward them to HSPH and DELIVER. The research team will pre-test the survey instruments in at least two selected districts and e-mail the results to HSPH and DELIVER for final design of the instruments. A second visit by HSPH and DELIVER will occur either at the initial phase of implementation of the surveys or shortly thereafter to monitor the process. The research team will then do a preliminary analysis of the survey instruments and send it, along with copies of the instruments, to HSPH and DELIVER. The DELIVER and HSPH teams will continue the analysis and provide feedback to the local team.

A final visit will be made when sufficient analysis has been completed for a week of finalizing the analysis and for preparing a country presentation to interested officials.

There will be an attempt to provide preliminary lessons learned from each country study so those findings can inform continuing DELIVER project activities. Country studies will be phased so that research lessons from initial countries can inform the research design of following country studies.

When all country reports are completed, DELIVER in collaboration with HSPH will prepare a synthesis document comparing the findings of all countries and drawing lessons for future logistics system design and implementation. This document will be published and distributed by DELIVER. A series of seminars presenting the findings will be held in Washington and regional meetings where appropriate.

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**Annex: Country Team Leader Reports on Decentralization and Integration are available on request.**