

OPTIONS GUIDE: PERFORMANCE-BASED INCENTIVES TO STRENGTHEN PUBLIC HEALTH SUPPLY CHAINS – VERSION I



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DISCLAIMER

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government

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ACRONYMS

ADB	Asian Development Bank
CMAM	Mozambique Central Medical Store
CMS	Central Medical Store
KPI	Key Performance Indicator
LIAT	Logistics Indicators Assessment Tool
LMIS	Logistics Management Information System
LSAT	Logistics System Assessment Tool
NDF	Nordic Development Fund
NGO	Nongovernmental Organization
NHS	National Health Service
OBA	Output-Based Aid
P4P	Pay-for-Performance
PBA	Performance-Based Aid
PBC	Performance-Based Contracting
PBF	Performance-Based Financing
PBI	Performance-Based Incentives
RBF	Results-Based Financing
ROI	Return on Investment
SCMS	Supply Chain Management System
SDP	Service Delivery Point
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
TB	Tuberculosis
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development

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FOREWARD

Does your supply system ensure availability of high-quality products in sufficient quantities at service delivery points throughout your country, or are there gaps in product availability? Is your system efficient and responsive, or are there delays? Are products and money wasted? In addition to paying for health commodities, all too often supply chain systems pay for inputs such as human resources, infrastructure, and IT, and not for the performance of central medical stores, subnational depots, and service delivery points. Rather than being paid based on their inputs, central medical stores and subnational warehouses might be paid for their performance on warehouse management, timely distribution of commodities, and effective planning. At the service delivery level, supply chain performance can be rewarded in addition to quality health service delivery. Performance-based incentives (PBIs) aim to motivate all the people and teams who together comprise a public supply chain to work hard and perform their function well. PBI is an innovative approach that explicitly links financial investment to results. In essence, it financially rewards supply chain actors for achieving a predetermined performance target (e.g., performance is verified through a physical count that confirms that products shown to be in the warehouse information system are on the shelves).

This approach has produced positive results when applied to strengthening service delivery performance, even in challenging country contexts. Experience with PBI applied to public sector supply systems is a new area for innovation that we believe holds promise. Therefore, rigorous evaluations are necessary and will help to reveal and clarify effective approaches to implementing it.

While the PBI concept seems relatively straightforward, the mechanics of its implementation need to be planned very carefully to elicit the desired behavior change in a given country. To facilitate this planning, the U.S. Agency for International Development (USAID) has provided support through its Health Systems 20/20 project¹ and its supply chain strengthening projects (USAID | DELIVER PROJECT, Supply Chain Management Systems (SCMS), and Systems for Improved Access to Pharmaceuticals (SIAPS) to develop this PBI Options Guide. Intended for country supply chain program managers, including those representing government, nongovernment, and donor agencies, the Options Guide offers the reader a systematic framework to document and structure his/her thought process, rationale, and ultimate decisions made when designing a PBI initiative to strengthen supply chain performance. In following each recommended step of the guide (facilitated by technical support from experienced PBI implementers), the user is alerted to factors and issues that can influence the success of a PBI scheme. Upon completion of the guide, the user will have produced an initial design and action plan for introducing PBI to his/her program area/country.

The suggested approach outlined in this Options Guide is based upon a successful tool used in Africa's first regional PBI workshop for service delivery sponsored by USAID, and further refined for Asia's first regional PBI workshop. Some of the participating countries that developed blueprints have gone on to implement their PBI designs, turning their ideas into reality. In addition, the guide draws upon the lessons learned from PBI implementation in developing countries.

¹ Health Systems 20/20, a cooperative agreement funded by USAID, offers USAID-supported countries help in solving problems in health governance, finance, operations, and capacity building.

It is our hope that this Options Guide will facilitate the task of developing successful PBI initiatives to strengthen supply system performance so that such systems can contribute to improved health outcomes in low- and middle-income countries.

A handwritten signature in black ink that reads "Catherine Connor". The script is fluid and cursive, with the first name and last name clearly distinguishable.

Catherine Connor, Deputy Director
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PREFACE

Building upon the successful model developed in 2007 for the East and Southern Africa Regional Workshop on Performance-Based Financing (PBF) (held in Kigali, Rwanda, May 2–4), which was further refined for the first-ever Asia Regional Workshop on Payment for Performance in 2009 (held in Cebu, Philippines, January 19–23), this guide offers a framework for thinking through and designing a performance-based incentive (PBI) initiative to strengthen supply system performance. Working together with a team from USAID’s supply chain strengthening projects (USAID | DELIVER PROJECT, SCMS, and SIAPS), Health Systems 20/20 adapted the methodology to PBI for supply chains. This is a new and exciting area that we believe has much potential but also much to be learned. We envision this guide as a first edition that will be periodically updated and enriched as countries learn more from the ongoing application of PBI principles to supply chain performance.

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I. INTRODUCTION

I.1 WHAT IS PBI? CONCEPT AND RATIONALE

Performance-based incentive (PBI) initiatives are attracting much global attention as a strategy to achieve health results. To date, however, we are aware of few PBI initiatives with a focus on strengthening the performance of supply chains. PBI introduces incentives (generally financial) to reward attainment of results. Recipients of performance incentives – which can be service delivery points (SDPs), subnational entities such as district teams or regional supply depots, or central medical stores – receive performance payments only if specified results are achieved (no result, no performance payment). By doing so, PBI

promotes hard work, innovation, accountability and results – as opposed to simply paying for inputs, like equipment, training, fixed salaried staff, and drugs. In essence, PBI is “any program that rewards the delivery of one or more outputs or outcomes by one or more incentives, financial or otherwise, upon verification that the agreed-upon result has actually been delivered” (Musgrove 2010). This implies a financial risk – payment is received when (or withheld until) results (or actions) are verified.



When aimed at strengthening delivery and use of health services, such schemes can be developed for both the supply side (health worker, facility, district health team, community) and the demand side (service user, patient) of the health system. A supply-side PBI scheme may tie health facility bonuses to the achievement of key performance targets such as an “increased number of women delivering babies with a skilled birth attendant” or an “increased number of fully immunized children.” A demand-side PBI intervention may give households cash incentives to receive preventive care services or pay tuberculosis (TB) patients money or food to encourage completion of treatment. Some service delivery schemes also reward supply system measures such as continued product availability of essential medicines.

At the national and subnational levels of supply systems, we know of few initiatives that reward public health supply chains for results. However, evidence from the commercial sector and from incentives at the service delivery and use level suggests that incentives might be a powerful way to stimulate improved performance at all levels of supply chain systems.

As with service delivery, most people and teams who work at different levels of supply systems are not rewarded for achieving better results. They are typically salaried. In contrast to PBI, incentives inherent in fixed salaries fail to stimulate sufficient attention to planning, procurement, warehouse management, distribution, and responsiveness to each level in supply chain systems. Instead, they tend to result in low productivity, absenteeism, stealing, or lack of innovation. These incentives are therefore not aligned with the ultimate goal of a supply system, which is to ensure that quality products are available in the right place at the right time. This misalignment of incentives is a primary underlying cause of waste and interrupted product availability, which contributes to poor health outcomes in the vast majority of developing countries. By linking payment to actual results achieved (at the central medical store [CMS],

subnational, facility, and individual worker levels), the many individuals and institutions that together comprise a public supply system can be catalyzed to implement solutions that increase availability of quality medicines, vaccines, commodities, and supplies.

BOX 1: MANY NAMES FOR PBI...

In entering the PBI milieu, one soon notices that global and national-level stakeholders use different terms and phrases to denote the PBI concept and related strategies. While these terms are similar, they may not be entirely synonymous and some distinctions do apply. Below are some popular PBI terms and an overview of their distinctions:

- **Performance-Based Incentives (PBI):** Any program that rewards the delivery of one or more outputs or outcomes by one or more incentives, financial or otherwise, upon verification that the agreed-upon result has actually been delivered. Performance payments may target supply-side (e.g., health center, health worker) and/or demand-side (e.g., pregnant women) recipients, subnational entities (district health teams, regional supply depots) or national entities (central medical stores).
- **Performance-Based Aid (PBA):** Payment from an external donor to a country based upon achievement of predetermined performance measures.
- **Pay-for-Performance (P4P):** Synonymous with PBI.
- **Performance-Based Financing (PBF):** Some consider PBF synonymous with PBI and P4P. Others consider only supply-side schemes with the attributes of the model pioneered in Rwanda as PBF.
- **Results-Based Financing (RBF):** Term introduced and commonly used by the World Bank; synonymous with PBI and P4P.
- **Output-Based Aid (OBA):** The use of development aid to support the delivery of services using targeted performance-related subsidies. Involves delegating service delivery to a third party (e.g., private firms, public utilities, nongovernmental organizations) that ties the disbursement of public funding to the services/outputs actually delivered (Global Partnership on Output-Based Aid 2008). Distinctions from PBI are that OBA is largely supply-side oriented, focuses on external financing, and defines performance primarily in terms of outputs (i.e., goods and health services rendered) rather than outcomes (i.e., the consequences for the beneficiaries of those output, e.g., disease X prevalence reduced).
- **Vouchers:** Target populations are given vouchers to access subsidized health services and/or products and/or other indirect benefits (e.g., transportation funds, financing for family member to accompany patient). The provider is then paid after remitting the vouchers to the payer. A voucher scheme can be an effective means for targeting specific population groups for health services or commodities (for example, bednets) and this constitutes one type of PBI approach.
- **Conditional Cash Payments:** Rendered for specific health services. Cash payments are given to patients when they use discrete health services, such as giving birth in a health facility with a skilled attendant. This is an example of a demand-side PBI approach.
- **Conditional Cash Transfer Programs:** Rendered as part of social safety net programs. These are general welfare programs that target the poor for a variety of social services. Health conditions may be added to these programs (e.g., participants attend a health education session or obtain prenatal care visits).
- **Performance-Based Contracting (PBC):** Refers to a legal or formal agreement to govern the terms of payment, which include a clear set of objectives and indicators, systematic efforts to collect data on the progress of selected indicators, and consequences (either rewards or sanctions) for the contractor that are based on performance (Loevinsohn 2008). PBC is a type of PBI approach that specifically involves the development of a contract or formal agreement, which may not always be the case for other PBI designs.

I.2 IS PBI RIGHT FOR YOUR COUNTRY?

While the concept sounds simple and logical, the challenge of designing and implementing a well-functioning scheme – including timely cash transfers, ensuring accountability, and managing and monitoring performance – can seem daunting, particularly in low-income countries that may already be grappling with inadequate infrastructure, shortages of human resources, weak information and financial management systems, competing priorities, high burden of disease, and limited funds. Nevertheless, it is because of the high health stakes that such countries should at least consider a PBI strategy² as one of the options for getting the most health out of limited funds. Moreover, through PBI introduction, many of the aforementioned systems issues, such as poor information systems and low productivity, can start to be addressed. In this regard, PBI has been effectively implemented with good results in post-conflict countries or unstable environments and has shown to be part of an effective strategy to strengthen health systems while generating better health results.

Before deciding whether or not PBI is right for you, consider whether and under what circumstances using money to buy results generates a higher return than alternate strategies in your country. Also, do the benefits of performance-based incentive programs justify the costs incurred? In addition to the immediate-term benefits of increased availability of life-saving commodities, PBI may also provide benefits, such as strengthening the capacity of supply and delivery systems and alleviating poverty, that will only be realized over decades. It is critical to note that not everything has to be “right” at the outset. PBI designers must be ready to assess and revise because successful implementation is an evolutionary process.

² This is not to say that PBI is the only or best way to generate improvements, but rather that it should be featured prominently in the menu of options from which programmers and planners draw when determining how to best achieve their targets.

2. OVERVIEW OF THIS GUIDE

2.1 WHAT IS THE GUIDE FOR?

To facilitate the PBI design process, this Options Guide offers country teams a systematic framework for organizing and documenting decisions. The framework takes teams through a series of key steps and tasks that guide decisions about the design of a PBI intervention aimed at strengthening supply chain performance. At each step, the guide also asks teams to consider a variety of factors that affect the success of a PBI design and provides tools to keep track of each design decision. While the guide offers a general overview of the major design steps, it does not address every detail needed for an operational implementation plan. It is also important to emphasize at the outset that the evidence base for applying PBI to strengthen public sector supply system performance is extremely limited. This is a new area for innovation with much to be learned through careful design, implementation, and evaluation. Subsequent versions of this guide will incorporate learning from ongoing and new experiences with PBI for supply chains.

2.2 WHO SHOULD USE THE GUIDE AND HOW?

This Options Guide is written with low- and middle-income countries in mind. It follows a format similar to the Blueprint Guide,³ a tool that provides guidance on developing PBI schemes for health service delivery. The Blueprint Guide built upon the successful model developed in 2007 for the first-ever PBI regional workshop for East and Southern Africa (held in Kigali, Rwanda, May 2–4), which was further refined for the first-ever Asia regional PBI workshop in 2009 (held in Cebu, Philippines, January 19–23). Many participants from that workshop have used their blueprints to successfully introduce PBI schemes to strengthen service delivery performance, turning PBI into a reality. In addition to feedback obtained at these events, the guide draws heavily from lessons learned when introducing PBI for health services in low- and middle-income countries. For case studies of country applications of PBI, tools, and key resources, please refer to the Health Systems 20/20 website.⁴ Another excellent resource is the World Bank's results-based financing site.⁵ To help adapt these principles to supply chain systems, this Options Guide drew on the collective experience of the U.S. Agency for International Development (USAID) supply chain strengthening projects, including the USAID | DELIVER PROJECT, SCMS, and SIAPS. In addition, an early version of the Options Guide benefited from a consultative process with participants in the 2012 United States Government Supply Chain Advisors Meeting in Johannesburg, South Africa.

Intended for a variety of health care stakeholders – including government officials, donor representatives, program managers, insurers, employees of nongovernmental organizations (NGOs), and district-level officials – this guide can be used:

Within a PBI training workshop environment; the decisions made in workshops will serve as a “rough-cut” of the design and plan, which should be finalized following a consultative process in-country.

Outside of a workshop setting, to guide interested country stakeholders in assessing feasibility and design and acquiring stakeholder buy-in to PBI. In these cases, facilitated in-country technical assistance

³ <http://www.healthsystems2020.org/content/resource/detail/2088/>

⁴ <http://www.healthsystems2020.org/section/topics/p4p>

⁵ www.rbfhealth.org

(from experienced PBI implementers) is recommended and the guide should not be used as a stand-alone tool.

2.3 HOW IS THE GUIDE STRUCTURED?

The guide is divided into chapters that reflect each of the major steps of PBI design and implementation. Each chapter briefly describes the step and offers a series of tables for PBI designers to fill in step by step. In so doing, the thought process, rationale, assumptions, and decisions are systematically documented. For each step, the guide offers a brief overview of the objectives, concepts, tasks, and considerations associated with the step.

In preparing a PBI blueprint, users of this guide will carry out the following key steps:

- Step 1. Understand the existing incentives in the supply chain
- Step 2. Identify and prioritize the top supply chain performance problems that PBI can address
- Step 3. Determine recipients and how to select them
- Step 4. Determine performance indicators and targets
- Step 5. Determine how to verify performance
- Step 6. Determine payment mechanisms and sources of funding, and how funds will flow
- Step 7. Determine the entity(ies) that will manage PBI initiatives and how to make PBI operational
- Step 8. Develop an advocacy strategy and identify immediate next steps

In addition, the guide offers a brief discussion on considering rigorous evaluations as a possible component of a PBI learning strategy.

3. GETTING STARTED

3.1 POINTS TO KEEP IN MIND

When preparing a PBI blueprint, designers should remember that the process is iterative and will require returning to earlier steps for further revisions once decisions in later steps become clearer.

Before getting started, please take care to avoid common design and implementation mistakes.

BOX 2: COMMON MISTAKES IN PBI DESIGN

1. Failure to consult with stakeholders to gain input on design, maximize support, and minimize resistance
2. Failure to adequately explain rules (or designing rules that are too complex)
3. Too much or too little financial risk
4. Fuzzy definition of performance indicators and targets, too many performance indicators and targets, and targets for improvement that are unreachable
5. Tying the hands of managers so that they are not able to fully respond to the new incentives
6. Insufficient attention to the systems and capacities needed to administer programs
7. Failure to monitor unintended consequences, evaluate, learn, and revise

3.2 MATERIALS AND RESOURCES NEEDED

Before undergoing each step and task, country teams should have a solid understanding of the supply chain performance challenges and underlying problems in their supply systems. Country teams should have on hand logistics management information system (LMIS) data, and any assessments that have identified supply chain performance problems or diagnosed their underlying causes.

Potential resources include:

- Program-specific strategic and financing plans (pharmaceutical management master plans, commodity security plans, supply chain master plans, etc.)
- Human resource capacity development plans
- Results of rapid pharmaceutical management assessments
- Logistics indicators assessments



3.3 DIRECTIONS

For each step in the design process described in the following chapters, review the underlying concepts, objectives, tasks, and considerations. Discuss your responses as a team and document your final decisions for each step in its associated table. Also, be sure to identify key stakeholders who would be critical to engage with for each step. For example, identifying indicators and performance targets may

require further discussion with teams at the CMS, subnational-level medical stores, district teams, facility representatives in charge of supply management, monitoring and evaluation experts at the Ministry of Health, and LMIS experts (to provide input as to the feasibility of measuring proposed indicators).

BOX 3: COMMON MISTAKES IN PBI DESIGN

Good performance-based incentives should have the following characteristics:

- The incentive should be large enough to trigger a change in behavior
- The incentive should work for the majority of recipients
- The marginal impact of the incentive should outweigh the sum of the actual incentive and the administrative/transaction cost associated with delivering the incentive
- The incentive should inspire and promote team work
- The incentive should be replicable over multiple periods and it should be scalable
- The incentive should not be an enabling condition
- The amount of the incentive should be easily adjustable to reflect the level of performance

Based on these desired characteristics, here are a few **examples of inadequate incentives** in the context of PBI:

Incentive	Why inadequate in the context of PBI?
<ul style="list-style-type: none"> • Paying for a training 	<ul style="list-style-type: none"> • Not easily adjustable to the level of performance (difficult to award only 1/10th of the cost of a training, for example) • Not easily replicable over multiple periods • Not necessarily valued by the majority of recipients
<ul style="list-style-type: none"> • Paying for a forklift 	<ul style="list-style-type: none"> • Same arguments as for training • May be more of an enabling condition

4. WHAT IS THE EXPERIENCE OF APPLYING PBI TO STRENGTHEN THE PERFORMANCE OF SUPPLY CHAINS?

4.1 OBJECTIVE

- To identify key lessons from the experiences of institutions and managers who have applied PBI to public and commercial sector supply chains

4.2 KEY CONCEPTS

Evidence from several well-controlled studies has shown that PBI can be used successfully to improve health service delivery in both well-resourced and under-resourced settings. For example, the work of Basinga, Gertler, et al. in Rwanda (2011) and Eichler, Auxila, et al. in Haiti (2009) has shown that PBI can be used to improve quality of care and access to maternal and child health services in poor rural settings. Against this background, it is therefore reasonable to assume that carefully designed and well-implemented PBI interventions can be used to drive improvement in public supply chain performance. In theory, PBI offers opportunities to strengthen supply chains by linking performance to rewards.

PBI is often used in commercial sector supply chains worldwide. However, to date there have only been very limited applications in public sector supply chains. This holds true for both interventions aimed at supply chain professionals and institutions, and also for the supply chain-related performance of health facilities. In this chapter, we provide examples from both the commercial and the public sectors. We also summarize the key lessons we can learn from these examples. For a more extensive discussion of these commercial and public sector examples, we recommend the PBI pages of the USAID | DELIVER PROJECT website.⁶ It includes a detailed description of each example, including a summary literature review based on examples drawn from the major bibliographic databases. The website is regularly updated with new examples and results from existing PBI schemes that have a supply chain component. Programs were identified in Africa, Asia, and Latin America, and were supported by a range of donors including the World Bank, United Nations Population Fund (UNFPA), Asian Development Bank (ADB), Nordic Development Fund (NDF), USAID, and the Bill and Melinda Gates foundation.

4.3 COMMERCIAL AND PUBLIC SECTOR EXAMPLES

The commercial sector routinely uses performance-based approaches in the supply chain. A few examples are shown in Box 4. Examples from the public sector are presented in Box 5.

⁶ <http://deliver.jsi.com/dhome>

BOX 4: COMMERCIAL SECTOR PBI EXAMPLES

CIGNA (a U.S. health insurer) and **Merck** (pharmaceutical company) signed a performance-based contract in 2009, aligning incentives along the supply chain (from supplier to consumer) by linking drug discounts to blood sugar goals. Merck offers discounts on select diabetes drugs to people insured by CIGNA based on improved medication adherence and health outcomes (CIGNA and Merck 2009).

UPS has a company-wide incentive program based on key performance indicators for the corporation and/or individual business unit. These incentives are split among employees in some way (e.g., cash or company stock) depending on rank and tenure. Indicators of performance may include:

- supply chain service goals to customer such as overall “on-time” percentage
- employee training goals
- financial profit and revenue goals
- safety (reduced number of accidents)

The company provides further individual incentives that are part of a “Rewards Program” designed to target and reward outstanding performers or working groups for their contributions to the corporation or business unit. Often they are designed to target and reward those employees who can quickly achieve a desired goal or exemplify to other employees their willingness to embrace changes resulting from corporate direction or strategy. These rewards can vary greatly, from small token items such as tee shirts and pens to really expensive gifts, and include:

- rewards points from a gift catalog
- vacation trips for employee and spouse
- gift certificates or gift credit cards

BOX 5: PUBLIC SECTOR PBI EXAMPLES

Ghana: This small program aims to improve the timeliness, accuracy, and completeness of logistics reports at 17 health facilities in urban Ghana. Geographic areas that score highest on reporting indicators receive small amounts of equipment.

Paraguay: This program was carried out in all 19 health districts, with the aim of lowering contraceptive stock-out rates at service delivery points. Family planning program managers who maintained zero stock-outs of the four basic contraceptives covered by the Ministry of Health (condoms, oral contraceptives, Depo-Provera, and intrauterine devices) were awarded training opportunities every quarter worth roughly US\$40.

Rwanda: The nationwide scheme is carried out in 40 district hospitals and another 500 health centers with the aim of improving the quantity and quality of primary health care services. The facility receives monthly payments based on the numbers of priority services they deliver. Facilities are assessed quarterly on a wide range of service quality indicators, including for supply chain management. Overall scores on these quarterly assessments discount the total amount of the facility payments for delivered services. Facilities distribute roughly 85 percent of the award to staff in the form of bonuses, which account for up to one-half of salary.

Source: Stewart, Bahirai et al. 2012 (forthcoming).

4.4 KEY FINDINGS AND LESSONS

Examples of the use of PBI in public health supply chains in developing countries are scarce, but not unheard of (see Section **Error! Reference source not found.**). Usually, the supply chain is a small subset of a much larger PBI scheme focused on improving health service delivery (see, for example, the box to the right). In the programs found, supply chain indicators were elements of a larger PBI scheme, usually aimed at improved overall health outcomes.

This is also reflected in the level at which the interventions are aimed. Despite having different contextual issues and bottlenecks, nearly all examples are of programs targeting the facility level of the supply chain. There is room for further exploration of PBI at higher levels of the supply chain, i.e., central, regional, and/or district levels. The limited number of examples includes both monetary and nonmonetary rewards. Unfortunately, there are no good evaluations of the impact of PBI on performance of public health supply chains in developing countries.

Emerging Themes

- Performance problems may benefit from PBI. Rewards within PBI can be both monetary and nonmonetary, though we question whether nonmonetary reward models can be scaled up and sustained
- Usually PBI for supply chain is a subset of a larger program
- Results are not routinely collected

5. STEP 1: UNDERSTANDING EXISTING INCENTIVES IN YOUR SUPPLY CHAIN SYSTEM

5.1 OBJECTIVE

- To understand how incentives exist in all environments and to identify the current incentives imbedded in your supply chain management system

5.2 KEY CONCEPTS

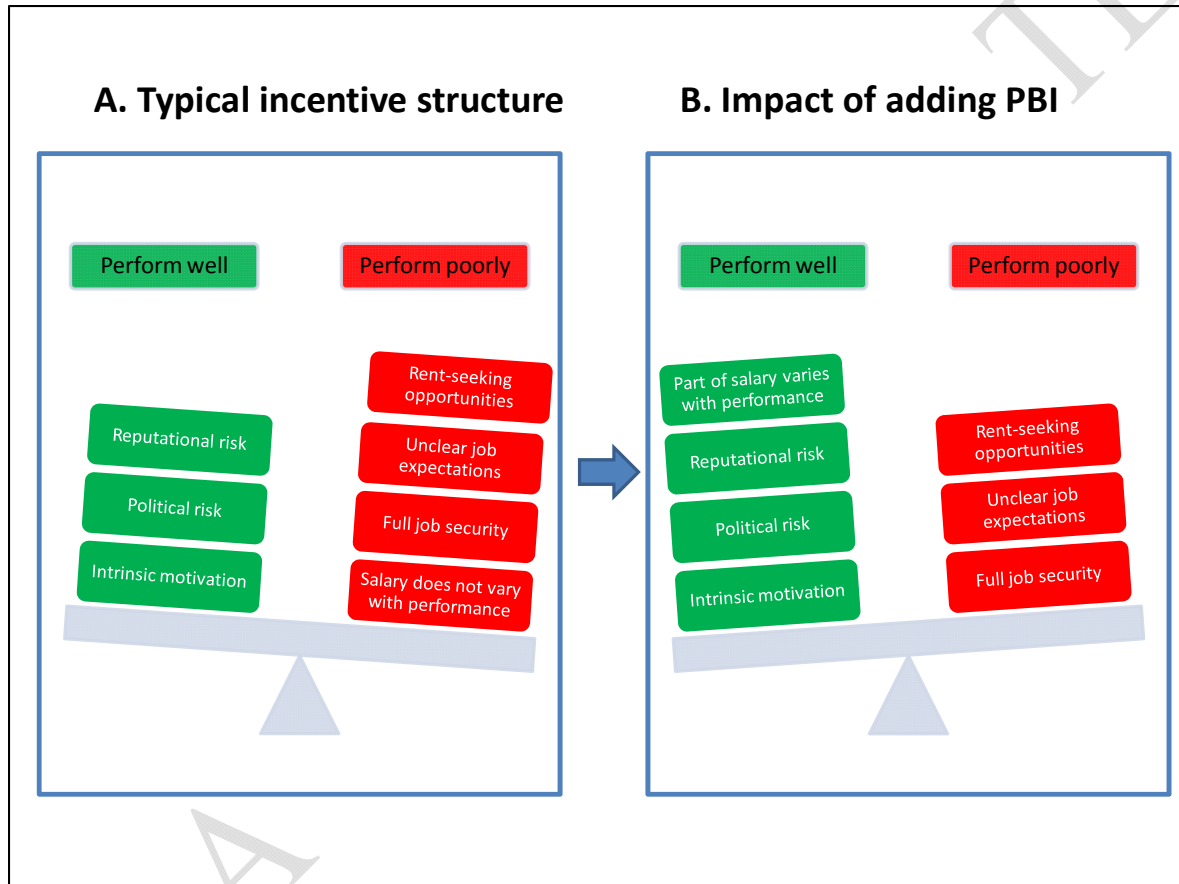
Incentives exist in all environments, and are those factors that influence the behavior of the individuals or units that make up the supply chain. Ideally, incentives should stimulate the actors at each level to work towards the overall goal of a well-functioning supply chain. In almost all supply chains, however, the existing incentives do not typically favor good overall system performance. When this is the case, we say that the existing incentives are “misaligned.” Understanding the role of incentives and their potential for complementing the human resources, infrastructure, information systems, processes, and knowledge needed to operate a high-performing supply chain system is the objective of this chapter.

Incentives can influence behavior toward good performance (and, thus, alignment with overall goals), or toward poor performance and misalignment. Influences in both directions exist in almost every system and it is the relative impact of each type of incentive that will determine whether the balance tips in the favor of alignment or misalignment. Part A of Box 6 shows a simplified illustration of a typical incentive structure in a public sector supply chain. On the side of the scale favoring alignment with supply chain goals, at the base is always some degree of intrinsic motivation on the part of each worker. Intrinsic motivation is the innate willingness to help others and the sense of professionalism, reinforced by peers and their own self-image, which encourages them to do a good job. Another type of incentive that exists for some actors and which encourages good performance is termed “reputational risk,” which Yadav, Curtis, et al. (2006) define as “the impact that negative publicity [related to poor performance] can have on an institution's future, e.g., decline in future revenues or donor funding, reduction in the customer base, costly litigation, or restructuring to take away authority over a function.” A third type of incentive that generally influences in the direction of good performance is “political risk.” Political appointees who are sensitive to public opinion face risk when the supply chain performs poorly. They may also be rewarded politically when things go well. On the other side of the scale are common factors that push the balance toward poor performance and misalignment with supply chain goals. For most civil servants, salaries do not vary with performance. Moreover, civil servants typically have job security and thus cannot be fired for poor performance. When job expectations are unclear, actors may not even know the link between their performance and overall supply chain goals. At the same time, actors may actually profit financially from a poorly performing supply chain, for example when lack of good information systems enhance opportunities for theft. Although we noted that political risk can generally be a positive force favoring good performance, it can also work in the opposite direction. Politicians may, for example, pressure supply chain managers to use the supply chain as a way to disburse political favors

(e.g., by diverting commodities to politically favored areas of the country), which weakens the overall performance of the system.

Part B of Box 6 shows the theoretical impact of introducing PBI into the balance. First, PBI adds an element of financial risk by varying individual earning with performance (although generally leaving the fixed component of salary unchanged). Some of this financial risk gets transferred to the “aligned” side of the balance as a financial reward for good performance (and penalty for poor performance). PBI also typically adds an element of peer pressure to perform, since most awards are based on team rather than individual performance.

BOX 6: EXISTING INCENTIVES AND POTENTIAL OF ADDING PBI TO SUPPLY CHAINS



5.3 TASKS

1. Map your supply chain
2. Describe how commodities, information, and funds flow in your supply chain
3. Describe the functional units within each “link” in your supply chain
4. Complete your incentive map

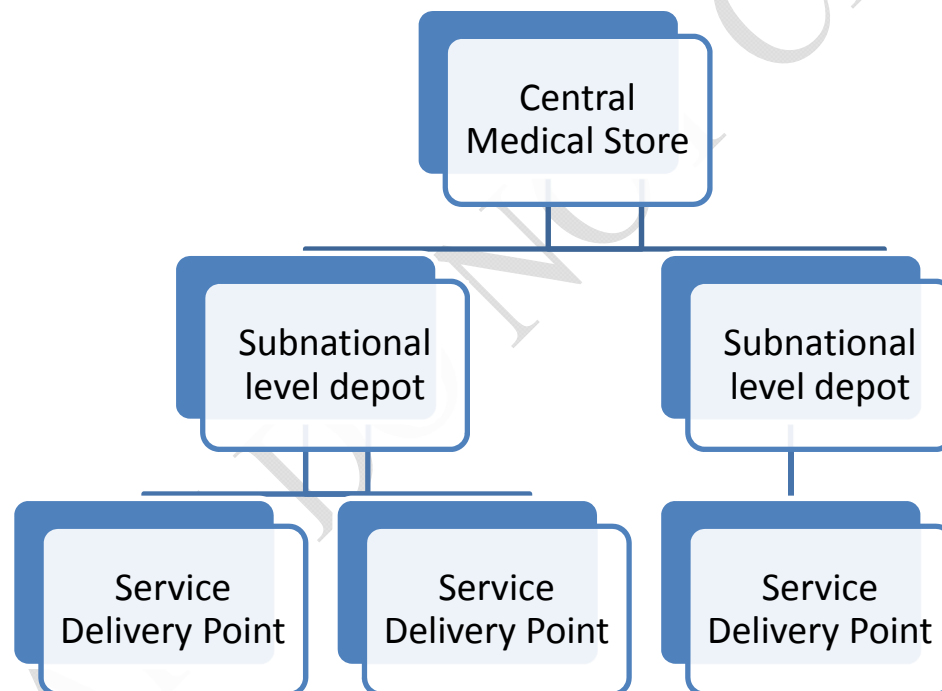
5.4 CONSIDERATIONS

You will need to begin with a diagnostic process to help you understand existing incentives in your supply system and whether they motivate or hinder strong supply chain performance. This foundation

will provide the starting point to build on, that will enable you to consider additional incentives to inspire efforts and actions by many supply chain actors to improve the performance of your supply chain system. The following steps will help you map your supply chain and unpack the *existing* incentives operating within each link in the chain, as well as between the links.

- I. Map your supply chain: You will begin by mapping the structure of your public supply chain. **Error! Reference source not found.** presents the simplified structure of a typical public sector supply chain. Your map may have more levels and/or elements. You may, for instance, have multiple subnational levels (e.g., regional and district level depots) or vertical programs with parallel structures (e.g., distribution systems for vaccines, TB treatment, or HIV/AIDS treatment). Your mapping may also include elements of the NGO or private commercial sector that are integral to the public health supply chain in your country.

BOX 7: STRUCTURE OF A TYPICAL PUBLIC SUPPLY CHAIN



2. Describe how commodities, information, and funds flow in your supply chain: Next you will need to describe the process of how service delivery points receive commodities. Imbedded in these processes are incentives that may enhance or hinder supply chain performance. While some processes may need to be taken as a given in the immediate term, it may be possible to overlay additional incentives that will improve performance. In the longer term, reforms may be introduced that change the structure and the incentives in your supply system.
 - a. Is it a “pull” system where SDPs request commodities and these requests are aggregated by subnational-level depots and submitted to the CMS, which results in orders being filled by the CMS and distributed to subnational-level depots and ultimately to SDPs? Is it a “push” system whereby decisions about quantities of health commodities for SDPs are made by a higher level and commodities are delivered according to a schedule? Is there a combination; as in an “informed push” system where essential logistics data are

sent from SDPs to a higher level and the higher level uses the data to determine quantities to be sent to SDPs?

- b. How are commodities transported? Does the CMS own vehicles and employ drivers or is this function contracted to a third party? What are the checks and balances to ensure that the commodities that are loaded onto a truck reach the subnational depot or SDP?
 - c. How does information flow from SDPs to the CMS to inform how much to procure? Is this complemented by other information such as historical consumption patterns, patient morbidity data, patient treatment data, and/or demographic trends?
 - d. Who controls the money to pay for commodities and how does money flow? To answer this question you will need to consider whether your system is highly centralized, with all funding for commodities managed at the central level, or whether you operate within a decentralized system with control over funding at local levels. Your system may also have dedicated funding streams to pay for commodities for specific programs (for example, Expanded Program on Immunization (EPI)). SDPs may also control some funds that they can use to purchase key commodities to fill a gap.
3. Describe the functional units within each “link” in your supply chain: The next step is to describe the different functional units within each entity. For example, your CMS may have functional units in charge of planning, procurement, warehousing, and distribution. Your regional depot may have functional units in charge of quantification, planning, warehousing, and distribution. SDPs may focus on stock management and distribution.
 4. Complete your incentive map: Once you have identified the functional units in each link in your supply chain, it is time to examine the incentives faced by management, by each team in charge of a functional unit, and by the individuals that make up each team.

Table I displays the structure of an incentive map for an illustrative country that has a supply chain system characterized by a public CMS, regional depots, and SDPs. The rows show the entities in our illustrative supply chain system and the functional units that operate within each entity. Borrowing from the categorization used by Yadav, Curtis, et al. (2006), across the top we consider the degree of three types of externally imposed⁷ risk assumed by each functional unit within each entity and associated with poor performance of their functions, along with their degree of intrinsic motivation. In this example, no one bears any financial risk because all workers are public employees with civil servant salaries that don't vary with their performance, and they have full job security. Although not political appointees, the directors of the CMS, subnational depots, and SDPs face political risk because they are under pressure from politicians to perform well. The directors also face some reputational risk, particularly at the CMS level. We assume that there are medium levels of intrinsic motivation for directors and low levels of intrinsic motivation for the rest of the supply chain staff.

⁷ It is important to emphasize that people may be driven to perform well for reasons other than financial risk. This assessment is considering only externally imposed risk, as performance-based incentives are externally imposed interventions to counteract environments of low risk that lead to poor performance and weak accountability.

TABLE 1: ILLUSTRATIVE INCENTIVE MAP

Supply Chain Entities and Functional Units	Level of Incentive	Financial Risk	Political Risk	Reputational Risk	Level of Intrinsic Motivation (Low, Medium, High)
CMS					
Director	Individual	—	+	+	Med
Planning	Team	—	—	—	Low
	Individual	—	—	—	Low
Procurement	Team	—	—	—	Low
	Individual	—	—	—	Low
Warehousing and inventory management	Team	—	—	—	Low
	Individual	—	—	—	Low
Distribution	Team	—	—	—	Low
	Individual	—	—	—	Low
Subnational Depot					
Director	Individual	—	/	/	Med
Planning	Team	—	—	—	Med
	Individual	—	—	—	Med
Warehousing and inventory management	Team	—	—	—	Low
	Individual	—	—	—	Low
Distribution	Team	—	—	—	Low
	Individual	—	—	—	Low
SDP					
Director	Individual	—	/	/	Med
Pharmacy	Team	—	—	—	Low
	Individual	—	—	—	Low

Note: [“—” means no risk; “/” means some risk; “+” means considerable risk associated with poor performance]

For your own mapping, begin by considering the existing incentives in each link. What follows are some questions to guide this process:

I. Consider the management of your CMS.

- To what extent do they face political risk? If the director is a political appointee it is likely that he/she responds to incentives that are in line with the position of her/his political party and with the elected official that appointed her/him. Incentives may be to show the population evidence of improved availability of commodities and enhanced transparency and accountability. A strong incentive design would build on the political ambitions of a politically appointed CMS director.
- To what extent do they face financial risk? If she/he is a civil servant it is likely that he/she receives a salary that is not affected by whether she/he performs well or poorly. Add to this that a civil servant is often guaranteed a job for life and you will find weak incentives to devote extra effort to solve challenges and to enable strong supply chain

performance. For civil servants the opportunity to earn performance payments linked to achievement of targets for improvement can be motivating.

- c) To what extent do they face reputational risk?
- d) What is the degree of intrinsic motivation?

2. Consider each functional unit.

- a) Are functional units clearly defined and do staff know which unit they are assigned to and their roles?
- b) Each functional unit has financial incentives as a team as well as individual incentives. For example, the warehouse may be staffed with a combination of civil servants that are complemented by day laborers. Civil servants face the financial incentives described above for a civil servant manager. In contrast, day laborers face the possibility that they won't be hired in the future if they perform poorly. Alternatively, they may have the incentive to stretch the number of days it takes to fulfill a job. Day laborers are less likely to view themselves as part of a team.
- c) Who is each functional unit accountable to? What are the existing rewards/penalties, if any, for good/poor performance?
- d) What is the degree of intrinsic motivation?

3. Consider reporting relationships between levels and associated incentives.

- a) Do subnational-level depots report to the CMS, or is your country decentralized so that subnational-level depots are accountable to regional or district-level governments?
- b) Similar questions as above.

Box 8 illustrates this step with the example of Mozambique, where PBI has been introduced for the CMS.

BOX 8: MOZAMBIQUE – PBI FOR THE CENTRAL MEDICAL STORE

To strengthen the performance of the central medical store (CMAM) in Mozambique, USAID is considering a grant that will pay CMAM only if they achieve quarterly performance targets. CMAM's director is politically appointed and CMAM employees are civil servants who receive fixed salaries. Day laborers are hired to complement CMAM warehouse staff. CMAM's performance problems are partly due to weak systems, which the Ministry of Health, in collaboration with its development partners, is in the process of strengthening. To complement technical assistance and support to purchase and implement modern systems and processes, USAID is introducing incentives through a grant to provide the opportunity to earn additional funding conditional on performance. This grant changes the incentive map from one similar to the depiction of CMS incentives in Table 1 to the following:

Supply Chain Entities and Functional Units	Level of Incentive	Financial Risk by Function			Political Risk	Reputational Risk	Level of Intrinsic Motivation
		Forecasting and Supply Planning	Warehousing and Inventory Management	Transportation			
CMS		+	+	+	+	+	
Director	Individual	+	+	+	+	+	High
Planning	Team	+	—	—	—	—	Medium
	Individual	+	—	—	—	—	Medium
Procurement	Team	—	—	—	—	—	Medium
	Individual	—	—	—	—	—	Medium
Warehousing and inventory management	Team	—	+	—	—	—	Low
	Individual	—	+	—	—	—	Low
Distribution	Team	—	—	+	—	—	Low
	Individual	—	—	+	—	—	Low

["—" means no risk; "/" means some risk; "+" means considerable risk associated with poor performance]

A participatory process determined that the initial grant would focus on planning, warehouse management, and distribution. Functional teams were engaged to specify indicators and to agree on quarterly targets that they believed could be achieved with some effort. When quarterly targets are reported and verified, CMAM will receive the portion of payment associated with achieved targets. A portion of the grant payments may be used to provide performance bonuses to functional units to strengthen teamwork, and to individual workers to reward effort.

You are now ready to complete an incentive map for your supply chain, using Table 2 provided at the end of the chapter. You will use this map to identify the recipients of PBI, to guide selection of indicators and targets, and to structure payment mechanisms in later steps in this process.

TABLE 2: SUPPLY CHAIN PBI STEP I WORKSHEET

Step I: Incentive Map										
Supply Chain Entities and Functional Units	Level of Incentive	Financial Risk by Function						Political Risk	Reputational Risk	Intrinsic Motivation
		Product Selection	Forecasting and Supply Planning	Procurement	Warehousing and Inventory Management	Transportation	Waste Management			
CMS										
Director	Individual									
Planning	Team									
	Individual									
Procurement	Team									
	Individual									
Warehousing and inventory management	Team									
	Individual									
Distribution	Team									
	Individual									
Subnational Depot										
Director	Individual									
Planning	Team									
	Individual									
Warehousing and inventory management	Team									
	Individual									
Distribution	Team									
	Individual									
SDP										
Pharmacy	Team									
	Individual									

["—" means no risk; "/" means some risk; "+" means considerable risk associated with poor performance]

6. STEP 2: HOW IS YOUR SUPPLY CHAIN PERFORMING?

6.1 OBJECTIVE

- To identify what the top problems in the supply chain are and how to prioritize them
- To examine which of the top problems in the supply chain can benefit from PBI as part of the solution

6.2 KEY CONCEPTS

- Performance problems in this context refer to supply system outcomes in need of significant improvement, possibly through a PBI intervention.
- Performance goal refers to the “general aim towards which to strive; a statement of a desired future state, condition, or purpose. A goal differs from an objective by having a broader deadline and usually by being long-range rather than short-range” (European Observatory 2008). For example, a performance goal may be “wastage due to expiry is reduced.”

6.3 TASKS

1. Examine data on supply system performance and identify top problems
2. Identify underlying causes related to motivations, and actions that need to be taken by supply chain entities, teams, and individuals
3. Prioritize based on whether change is possible and the benefit would be significant
4. Choose top five
5. Identify broad performance goals

6.4 CONSIDERATIONS

Any PBI program must be designed to target improvement of specific and well-defined performance problems. Therefore, supply chain PBI program implementers must spend considerable time analyzing and defining the supply chain problems and underlying causes that PBI programs can solve. A commonly used standard method of determining the level of performance of a public health supply chain is to examine periodically whether it regularly achieves the “six rights” – that the right health commodities reach the right people at the right place in the right quantities and right quality at the right time.

While it may be tempting to address many performance-related goals, it is wise to limit program goals to a small number (fewer than 10) at the outset to ensure success of the PBI program. PBI program designers should prioritize goals based on the following considerations:

- What will be the impact on priority supply chain performance problems?
- What is the likelihood of influencing results?
- What is feasible to implement at this time?

Also, consider the following questions:

- Where is the largest performance improvement needed? What specific results are desired?
Illustrative areas for improvement are:
 - Wastage due to expiry is reduced
 - Leakage is eliminated
 - Product availability at the service delivery level is improved
- Consider current incentives and how they affect motivation and actions. Understand the existing incentive environment, because new incentives (the result of PBI) will be introduced on top of existing ones; the interaction of the two will influence the overall result. Refer to the diagnostic process from Chapter 5.
- Where are large performance improvements possible?
- Are desired actions/behavior changes under the supply chain actor's control?

Many tools have been developed over the years to evaluate supply chain performance. For instance, the USAID | DELIVER PROJECT regularly uses the Logistics Indicators Assessment Tool (LIAT) and the Logistics System Assessment Tool (LSAT) (Box 9 illustrates how these tools were applied in Zambia). Most often used jointly, the LSAT is designed to facilitate a comprehensive qualitative assessment of the separate components that make up a logistics system, and the LIAT is used to assess how well the system is functioning by measuring key quantitative indicators. Both tools were developed for use by ministries of health, NGOs, and other supply chain stakeholders. For a detailed discussion of these tools, please visit the project's website,⁸ where you will also find accompanying user guides that give step-by-step instructions on how to adapt and use the tools.

The Supply Chain Management System Project⁹ is currently field-testing supply chain capability-maturity and performance diagnostic tools. The hypothesis being tested is that the performance of the supply chain affects and is affected by its capability and maturity and that interventions to improve capability and maturity will have an impact on performance. We hypothesize that well-designed and -implemented performance-based incentives will catalyze better supply chain performance in capable and mature supply chain systems than in less-mature supply chain systems.

An assessment should be done before the PBI intervention to inform PBI design and to capture baseline data that will enable ongoing evaluation of the impact of PBI. Assessments might be incorporated into forecasting and system design workshops at the country level and the submission of key status reports by technical assistance providers. It is advisable for assessors to conduct a limited number of site visits, focus groups, and semistructured interviews to accumulate both qualitative and quantitative evidence

⁸ <http://deliver.jsi.com/dhome>

⁹ Please note that the Technical Working Group that is addressing these tools includes representation from the USAID | DELIVER PROJECT and the SIAPS project.

that supports the conclusions they reach. The scope of the assessment depends largely on the resources that are available. All relevant stakeholders should develop and approve the assessment plan and commit to seeing the process through to the end. One of the more important initial steps in a supply chain assessment is undertaking secondary research to determine what relevant data and information already exist. For example, sufficient data for a situational analysis can often be found in surveys already conducted by other organizations.

BOX 9: A SUPPLY CHAIN PERFORMANCE ASSESSMENT OF ZAMBIA

In 2008, the Zambian Ministry of Health, with assistance from the USAID | DELIVER PROJECT, carried out an assessment of the logistics system for family planning commodities. The purpose of the logistics system assessment and stock status survey was to provide the Ministry of Health, USAID/Zambia, and other stakeholders with information on the availability of family planning commodities and logistics information at the district and health facility levels. This comprehensive assessment of the logistics system consisted of both quantitative and qualitative data collection using two separate data collection tools: the Logistics Indicators Assessment Tool (LIAT) and the Logistics System Assessment Tool (LSAT). Specific assessment objectives included:

- Assessing selected inventory control procedures and logistics management practices (i.e., ordering, transport and distribution, supervision, etc.) within the system
- Collecting data on stock-out rates, stock-out frequency and duration, consumption/issue rates, current stock on hand, and storage conditions

The observations included an assessment of logistics records and reports, supervision, storage conditions, and stock availability.

Findings

- i. *Low availability of essential data items:* A culture of record-keeping and reporting existed in the family planning program both in health facilities and the districts. Yet, availability of records and reports with essential logistics data items such as stock on hand, consumption, and losses and adjustments was not high. Within the program, the utilization of logistics records and reports was rarely found in combination.
- ii. *Weak logistics management information systems (LMIS):* The discussion during the LSAT revealed a very weak LMIS system for family planning, with scores below 10 percent. This is substantiated by the survey finding of a low rate of inclusion of essential logistics data in the reports. The finding also draws attention to the training of logistics managers on record keeping and reporting, and the supervision facilities receive in logistics management.
- iii. *Underperformance of staff:* Around 70 percent of the respondents from the health facilities reported receiving either on-the-job or workshop training, and a similar percentage reported a recent supervisory visit. Yet, the observations made in the field with regard to record keeping and reporting raise questions about the level of the training and supervision. These indicators were self-reported, and could be subject to overstatement. Apart from this, it is likely that many of the managers did learn to complete the forms, but as the system is weak, commodity managers did not feel compelled to keep the logistics records properly. With regard to supervision, the GIS mapping shows that the supervisory visits were concentrated in two provinces, while in other areas the visits were rather random.
- iv. *Stock-outs:* The stock availability indicator varied by the types of products, but not much between health facilities. Across the facilities, stock-out on the day of visit was common for most of the products, except for male condoms and Oralcon-F. The survey collected stock-out data at two points, which provided an opportunity to observe changes over time. During the period October 1 to December 31, 2007, in two of the four surveyed provinces, health facilities experienced stock-outs. The interesting find was that in the other two provinces, during the same time period, most of the surveyed facilities had the products of interest, indicating a wider issue than not having the products at the sources.

6.6 THE ASSESSMENT PROCESS

Step 2a: The first part of this step is to identify the current challenges hampering performance of supply chains. For instance, classify supply chain problems into categories of commodity availability, affordability, and quality, organized by supply chain level (see the example in Table). Sources of information on supply chain problems include stakeholder interviews; document review; LMIS data; systematic data collection exercises such as the LIAT, LSAT, Capability Maturity Model (CMM), and Supply Chain Key Performance Indicators (KPIs); end-use verification; and other special studies.

BOX 10: OVERVIEW OF THE SUPPLY CHAIN ASSESSMENT PROCESS

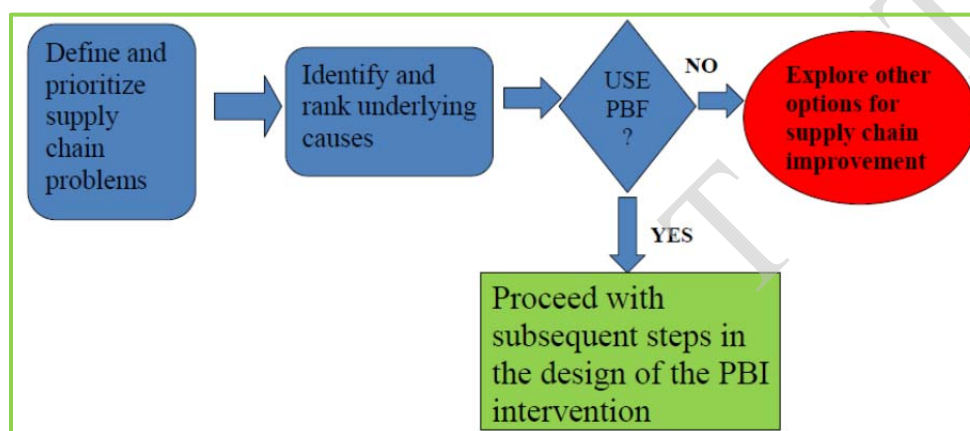


TABLE 3: EXAMPLES OF SUPPLY CHAIN PERFORMANCE PROBLEMS BY PERFORMANCE AREA AND LEVEL IN ONE COUNTRY

Performance Area	Level of Supply Chain		
	Central	District	Service Delivery Point
Availability			
a. stock-outs	Insufficient levels of stock, especially of nonprogram essential medicines	Insufficient levels of stock, especially of nonprogram essential medicines	Insufficient levels of stock, especially of nonprogram essential medicines
b. expiry	Significant quantities of expired stock	Large quantities of expired stock	Large quantities of expired stock
c. excess inventory	No problems	Overstocking of antimalarials	No problems
Affordability			
a. cost of medicines	Possible problem if prices that CMS is paying are much higher than international reference price	No problems	Generally affordable to clients because of reimbursement through social insurance and low co-pay
Quality			
a. Drug quality		Products obtained from private market are of uncertain quality	Products obtained from private market are of uncertain quality

Key: (performing well - white; some performance problems – light green; not performing well – dark green)

Step 2b: The next part of Step 2 is to prioritize the supply chain problems that the PBI intervention should focus on. Most supply chains exhibit a range of problems. You will want to focus your efforts on addressing the worst problems. Of course, “worst” is a relative term. Thus, it is important to prioritize the supply chain problems identified in Step 2a in as objective a manner as possible. There are some criteria to consider when prioritizing problems such as: prevalence of the problem in the system; seriousness in terms of the impact on the desired outcome/performance area; manageability of the problem in terms of available resources to deal with it; and potential significance of dealing with the problem with respect to the “six rights.” You can use various ranking methods to assess problems against such criteria, but be sure to be consistent and transparent in how you prioritize. Also, it is important to take into consideration other strategic priorities for the supply chain or for the health system in general. For instance, one health system might be planning to step up access to HIV/AIDS testing services through a campaign of increased testing and initiation of antiretroviral (ARV) treatment. The system will need to deliver an increased number of tests to district labs to handle the likely increase in demand for tests. Performance incentives might focus on rewarding the links in the supply chain that contribute to making sure that HIV tests are supplied where they are needed.

Step 2c: Next, it is important to analyze the underlying causes of the supply chain problems that the PBI intervention will seek to solve. The main purpose here is to examine whether the underlying causes are amenable to a PBI approach. Generally, PBI interventions work best on those challenges that are caused by people and teams not taking actions to work hard, identify solutions, or work effectively together. If supply chain problems and causes are not linked to actions of individuals and teams, then PBI interventions might not be the correct remedy. For example, causes of problems related to a lack of processes, tools, or infrastructure cannot be addressed through PBI.¹⁰ Likewise, problems caused by a lack of knowledge, skills, or technical competencies will not be improved on their own by a PBI intervention. For instance, if warehousing personnel have not been trained in correct receiving, put-away, and dispatch procedures, these processes are unlikely to improve on their own with a PBI intervention. However, if the warehousing personnel receive training in these procedures, PBI can be used to improve the uptake and actual use of these new skills. There are several ways of analyzing underlying causes to a supply chain problem. One frequently used example is the Ishikawa fishbone approach illustrated in BOx . This analysis can be organized according to the functions and levels within the supply chain.

Step 2d: Finally, you need to consider the potential of PBI to motivate the desired behavior necessary to remove the underlying causes and, ultimately, contribute to solving the supply chain problem. Consider also whether it is possible to attribute existing performance problems to underlying causes at the individual, team, or institutional level. One way to do this is by examining the motivation of stakeholders to engage in the desired behavior. For the desired behavior associated with each underlying cause of performance problems, assess the stakeholder motivation, as illustrated in Table .

¹⁰ However, it should be noted that where processes, tools, or infrastructure exist but are not being utilized properly or fully to strengthen supply chain performance, PBI, if directed at the right people and teams, could have a significant impact on performance by catalyzing more effective use of existing capacity.

BOX 11: EXAMPLES OF UNDERLYING CAUSES OF STOCK-OUTS, BY SUPPLY CHAIN LEVEL AND FUNCTION

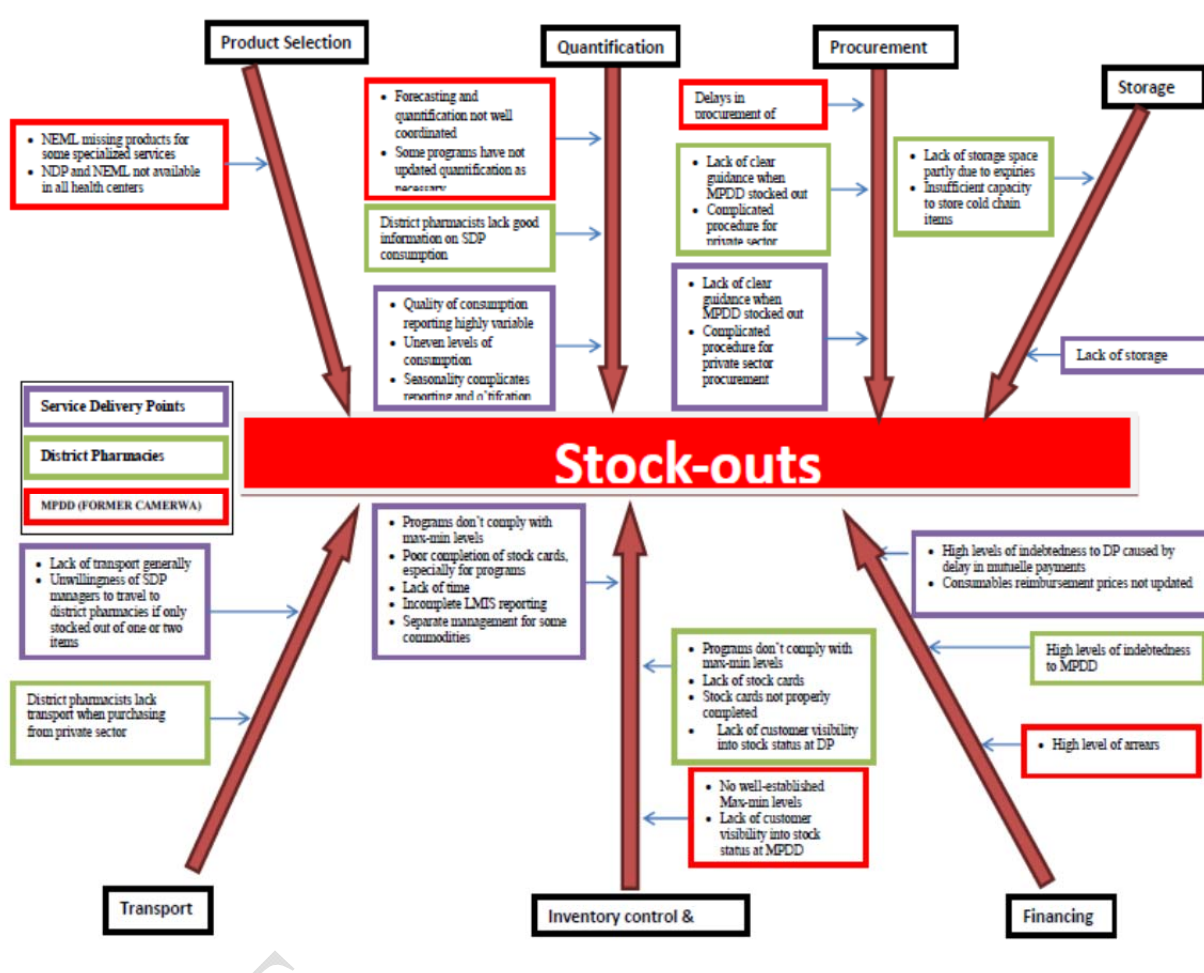


TABLE 4: EXAMPLE OF ASSESSMENT OF STAKEHOLDER POSITION TO IDENTIFY MISALIGNED MOTIVES

Desired Behavior (Flipside of underlying causes)	CMS	Intermediate Medical Store	SDPs	Donors	Private Sector	Politicians	Insurance Authority
Improved delivery to SDPs	Indifferent	Motivated	Motivated	Motivated	Unmotivated	Indifferent	Motivated

TABLE 5: SUPPLY CHAIN PBI STEP 2 WORKSHEET

Step 2: Performance Problems and their Underlying Causes, in Order of Priority			
Performance Problems	Rationale for Selection	Underlying Causes	Performance Goal
1.			
2.			
3.			
4.			
5.			

Country stakeholders to involve when defining Step 2:

7. STEP 3: DETERMINE RECIPIENTS AND HOW TO SELECT THEM

7.1 OBJECTIVE

- To identify **whose** behavior you want to change through the introduction of PBI and who would potentially receive performance payments

7.2 KEY CONCEPTS

Recipients are institutions and/or individuals that can potentially receive incentive payments provided they meet performance targets. PBI initiatives aimed at strengthening supply chain performance can target a variety of potential recipients including central medical stores, regional depots, district health teams, service delivery points, teams within each entity, and individuals who work within supply systems.

In some public systems, a recipient may also be an entity that is contracted to perform a function with payment terms that are conditional on their performance. Some countries, for example, may contract with a transportation company to transport commodities from warehouses to the next level in the supply chain.

In countries that are implementing PBI for service delivery, there may be opportunities to incorporate some supply chain performance indicators as part of the package of metrics that are rewarded at both the SDP level and the subnational team level that is responsible for supporting SDPs. In Rwanda, for example, health facilities receive payments for each unit of services provided from a specified list. In addition, facilities are assessed each quarter and assigned a score based on structural and process measures and adherence to clinical guidelines. Included in this assessment are measures that assess how supplies are managed and their availability. A new PBI scheme is also being implemented in Rwanda that rewards community health workers for their role in assuring that commodities are available for community case management of childhood illnesses (Box 7-1).

You may want to consider whether there are preconditions that need to be met before a recipient can qualify to be paid based on performance. This, in itself, can be a form of PBI as it provides incentives to strengthen systems to be able to meet the conditions to participate.

7.3 TASKS

1. Determine whether there are other PBI initiatives in operation in your country that would be enhanced by rewarding supply chain performance measures
2. Identify potential recipients based on the top performance problems that PBI is meant to address
3. Determine how recipients will be selected, for example, whether preconditions need to be met before participating

7.4 CONSIDERATIONS

Selecting the type of recipient to pay

Selection of the recipients should be based on the top performance problems that need to be addressed and the behaviors that need to change in order to improve supply chain performance (relating to the underlying causes of performance problems). In determining who should be rewarded for performance, review the underlying causes and consider the following:

- Strong supply chain performance is the result of teams of people working together. Incentives at the team level inspire initiatives to strengthen systems. In addition, incentives awarded to teams or functional units will be expected to inspire team members to monitor each other, as the performance of each team member impacts on the performance reward that is shared by the team.
- If the supply chain functions carried out by the CMS need strengthening, consider rewarding functional units within the CMS in addition to the entity as a whole.
- Consider the impact of incentives to drive changes in the behaviors and actions of recipients as part of your analysis. Will performance incentives motivate changes in behavior that lead to enhanced supply system performance? Does the recipient operate in an environment with other incentives that may conflict? Does the recipient have the power to make the changes needed to achieve desired improvements in performance?
- Consider enhancing existing PBI initiatives by incorporating supply chain indicators and rewarding their improvement. In particular, initiatives that reward health facilities and district health teams for increasing utilization and quality of services may benefit from including supply chain indicators.
- Consider also whether the benefits outweigh the costs of monitoring. For example, it may be less costly to build on existing PBI schemes than to launch PBI schemes focused exclusively on enhancing supply chain performance at the service delivery level.
- Consider any administrative or legal hindrances that may prevent the incentives from reaching the recipients. Does a higher level in the system have the right to decide how and when any compensation to the recipients is disbursed? Is it possible for these higher-level managers to direct incentive payments accrued from supply chain performance to other priority areas?
- Consider whether it is possible for the incentive to be meaningful in the context of the work of the recipients. Can the recipients appreciate the true value and meaning of the incentive in their normal working environment? Do the recipients appreciate the incentive enough for them to strive to achieve the targets set in the PBI program?

7.5 SELECTING RECIPIENTS

In some settings you may decide that recipients need to meet certain preconditions before becoming eligible to participate in your PBI scheme. For example, they may need a reliable information system to be able to generate routine reports. Be careful, however, about imposing too many preconditions, as PBI itself can be expected to strengthen the system – as the teams working within the supply chain will respond to the opportunity to earn performance rewards with innovations to address performance problems from the bottom up.

If you currently contract out some services to private entities, you may want to consider whether the contracts can be revised to hold the contractor accountable for achieving defined performance measures. You may want to launch a competitive process to select awardees based on their willingness

to place a portion of the contract value at risk, conditional on whether performance targets are reached. This requires determining selection criteria, and designing a “request for proposal” document; it may benefit from holding a bidders’ conference to train potential bidders. An evaluation team needs to be assigned and evaluation criteria predetermined. Refer to literature on contracting for various approaches (Loevinsohn 2008).

BOX 12: SELECTING INCENTIVES FOR COMMUNITY HEALTH WORKERS IN RWANDA

Community Health Workers (CHWs) in Rwanda are a vital piece of the service delivery system for case management of maternal and childhood illnesses at village level. They are often the first point of contact of rural communities with the extended health system. A major priority of the Ministry of Health in Rwanda is to increase the availability of health commodities for the management of maternal and childhood illnesses at the lowest levels of the supply chain. A community-based PBI scheme already exists in Rwanda. In this scheme, CHWs organize themselves in voluntary cooperatives and sell community health indicators to health centers. In October 2011, the SC4CCM project embarked on a scheme to provide CHWs with incentives to improve performance of supply chain tasks in three pilot districts. Rather than introduce a new PBI scheme, the SC4CCM project sought to test the feasibility and efficacy of adding supply chain-specific indicators to the existing community PBI scheme by piloting the scheme in three intervention districts. Initially, the project began by organizing focus group discussions with CHWs, from which it emerged that the most influential incentives were a monthly transport and communication allowance as well as a quarterly investment prize in the CHWs’ cooperatives. Once these incentives had been agreed upon, the SC4CCM project drafted supply chain-specific indicators and developed tools for their collection. The incentives were rolled out in May 2012. For more information on the PBI incentives of the SC4CCM project in Rwanda, please visit the project’s website at www.sc4ccm.jsi.com.



Community health workers at a focus group on supply chain incentives in Rwanda (Courtesy of SC4CCM, October 2011)

TABLE 6: SUPPLY CHAIN PBI STEP 3

Step 3: PBI Approach, its Recipients, and Process for Selection		
PBI Approach	Recipients	Process for Selection
Country stakeholders to involve when defining Step 3:		

8. STEP 4: DETERMINE INDICATORS AND TARGETS

8.1 OBJECTIVE

- To take initial steps toward defining measurements and specific targets of performance success that will determine payment

8.2 KEY CONCEPTS

Performance indicators are measurements that aim to describe as much about performance as succinctly as possible. They help to understand a system, compare it, and improve it (NHS Institute for Innovation and Improvement 2008). Indicators used to reward performance should be quantitative variables that allow for the verification of change. Examples include:

- Order packing accuracy: number of compliant products sent as a percentage of the total number of products sent
- Order cycle time for delivery (in calendar days) for orders from the central-level warehouse to the subnational-level warehouses
- Stock accuracy: percentage of products in a warehouse for which the physical stock corresponds to the theoretical stock

Performance targets: While indicators specify what will be measured, targets imply the direction, speed, and destination; that is, how much of an improvement and how quickly it is achieved (NHS Institute for Innovation and Improvement 2008). They offer clarity to the potential recipient about what he/she should work toward. Examples include:

- Increase order packing accuracy from the baseline of 55 percent to 75 percent within the 12 months covered by the contract
- Reduce the order cycle time for delivery from the baseline of X calendar days to Y calendar days within the 12 months covered by the contract
- Increase stock accuracy from the baseline of 47 percent to 67 percent within the 12 months covered by the contract

8.3 TASKS

1. Define indicators of performance
2. Determine targets for improvement

8.4 CONSIDERATIONS

8.4.1 INDICATORS

This step may seem daunting at first, particularly for countries with weak LMIS. When initiating a PBI intervention, use a small number of indicators for each type of recipient. Limiting the number makes the scheme easier to understand and focuses recipients on making a few important changes that improve their performance. As the PBI program evolves, increasingly complex performance measures may be both feasible and desirable. Furthermore, successful PBI schemes can in turn strengthen reporting and bolster the LMIS, because the information now more directly affects the recipients.

Indicators must be directly related to the PBI goals of the payer, which in this case relate to the strengthening of the supply chain. They should also be understandable, particularly to those whose behavior you seek to change – potential recipients will not be motivated unless they understand the evaluation process and how payment is linked to their performance. Indicators of key output measures must be attributable to the actions of potential recipients; that is, recipients should have direct influence over the indicators. For example, if the recipient is a subnational warehouse, an indicator should not be so broad as the “percentage of patients having received the adequate treatment” – there are many actors involved, including the prescriber, the pharmacy at the level of the health facility, and possibly private pharmacies, over which the recipient has little or no control. Rather, a good example would be “order cycle time for delivery,” because the recipient can influence this aspect of the supply chain. Finally, indicators should be measurable and verifiable; this process needs to be clearly articulated in a contract or performance-based payment agreement. Lack of specificity and clarity may lead to disputes between the recipient and payer at the end of the contract period.

Good candidates for indicators are those (1) relating to a single process (e.g., stock keeping), (2) relating to the part of the process that can be influenced by the recipient (e.g., what needs to happen within the subnational warehouse, or between the subnational warehouse and the health facilities), (3) for which a target can be set (e.g., order packing accuracy), (4) having clear and standardized guidelines (e.g., for stock-keeping practices), and (5) relating to a common process (e.g., regular orders coming from the facilities).

In Step 1, you were asked to map your supply chain. Figure 5 2 displayed the structure of a typical public supply chain, with the CMS at the top and SDPs at the bottom. There is an important distinction between SDPs and the higher levels of the supply chain. The SDPs are the only level where supply chain management is not the sole function; as the name indicates, the main function of this lowest level of the supply chain is the delivery of health services. The pharmacy in a health facility is considered an ancillary service, comparable to the laboratory, the radiology department, or the kitchen. This has important implications for the design of a PBI scheme. If the recipient is a CMS or a subnational warehouse, it is absolutely conceivable to have only indicators relating to supply chain management, as these indicators will measure the extent to which the recipient fulfills its key function. If the recipient is a health facility, however, having indicators relating only to supply chain management would be highly problematic for one of the following two reasons. If the incentives are targeted to only a few of the staff members, namely those in charge of the pharmacy, PBI is likely to create tensions within the facility and to damage the team spirit. This in turn will worsen rather than improve the facility’s overall performance. If instead, the incentives are targeted to all staff members, including lab technicians and midwives, the indicators will not be aligned with the facility’s key function. In short, it is not recommended to have a stand-alone PBI scheme that only rewards good supply chain management at the service delivery level. If the country already has a service delivery PBI scheme, however, that scheme can incentivize improved supply chain management at that level in at least three ways:

- The scheme can include specific process indicators relating to supply chain management, either at the level of the district health management team or at the level of the health facility, alongside the typical service delivery indicators. One of the indicators selected for the Council Health Management Team (the equivalent of a district health management team) in a PBI pilot in Tanzania, for example, is “the proportion of facilities reporting stock-outs of either one or more of the tracer medicines in a specified period.”
- The service delivery indicators selected for the health facilities can be defined in a way that implies good supply chain management. Examples include “percent of children aged 6–59 months who received two doses of vitamin A” and “percent of antenatal care clients who received IPT2” (i.e., intermittent preventive treatment or malaria prophylaxis).
- An assessment of supply chain management at the level of the health facility can be included in a quality checklist, the score of which influences the amount of the performance incentive. Box describes the example of Senegal, where this approach has been adopted.

BOX 13: MEASURING THE PERFORMANCE OF THE SUPPLY CHAIN AT THE FACILITY LEVEL IN SENEGAL’S PBI SCHEME

Senegal is piloting PBI in three districts. District Health Management Teams and public health facilities in each of these districts have signed performance contracts. The amount of the performance payments depends on the achievement of targets relating to specific service utilization indicators, with a focus on maternal and child health. Sub-optimal quality, as captured by the score on a quality checklist, deflates the payment amount. The quality checklist covers nine domains. One of the domains is management, which relates to financial resources, human resources, and drugs and medical supplies. The checklist looks at six different aspects of the management of drugs and medical supplies, namely:

- Whether the facility’s pharmacy meets certain norms (e.g., protection against direct sunlight, availability of shelves)
- Whether disinfection and sterilization products are in stock and meet certain criteria
- Whether all drugs and medical supplies are stored adequately (e.g., logically arranged, respecting expiry dates, with physical stock corresponding to theoretical stock)
- Whether management tools such as stock cards and ledgers are available and properly completed
- Whether 10 tracer products are available and have not been out of stock in the past three months
- Whether proper distribution supplies are available

8.4.2 TARGETS

Determining targets for improved performance is an art as well as a skill, perfected as managers gain experience and programs evolve and mature. Care should be taken to develop informed, feasible, yet challenging targets. Targets should be neither achievable with very little effort, nor, at the other extreme, impossible to meet even with extraordinary effort. Targets for improvement should be attainable within a contract period. Generally, bigger increases are possible when starting from a low baseline (as opposed to starting when already close to the maximum level of possible performance). In order to work effectively, there should be clear links between target setting and performance payment. It should be readily discernable that individual action can significantly influence achievement of performance targets; such targets are the most motivating.

The team should also try to anticipate any unintended consequences of selected targets, both positive and negative. For example, a scheme that rewards the proportion of products in stock may have the

adverse effect of causing the warehouse management to unnecessarily inflate its orders and increase its buffer stock, which would lead to excessive use of storage space and increased waste.

Two types of design options for setting targets have been shown to produce disappointing results: (1) a uniform threshold applicable for all PBI participants (for example, everyone must reach 100 percent stock accuracy), and (2) following a “tournament model,” where those in, say, the top 75th percentile of performance receive the bonus.

In most low- and middle-income countries, the goal should be to increase the performance of **all** participants, both those starting at a low baseline and already-strong performers. Capacities and contexts differ, making it hard to establish an absolute level of performance that all need to reach. As discussed above, participants, especially those starting at a low baseline, will be more motivated to work toward a realistic target than toward one that appears to be an impossible challenge. For this reason, we recommend establishing targets for improvement that are set according to each recipient’s own baseline.

A tournament model awards a performance bonus only to participants in the top X percentile. This tends to reward participants who are already top performers and fails to reward those that have more ground to cover to catch up. For this reason, a tournament approach should only be used if it is in addition to incentives that encourage the lower performers to improve.

TABLE 7: SUPPLY CHAIN PBI STEP 4 WORKSHEET

Step 4: PBI Indicators of Performance and Targets	
Indicators	Targets
1.	
2.	
3.	
4.	
5.	
E.g., percentage of products for which the physical stock corresponds to the theoretical stock	75%
Country stakeholders to involve in Step 4:	

9. STEP 5: HOW TO VERIFY PERFORMANCE

9.1 OBJECTIVE

- To determine how you will verify reported performance before rewarding it

9.2 KEY CONCEPTS

Verification is the process of confirming that reported results actually occurred.

In most PBI schemes, recipients are required to routinely report the results they will be rewarded for achieving. Verification is the process of confirming, preferably by entities or teams with no conflict of interest, that the reported results are true. Verifiers should have no financial or reputational interest in confirming that reported results are true.

9.3 TASKS

To design a successful verification approach you will need to answer the following questions:

- What data are used and what are the data sources?
- How is the verification process carried out?
- How frequently should results be verified?
- Who are the people/entities involved?

9.4 CONSIDERATIONS

Success of any PBI scheme depends upon verification of its results. This is especially important because, once a program is in place to pay recipients based on results, they face incentives to report (correctly or incorrectly) that the results were achieved. The approach to verification needs to be designed carefully, as it can have both positive and negative effects on information tracking and how data are used. On the one hand, managers may be motivated to strengthen the quality of their LMIS to better identify where actions are needed to ensure progress toward meeting rewarded targets. On the other hand, PBI could lead to falsification of data, resulting in a weakened LMIS unless care is taken to ensure the credibility of tracked data, complemented by clearly defined consequences for misreporting.

For the elements of the supply chain at the service delivery level and the district health team level, it is likely that supply chain indicators will be incorporated into an integrated PBI model that rewards health results. Verification of supply chain indicators will most often be incorporated into the process used to verify performance at the SDP level. This may involve teams comprised of regional or national Ministry of Health officials, NGOs, auditing firms, universities, or others, who check facility registers, verify that services reported were actually delivered (through random household visits), and verify stock availability and storage conditions through direct observation, often as part of the quality verification.

At higher levels in the supply system, such as subnational-level depots or central medical stores, a distinct verification approach will likely be needed. A few examples of approaches to track and validate results are:

- **Participant-reported results, with random audits from an external agency:** An external agency is contracted to evaluate the credibility of reported information that, most often, comes from the records: samples of products are identified, warehouse records are audited, and a randomly selected sample of clients (e.g., health facilities ordering from the warehouse) are visited to verify that reported products were actually delivered. The strength of this approach is that it stimulates providers to improve and use information for management decisions.
- **Verification by peers:** Peer participants can be used to validate the reported results of other participants at the same level. For example, a team from one warehouse can be used to verify the reported results of a similar warehouse in another region. The strength is that teams from peer entities learn from each other through the assessment process. The drawbacks are that it often takes scarce human resources away from their workplace, and that peers may be less willing than external entities to identify data discrepancies. Training peers to acquire the skills to audit peer entities also imposes costs and time away from work. Furthermore, peers may be tempted to “go easy” on their colleagues, both to avoid having to provide negative feedback as well to encourage similar favorable treatment when it is their turn to be assessed.

Table provides examples of Key Performance Indicators and means of verification.

TABLE 8: EXAMPLES OF MEANS OF VERIFICATION

AREA	FUNCTION	EXAMPLE OF INDICATORS	MEANS OF VERIFICATION
Planning	Forecasting	<ul style="list-style-type: none"> • Timely forecasting exercise (according to calendar) • Forecast and supply planning report is accepted and approved 	<ul style="list-style-type: none"> • Forecasting report submitted on time • Partners concurrence and commitment report to the commodities demand forecast
	Supply planning	<ul style="list-style-type: none"> • Developing a supply schedule in line with the commodity demand forecast and stock availability 	<ul style="list-style-type: none"> • Supply and delivery reports from suppliers and the warehouses/stores
Procurement	Packages/lots procurement processing on time	<ul style="list-style-type: none"> • Completion of the procurement lots/packages bidding documents in time (% completed in time) • Completion of the tender evaluation on time • Percentage of tenders documents completed in time (for the next steps to take place) 	<ul style="list-style-type: none"> • Number of procurement packages that are accomplished within the given timeframe • Tender evaluation report • Tender tracking datasheet
	Quality bids evaluation and award	<ul style="list-style-type: none"> • Percentage of tenders evaluated without any complaints 	<ul style="list-style-type: none"> • Bid evaluation final reports • Complaints/appeal reports

	Good contract management	<ul style="list-style-type: none"> • Percentage of contracts signed on time • Percentage of contracts that abide to the contract awarded 	<ul style="list-style-type: none"> • Procurement contracts reports • Contract implementations report
Logistics Management	Handling the procured commodities	<ul style="list-style-type: none"> • % of commodities received following Standard Operating Procedures • % of commodities with complete documentation 	<ul style="list-style-type: none"> • Goods delivery and receiving report • Stock inspection report • Physical inspection (if necessary) • Stock monitoring reports • Bin cards • Ledgers and registers
	Inventory management	<ul style="list-style-type: none"> • % of commodities with physical stock matching quantities in registers/bin cards • % stock-out of tracer item at a given time • % of overstocked commodities 	<ul style="list-style-type: none"> • Physical audit/review • Inventory reports • Inventory reports
	Warehouse management	<ul style="list-style-type: none"> • % of store reports (monthly or weekly) submitted on time 	<ul style="list-style-type: none"> • Monthly/weekly report log/summary sheet
	Distribution	<ul style="list-style-type: none"> • % successful distributions made in time • % of products damaged during distribution • % of distribution reports submitted on time 	<ul style="list-style-type: none"> • Distribution report • Product damage/discrepancy report/form • Signed and date- and time-stamped receipts • Distribution report sheet
	Reporting	<ul style="list-style-type: none"> • % of stock status reports at central level submitted on time • % of stock status report at facility level submitted on time 	<ul style="list-style-type: none"> • Date- and time-stamped stock status reports

TABLE 9: SUPPLY CHAIN PBI STEP 5 WORKSHEET

Step 5: Verification		
Performance Target	Sources of Data	Verification Approach

10. STEP 6: DETERMINE PAYMENT AMOUNTS AND MECHANISMS

10.1 OBJECTIVE

- To determine the mechanism that links reward (or penalty) to attainment of targets

10.2 KEY CONCEPTS

Positive incentives: Reward individuals or teams directly for a desired behavior or outcome. Positive incentives are affirmative enablers encouraging a desired behavior (Jochelson 2007).

Negative incentives: Focus on the failure of an individual or team to adopt a desired behavior, and discipline that individual/team by withdrawing the reward, believing that this will encourage adoption of the desired behavior (Jochelson 2007). Examples include withholding funds or reducing fees if performance is not achieved.

Financial risk: Probability/likelihood of receiving or losing performance payment, i.e., payment occurs if the desired action is taken or behavior positively changed, but does not occur if conditions are not met.

10.3 TASKS

1. Determine how much payment will be linked to performance and how much is not exposed to financial risk
2. Develop a formula that will determine performance payment
3. Clarify where the funding for payments will come from and determine if it is sustainable

10.4 CONSIDERATIONS

10.4.1 DESIGNING A PAYMENT APPROACH

PBI imposes financial risk. Payment is received when (or withheld until) results (or actions) are verified. In determining the level of exposure to financial risk, country teams must assess how much risk is enough to motivate a positive behavior change and how much risk is too much to motivate actions to achieve the potential reward. In most cases, the majority of funding will be regular and reliable with only a small portion conditional on attaining performance targets.

Before choosing the most appropriate approach, you should review your assessment of the existing incentive environment. Consider that incentives are introduced on top of existing ones. This interaction is critical.

Included in this assessment is an estimate of other sources of funding and the associated terms. Consider the recipients' other resources: Will the potential performance payment be a small or large

portion of total funds going to the recipient? For example, if the CMS receives only 10 percent of its funding from your PBI program and the rest in untied grants, you may need to increase the amount of funding that is linked to results (at risk) to make it worthwhile for the CMS to work toward achieving the results. At the level of the team, the amount of the performance payment that is shared as individual bonuses must be adequate to motivate more effective team and individual performance.

Who do you pay?

In most cases, the performance payments are more effective when introduced at the level of teams, such as for all people working in a functional unit in a CMS. Because improving supply system performance requires the combined efforts of a team of people, team-based incentive programs are more likely to induce the desired results. In addition, rewarding the performance of teams inspires team members to motivate as well as monitor each other, as the efforts of team members contribute to the performance rewards that are jointly earned and shared. When performance payments are made to teams, part or all of the funds should be shared with the individual members of the teams.

Consider the following:

- *How often will you pay the performance award?* There are trade-offs in making frequent payments linked to performance; they may be more motivating but have costs of reporting, measuring, verifying, and paying.
- *What portion of payment is at risk?* Institutions may be able to absorb more risk than individuals. However, too much risk can be de-motivating. In the vast majority of cases, a relatively large portion of payment should be regular and reliable. Experience to date suggests that the risk can be relatively small and still have an impact – for example, successful service delivery programs in developing countries have imposed a roughly 10 percent financial risk on providers.
- *Will you pay a fee for each unit of a defined service or activity, or will you reward attainment of targets?* In PBI approaches that reward increases in the numbers of services delivered, paying for each unit of service is a design option. Fees for units of services is a less likely model when rewarding supply chain performance, but since applying PBI to strengthen supply chains is a new approach, all options should be considered.
- *In a reward-for-target model, is payment tied to attainment of all targets, or will payment be made for achievement of some targets? Similarly, will payment per target be “all or nothing”?* Partial payments for partial attainment of the target(s) may be specified in a stepped approach. An all-or-nothing approach is clear, imposes fewer transaction costs on the payer, and encourages long-term planning and systems strengthening, but recipients that miss the target by even a small amount receive no payment. In contrast, a stepped approach may be perceived as more “fair,” but it imposes increased transaction costs and weakens the incentives to attain the full target.
- *How frequently will performance payments be made?* More often is more motivating but is also more costly and burdensome to administer. Payment frequency has implications for establishing targets if, for example, targets are annual and payment is quarterly. You will have to determine how to adjust targets for the period of performance. You may also want to incorporate a “catch up” payment that allows a recipient to earn back the performance payment they may have lost in a previous period by exceeding the target level of performance in a subsequent period.
- *At the SDP level, should a product availability indicator be rewarded along with other indicators of health service utilization, or should you consider incorporating product availability into quality assessments that may be used to either inflate or deflate the payments facilities and district health teams receive?* In addition to rewarding increases in the quantity of services provided, PBI schemes can incorporate a payment that rewards (or penalizes) quality. One example is to include an indicator of “product availability” that is measured by spot checks that one-month supplies of essential medicines are in facility supply

rooms.

- *Should the PBI program have rules for distribution of the award payment among team members or allow the team to allocate payment?* In some settings, it may be necessary to establish rules for the distribution of group awards – including, perhaps, requiring that a portion of the award be set aside for investing in the entity. If the PBI program does not establish rules, teams should be required to do so in advance, so that members are clear about how they will benefit financially if the team attains its targets.

10.4.2 AGREEING TO A PAYMENT FORMULA

There is no set approach to development of a payment formula. What is clear, however, is the importance of **clearly specifying the terms of payment in a written contract or performance agreement that is signed by both recipient and payer**. The following are two examples of payment formulas that are relevant to supply chains.

1. Payment formula: Payment for achieving all-or-nothing targets:

Figure 10 illustrates a performance award system that is apportioned among various targets. It is derived from a performance-based grant between USAID and the CMS of Mozambique. Each quarter, the CMS has the possibility of earning US\$125,000 if they achieve all of five targets. Each target is valued at US\$25,000 and payment is all or nothing for each target, which implies that the performance payment for each target is only earned if that target is achieved: there are no partial payments for partial achievement of a target. The CMS can earn has the possibility of earning a maximum of US\$500,000 for attainment of all targets in all quarters.

TABLE 10: EXAMPLE: CMS QUARTERLY PAYMENTS AND TARGETS

Indicator and Target	Payment per Quarter
1a. Annual forecast and supply plan for each product group meets 3 quality criteria (Q1)	US\$25,000
1b. Updated supply plan for each product group meets 3 quality criteria (Q2–Q4)	
2. Order cycle time for distribution to provinces in 15 calendar days or less	US\$25,000
3. Order packing accuracy is 80%	US\$25,000
4. Order cycle time for delivery is 20 calendar days or less	US\$25,000
5. Warehouse stock accuracy is 80%	US\$25,000

2. Paying for availability of drugs and supplies at the service delivery level

A number of PBI initiatives that provide incentives to facilities to deliver additional quantities of priority service also incorporate a tool that assesses quality, which also impacts the payment facilities receive. This quality tool often includes some measures of supply availability as well as measures of management of the supply room. In Rwanda, for example, this score on a quality assessment deflates the overall

performance fees that a facility can earn, and serves to provide incentives to improve the management of supplies and ensure availability of essential medicines in the process. In Burundi, facilities can earn an additional bonus for their score on a quality tool. In 2012, Malawi will be experimenting with a PBI approach that will reward district health management teams for ensuring that essential maternal and newborn health drugs are available at facilities, and this will be complemented by rewards to facilities for having maternal health drugs available in delivery rooms.

10.4.3 PAYING FOR PBI

Where will the money for performance payments come from – are the **existing funds** enough to cover the performance payments? There are several things that the team can consider in determining this:

Change existing methods of paying supply chain entities (government, NGOs, donors, etc.) from input-based to performance-based.

The team can also advocate for **new funding sources** to cover the award fee amount. This is likely to be the most attractive to recipients. However, if these funds are only available for a short period of time, the long-run viability of the program may be threatened. It is possible, however, that demonstration of strong results from PBI using external funding may provide the evidence policymakers need to increase public spending for health.

- Lobby donor partners for funds – many donors are increasingly adopting a performance-based culture.
- Lobby the Ministry of Finance for additional funds.
- Consider using some of the mark-ups/profits generated within the supply chain to fund the PBI scheme.

If research can demonstrate that the benefits of PBI in terms of reduction in wastage and leakage of drugs outweighs the costs of the performance-based payments, a strong argument can be made to justify paying for PBI.

BOX 14: SUSTAINABILITY OF PBI SCHEMES AIMED AT IMPROVING PERFORMANCE OF PUBLIC HEALTH SUPPLY CHAINS

Managers of public health supply chains should always consider the sustainability of PBI schemes right from the design stage. Gruen et al. (2008) define sustainability as “how well programs become institutionalized in organizations or health and social systems.” Adapting the definition of sustainability adopted by LaPelle et al. (2006), we could add that, for a PBI scheme to be considered sustainable, the scheme’s functions should be able to continue improving or at least maintaining supply chain performance “after termination of major financial, managerial and technological assistance from an external donor.” Sustainability involves managers trying to plan for what would happen if the scheme ended. For PBI schemes, planning for sustainability requires the use of approaches and strategies that favor long-term program maintenance. Such approaches include:

- Donor partners and governments should consider incorporating PBI schemes into existing or planned funding mechanisms, especially those directed toward specific levels in the supply chain. For instance, if a government or donor partner is considering increasing funding for a central medical store, the disbursement of funds can be tied to the demonstration of achievement of specific performance targets.
- Whenever possible, funds for PBI schemes should be obtained from profits accumulated by entities along the supply chain. If, for instance, a district pharmacy makes a small profit from selling commodities to service delivery points within the district, supply chain managers should consider funding a PBI scheme for the district pharmacy from these funds.
- Where funds for PBI schemes are obtained exclusively from donors, donors should consider developing agreements with recipient governments to take over the scheme in the long term. This can start with recipient governments committing small percentages to the scheme that increase annually until the scheme is completely funded from government resources.
- Supply chain managers should build the capacity of local organizations to carry out roles that are a significant expense for PBI schemes, such as monitoring and evaluation. All stakeholders should meet regularly to review progress and coordinate ongoing support.

What are some of the factors that will influence the degree of sustainability?

- Factors related to the design and implementation of the PBI scheme:
 - Involvement of stakeholders in the design: Are scheme approaches and goals discussed with recipients, as equal partners? Are the needs of the recipients driving the program, or those of external donor agencies and technical experts? Is a design process in place that allows all stakeholders (including Ministry of Finance, Ministry of Health, donors, recipients, technical experts) to reach consensus?
 - Scheme effectiveness: Is the scheme (perceived as) effective? Is it visible? What are the (desirable and undesirable) spillovers of the PBI scheme?
 - Scheme duration: What is the scheme's grant period (number of years in operation)? Is it a new scheme or is it an existing scheme that is acquiring additional funds?
 - Scheme financing: What are the sources of funds for the scheme (internal, external, a mixture)? What are the supply chain's local resources? How much of the supply chain's resources can contribute to funding the scheme? What strategies are in place to make the scheme financially sustainable?
- Factors within the organizational setting:
 - Institutional strength: What organization will be implementing the scheme? How mature (developed, stable, and resourceful) is this organization? Is it likely to provide a strong organizational base for the scheme?
 - Integration within existing programs/services: Is the scheme established as a vertical (categorical) program or is it a horizontal (comprehensive or integrated) program? Are goals, objectives, and approaches pre-specified or are they adapted to the supply chain setting over time? Is the program integrated into the standard operating practices of the supply chain? Is the mission of the program compatible with the mission and activities of the supply chain and the Ministry of Health in general?
 - PBI scheme champion/leadership: Is there a scheme champion? If not, can one be identified/ nurtured so that he/she may serve as an advocate for the continuation of the program? Is the program

10.4.4 BUDGET IMPLICATIONS OF PBI

The maximum financial outlay can be accurately projected if performance payments are determined by reaching a predetermined target level. This will be the likely model in most levels in a supply chain system.

Another factor in determining the PBI budget is program administration costs. There will be new operational costs – of negotiating, managing, monitoring, and verifying performance, and of building the capacity needed to carry out these functions.

Finally, the cost associated with the evaluation of the pilot (both a rigorous documentation and a possible impact evaluation) should also be included in the budget.

TABLE 11: SUPPLY CHAIN PBI STEP 6 WORKSHEET

Step 6: Payment Mechanisms and Sources of Funding		
Recipient	Payment Mechanism and Source of Funding	
Recipient Type A:		
1. Formula for performance payment if rewarding attainment of targets	Performance Target	Associated Weight (or in Money Terms)
2. Fee schedule if fee-for-service is chosen at facility level		
3. Added calculation that adjusts for quality?		
4. Frequency of performance payment		
5. Sources of funds		
6. Is this sustainable? Why?		
Recipient Type B:		
1. Formula for performance payment if rewarding attainment of targets	Performance Target	Associated Weight (or in Money Terms)
2. Fee schedule if fee-for-service is chosen at facility level		
3. Added calculation that adjusts for quality?		
4. Frequency of performance payment		
5. Sources of funds		
6. Is this sustainable? Why?		

II. STEP 7: DETERMINE THE ENTITY(IES) THAT WILL MANAGE THE PBI INITIATIVE, AND HOW TO MAKE PBI OPERATIONAL

II.1 OBJECTIVE

- To determine how to operationalize the PBI initiative and to identify responsible entities

II.2 KEY CONCEPTS

Previous steps took you through the overall design of your PBI program: you made decisions about your recipients, your indicators and targets, your monitoring system, and your approach to verifying results. Guiding these decisions in part was the feasibility of implementing them given the realities of the structure of your supply chain and your health system. In this chapter, you will consider how each of these design elements will be implemented, again, in the context of your health system. You will determine how PBI will be administered and who will assume responsibility for each aspect of the program.

Possible management entities include the following:

- Government ministries (Health, Social Affairs)
- Agencies established explicitly to oversee elements of the PBI program
- Social insurance agencies
- Community-based health insurers
- Schools of public health
- Accounting firms for financial management
- Accounting firms for data audits
- NGOs
- Donor project management units

After you have determined this “how” and “who,” you will consider what capacity building is needed so that providers and administrators are ready to carry out their new responsibilities. You will also need a plan to educate the many stakeholders in your public supply system about the new PBI approach. These steps may be part of your action plan.

PBI management functions: These functions are critical to the success of PBI and involve a number of implementation-related issues associated with each of the design decisions described in the previous steps.

- Selecting or identifying recipients
 - Who will design and implement the assessment process that determines whether preconditions are met, if recipient selection is based on criterion of “readiness”?
- Contracts or performance agreements
 - Who will be responsible for designing contract terms (broad template)?
 - Who will negotiate contract terms with specific recipients?
 - Who will sign the contracts?
- Reporting and monitoring
 - How will information on results achieved be reported, and by whom?
 - Who will receive reported results and monitor progress against targets?
- Verification
 - Who will be responsible for verifying that reported results are accurate, and how will this be done?
 - Who will do the counter-verification?
- Payment
 - How will verified results be recorded and used to generate payments?
 - How will funds flow, and to where?
 - How will recipients be required to account for how funds are used?
- Assess and revise
 - Who will assess whether the PBI approach is working and revise it if needed?

11.3 TASKS

1. Identify your management entity and the rationale for its selection (relevant capabilities for the job)
2. Define operational features for selecting recipients in your design
3. Define the process for establishing and administering contracts
4. Define the process for results reporting and monitoring
5. Define the process for verifying performance and how will this be administered
6. Define the process for generating payments
7. Define the process for assessing and revising your PBI design and its implementation
8. Define the process to evaluate the PBI pilot

11.4 CONSIDERATIONS

Compared with more traditional input-based approaches, administration of PBI for providers requires a focus on monitoring and data quality assurance rather than on accounting for spending on every small item. Because payment is made based on results achieved, you will need a robust information system and verification mechanism that links evidence of attained results to payment.

PBI can be implemented in public systems, as part of contracts with NGOs or with entities such as transportation companies that serve supply chain functions, or by health insurers (social, community-based, or private). Each scenario implies particular roles for administrators and recipients. This section presents broad categories to guide countries. It does not, however, cover every possible scenario. Within each functional category are many ways to operationalize. For example, many administrative functions can be contracted to a third party. If some functions are contracted, the lead entity will need to manage the contract.

It is important to consider whether entities responsible for particular roles face any conflict of interest. For example, it would not make sense for district-level supervisors who receive performance awards linked to facility performance to be responsible for validating the results facilities report. Because in this case supervisors have a financial interest in strong performance of the facilities they support, they would be less likely to catch over-reporting or outright cheating.

11.4.1 SELECTING RECIPIENTS

Step 2 helped you determine the profile of recipients and how you will select them. Now you will make a plan to operationalize the selection process. If you decided that preconditions/eligibility criteria need to be met before participating, these criteria need to be developed and applied. For example, you may require districts to have basic capacities to collect and monitor supply stock information and provide technical support and oversight to facilities. These preconditions should be specified in a manual or guide that is disseminated to all participants in the PBI program. You will also need to determine who will have the responsibility to apply the criteria to determine eligibility and how the outcome of their assessment is communicated to those responsible for establishing contracts.

11.4.2 ADMINISTERING CONTRACTS AND PERFORMANCE AGREEMENTS

Once recipients are chosen, terms of contracts have to be specified, negotiated, and recorded in a contract document. Contracts should specify the roles and responsibilities of each party. They should cover issues such as results that need to be achieved, explicit payment rules, reporting and payment frequencies, mechanisms for verifying results, penalties for late reporting, penalties for discrepancies between what is reported and what is validated, and a process for resolving disputes.

In most contexts, indicators and payment terms will be standardized. However, in many models, target levels of improvement needed to receive performance awards will depend on recipient baselines. Collecting and validating baseline information and determining targets for improvement is a core function of PBI administration.

The team that administers contracts or performance agreements needs clear links to the teams that monitor results and process payments. As just stated, contracts specify results that need to be achieved, monitoring and verification confirms that achievement, and payment is triggered when the monitoring team informs the payment team to process payments.

11.4.3 RESULTS REPORTING AND MONITORING

You will need to establish systems to track results, transfer information on results, aggregate and analyze results, and provide feedback. The flow of how information is reported will depend on the recipients you choose and the indicators of results you reward.

11.4.4 VERIFICATION

To deter data falsification and ensure that what is reported is reliable and true, a process needs to be established that uses independent entities or teams with no conflicts of interest to validate results, and which complements routine reporting. The issues and options were discussed in Step 5; here, you need to consider how you will administer the chosen process. If random audits will be used to control data quality, you will need to determine the process and the entities that will carry this out. This includes specifying the frequency of audits and the process that will be followed. If you choose a peer validation approach, you will need to detail the procedures to be followed, the roles and tasks, and the frequency. Entities or teams in charge of verification will need to be trained.

11.4.5 PAYMENT GENERATION

Once you verify that the targets specified in contracts are reached, you will need to determine how the performance payments will be transferred to the intended recipient. Ensuring reliable transfer of funds according to the rules established in contracts is critical to the ongoing credibility of the program.

11.4.6 ASSESSING AND REVISING THE PBI PROGRAM

The design and implementation of your PBI approach can be modified if it does not work as expected. Refinements will be needed as your system evolves and matures. To this end, an entity or team will have to be assigned the responsibility to assess whether the program is being implemented as planned and is achieving the desired impact, and to introduce refinements. Data from the routine monitoring system will contribute information that informs whether performance is improving on key indicators. In addition, countries may want to track progress on a list of indicators that are not being rewarded to identify unintended consequences of the PBI scheme.

You may want to complement information from the routine monitoring system with “process monitoring” that determines what is working and how recipients are responding. Process monitoring identifies how the many recipients in your PBI program are responding to new incentives and enables a program of learning that documents lessons. You may also want to consider more rigorous evaluation of the impact of your PBI approach as this evidence will contribute to your ability to generate high-level support to sustain it.

11.4.7 EXPECT DEMANDS FOR TECHNICAL ASSISTANCE

Once contracts formalize performance expectations and associated rewards, recipients may want technical assistance to help achieve performance goals. Entities responsible for managing a PBI program can expect requests from recipients for help. An important difference between technical support provided in PBI contexts and the typical approach to technical assistance in developing countries is that requests are demand-driven. Recipients ask for assistance because they are motivated to achieve performance targets and associated rewards. Administrators of PBI programs are advised to consider how to provide the forms of technical assistance that recipients may request.

TABLE 12: SUPPLY CHAIN PBI STEP 7 WORKSHEET

Step 7: Management Entity(ies) and Process for Management (Complete one form for each entity with management or administrative roles)		
Management Entity	Rationale for Selection and Process for Management	Example:
Name of entity:		Ministry of Public Health: Unit established in the Department of Planning.
1. Rationale for selection (relevant capabilities for job)		Has steering role for health system.
2. Process for selecting recipients		Will design and implement tool that assesses “readiness” to respond to incentives in PBI approach.
3. Process for establishing and administering contracts		Will establish a unit to design contract templates and negotiate contract terms with each subnational-level recipient.
4. Process for reporting and monitoring results		Recipients report results monthly and Ministry of Health unit maintains a database to receive self-reported data, compare to targets in contracts, and to send information on what should be verified to verification entity.
5. Process for verifying results		Independent entity is contracted to oversee verification and to coordinate team comprised of stakeholders. Ministry of Health unit manages this contract and oversees the process.
6. Process for generating payments		Once performance is verified, a system is maintained that compares verified performance to targets established in contracts. Payment unit processes payment for attained results.
7. Process for assessing and revising operationalization and design		Local university is contracted to monitor the process of implementation through focus groups and individual interviews. Monitoring system examines impact on nonrewarded indicators to identify unintended negative and positive spillover effects.
Country stakeholders to involve when defining Step 7:		

12. STEP 8: DEVELOP AN ADVOCACY STRATEGY AND IDENTIFY IMMEDIATE NEXT STEPS

12.1 OBJECTIVES

- To determine a strategy for obtaining buy-in and ownership, and mitigating potential opposition
- To identify immediate next steps – a program of action – for blueprint developers to ensure that country stakeholders will consider and discuss the PBI design

12.2 KEY CONCEPTS

Stakeholders: Groups that have an interest in the design, operation, and performance of the supply chain. This can include a broad array of individuals and institutions, both nationally and subnationally. Examples include politicians, Ministry of Finance, supply chain managers and workers, trade unions, donors, community groups, pharmaceutical companies and other private sector drug distributors and retailers, insurance agencies, health care workers, and clients of health care services.

12.3 TASKS

1. List potential stakeholders essential for obtaining buy-in for PBI
2. Assess degree of potential support
3. Identify potential PBI champion(s)
4. Identify approaches to generate buy-in
5. Determine the immediate next steps or program of action needed to turn this blueprint into reality
 - a) Who are the key individuals that should be briefed? What key messages should be conveyed?
 - b) What additional resources/support (financial and technical) will you need to follow up on your plans?
 - c) What will your team do to continue work toward building PBI?

12.4 CONSIDERATIONS

Like any new idea that significantly changes the way of doing business, a PBI initiative may affect numerous supply chain stakeholders, especially those receiving the specified reward and those who oversee and administer the PBI effort. For a variety of reasons that will depend on the country context, a particular stakeholder may be either an ardent fan of the initiative, a dedicated opponent, or – most likely – somewhere in between. If you want to see your PBI initiative move from design to reality to success, you must carefully analyze these stakeholder positions, identify potential champions, and

develop strategies to overcome potential opposition and generate buy-in and ownership. To help you in this analysis, using the format in **Error! Reference source not found.**, list each stakeholder, identify specific individuals as necessary and whether they might champion the initiative, classify the stakeholder according to their position with respect to the initiative (support, oppose, indifferent), and list any strategies you might use to overcome opposition or generate additional buy-in if required.

TABLE 13: SUPPLY CHAIN PBI STEP 8A WORKSHEET

Step 8a: Key Stakeholders, Positions, and Strategies to Overcome Opposition			
Stakeholder (Institution)	Stakeholder Contact Person and Position	Position (Support, Oppose, Indifferent)	Strategy to Generate Buy-In
	(Place * next to PBI champion)		

12.5 STAKEHOLDER INVOLVEMENT

As a strategy to address potential opposition, involving supply chain stakeholders from the earliest stages of PBI design is critical to maximizing the effectiveness of PBI and to minimizing potential resistance. We discussed above how it is key to involve potential beneficiaries of rewards in the PBI design to better understand their intrinsic motivations, the extrinsic incentives that can inspire desired actions, and the potential effects of newly introduced extrinsic incentives. Because the Ministry of Finance controls the purse, it will likely be critical to involve it throughout the process.

In Mozambique, for example, a performance-based grant between USAID and the central medical store, CMAM, was crafted using a highly participatory process. Teams working in functional units within CMAM worked together to finalize the indicators and targets that they would be held accountable for and rewarded for achieving.

12.6 IDENTIFYING PBI CHAMPIONS

As with any change, champions are critical to moving the process forward. Champions are individuals that understand the context of the country and are well connected to other key stakeholders (both supporters and detractors). Champions can “speak the language” of these stakeholders and thus effectively communicate the value of PBI.

For example, to move forward the design of the PBI for community supply chains in Rwanda, the design team identified the head of the community health desk in the Ministry of Health as a champion. The design team therefore ensured that she was consulted throughout the design process and that she had opportunities to provide input whenever possible. She was key to helping convince skeptical stakeholders of the benefits the PBI approach could generate.

12.7 FROM DESIGN TO IMPLEMENTATION

Consider whether you need additional information before moving from design into implementation. Some next steps might include assessments of your existing system to determine whether it can support PBI.

- Does the existing LMIS produce reliable service statistics that can be used in the initial stages of your PBI program?
- Do the existing fiscal flows that fund the supply chain allow paying for results? Will modifications be needed to your system of transferring public funds?
- Does the capacity to manage and administer PBI exist in the entities you have identified to manage the initiative? Where? Where are the gaps? What strategies might be considered to enhance capacity and address gaps?
- Do recipients have the ability to receive payments and the autonomy to manage funds? What changes are needed to accommodate PBI? For example, can a CMS receive funds directly for rewards? Do subnational supply chain entities such as a district pharmacy or warehouse have the authority to manage a bank account?

In determining your design team’s immediate next steps, consider this program of action as a “pledge” among team members to turn the blueprint into a reality. It is critical that the steps and timeframe for their implementation be realistic and that team members commit to their completion. Use the framework in Table to sketch out your next steps. Be as specific as possible in defining the immediate actions and a deadline for completing tasks.

TABLE 14: SUPPLY CHAIN PBI STEP 8B WORKSHEET

Step 8b: Program of Action – IMMEDIATE Next Steps			
Tasks	Way Forward		Deadline for Completing Tasks
Immediate actions	1		
	2		
	3		
Key individuals who should be briefed and message that should be conveyed to each person	Name:	Message:	
	Name:	Message:	
	Name:	Message:	
	Name:	Message:	
Additional resources/support (financial and technical) needed to follow up on plans			
Continued work by blueprint authors to support PBI development process			

13. CONSIDER EVALUATION

13.1 OBJECTIVE

- To consider how best to evaluate your PBI initiative to determine what worked and what did not work

13.2 KEY CONCEPTS

Monitoring is regular observation, surveillance, or checking of changes in a condition or situation, or changes in activities (World Health Organization 2008).

Evaluation is the systematic assessment of the relevance, adequacy, progress, efficiency, effectiveness, and impact of a course of action (European Observatory 2008)

13.3 CONSIDERATIONS

PBI initiatives for supply chains, like for all health interventions, require an appropriate level of routine monitoring as described in Step 7. Some PBI initiatives benefit from rigorous evaluation of impact on desired outcomes, of cost-effectiveness relative to other interventions aimed at improving performance, and/or of process assessment to understand what is working and what is not and how recipients respond to incentives. In settings with considerable product waste due to expiry and leakage/stealing, an assessment of costs averted through improved PBI could be critical information for building buy-in and ensuring continued support and sustainability of the approach. However, evaluation is costly, and you should always balance the cost of evaluation with the expected benefit in terms of greater knowledge of how the initiative operates and its impact.

A PBI initiative, if designed properly, will evolve as the participants learn and improve their performance capabilities, and with shifts in the context that require changes in performance. The routine monitoring that is part of the ongoing operationalization of your PBI program will track key performance indicators, both for indicators that are rewarded as well as those that are nonrewarded. Examining performance trends of nonrewarded indicators will help you detect whether some tasks are being neglected while others may be benefitting from positive spillover. Routine process monitoring should also examine whether the program is being implemented as planned. This information is valuable on its own as a management tool, and will also help you make judgments about program impact, by helping you sort out the extent to which poor implementation might be affecting outcomes and results.

Depending on the nature and complexity of the initiative, you may want to complement routine monitoring with more in-depth studies that examine particular aspects of the initiative. These might include specific levels of the supply chain, if your initiative is working at multiple levels (central, district, SDP), or specific supply chain functions (procurement, transport, information systems, etc.) if you are focused on multiple functions. Information from these focal areas could inform future design and contribute to learning.

Particularly because PBI for public health supply chains is a relatively novel and untested approach, your team should consider pursuing a relatively rigorous evaluation approach to determine the impact of the

initiative. The more you think you will need to “prove” the value of PBI (say, in the face of political opposition or skepticism on the part of key stakeholders or decision makers), the greater the level of rigor and the more you will have to spend on evaluation. However, showing that any improvement in supply chain performance is due to the PBI initiative and not to some other factor is not simple. The same rules of evaluation design apply to PBI initiatives as to other interventions, with approaches that range from non-experimental (e.g., simple before and after measurements), quasi-experimental (e.g., comparison of nonrandom intervention and control groups), to experimental (comparison of randomly chosen intervention and control groups). Whether you can deploy these methods will depend on a host of factors, including the level at which your scheme operates (nationally or only in part of the country), and how much money you have for evaluation. However, it is ideal to include baseline comparison data or comparison groups that do not receive the PBI intervention in order to ascertain whether the PBI intervention has had any impact.

Some examples of the way relatively rigorous evaluation has been used on PBI for supply chains includes:

- In the DRC, Soeters et al. (2011) used an experimental design with intervention and control districts to examine the impact of PBI on a range of indicators, including supply chain performance.
- In Tanzania, researchers are using a controlled trial design to measure whether the scheme to improve retail availability of antimalarials is effective.
- The commercial sector typically uses a return on investment (ROI) criteria to judge the impact of incentive programs (Rosen and Serumaga 2012).
- In Rwanda, a controlled before and after study is planned to measure the impact of a PBI scheme aimed at improving drug supplies at the community level in three pilot rural districts.

Policymakers considering PBI for supply chains will typically face a choice between PBI and other interventions to solve supply chain problems or to improve performance. Or they may consider PBI as a way to augment an existing program of work that aims to improve supply chain performance. Such policy decisions are amenable to two related types of economic evaluation: cost-effectiveness analysis, and ROI analysis. Cost-effectiveness analysis compares different approaches by relating the costs to the effectiveness of alternative interventions, measured in terms of supply chain performance. Depending on the goals of your study you can examine average, marginal, or incremental cost-effectiveness of the PBI program.

An ROI analysis for PBI is similar to the calculation that a commercial sector firm would carry out when considering a new investment or change in the way it operates or manages a process. The ROI calculation weighs the cost of the investment against the projected returns, over a specified time period. For example, let's say that the cost of implementing and carrying out PBI for a supply chain was US\$50,000 in the first year, then US\$25,000 per year in the following two years. The total cost would then be US\$100,000 over three years. If your supply chain were a commercial enterprise, you would measure return in terms of additional sales or profit generated from the investment. However, because public health supply chains typically do not operate to turn a profit, but rather to provide a service, you could estimate “return” in terms of the savings to the system that might accrue from the investment. For example, your PBI initiative may target procurement performance with the goal of obtaining lower prices and greater efficiency in the procurement process, leading to savings on drug purchases and on the cost of administering the procurements. Your PBI initiative might target reduction in waste and leakage and might generate significant savings in terms of the money value of products that were not wasted or stolen (averted costs). In our example, the US\$100,000 you invested in the PBI is expected to generate savings in the first year of US\$30,000, followed by savings in years 2 and 3 of US\$50,000 each.

Over three years, the US\$100,000 investment has thus generated savings of US\$130,000. Your ROI is thus US\$30,000 on an investment of US\$100,000, or an ROI of 30 percent.

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ANNEX A: EXAMPLES OF PBI APPROACHES THAT ADDRESS PERFORMANCE BARRIERS

Performance Barrier*	PBI Solution	How Does it Address the Issue?
<ol style="list-style-type: none"> 1. Financial and physical barriers 2. Information and social norms that inhibit utilization 3. Staffing and management challenges 	Conditional cash transfer programs	<ol style="list-style-type: none"> 1. Directly increases household income and reduces price of essential services. Also inhibits household decisions to purchase low-cost services. 2. Payment conditional on actions can counteract social norms that may drive households to invest less on females. By conditioning payment on receipt of specified services, household decisions to choose low-cost and low-quality substitutes may be altered. 3. Can stimulate providers to be more responsive and accountable to households, in the process catalyzing a process of management strengthening that leads to increased utilization.
<ol style="list-style-type: none"> 1. Financial and physical barriers 2. Staffing and management challenges 	Transportation subsidies	<ol style="list-style-type: none"> 1. Reduces direct cost of obtaining care. 2. Can stimulate providers to be more responsive and accountable to households, in the process catalyzing a process of management strengthening that leads to increased utilization.
<ol style="list-style-type: none"> 1. Financial and physical barriers 2. Information and social norms that 	Food support	<ol style="list-style-type: none"> 1. Frees up income that would have been used to buy food. Reduces opportunity costs for seeking care – especially for treatment of chronic conditions. 2. May help overcome social barriers to obtaining care.

inhibit utilization 3. Staffing and management challenges		3. Can stimulate providers to be more responsive and accountable to households, in the process catalyzing a process of management strengthening that leads to increased utilization.
1. Financial and physical barriers 2. Staffing and management challenges	Direct payment to households/patients (demand side) for use	1. Provides incentives to access care by reducing direct costs (may make costs negative). 2. Can stimulate providers to be more responsive and accountable to households, in the process catalyzing a process of management strengthening that leads to increased utilization.
1. Financial and physical barriers 2. Information and social norms that inhibit utilization 3. Staffing challenges 4. Management challenges 5. Resource allocation inequities and inefficiencies	Financial rewards to providers for results (and/or penalties for poor performance)	1. Motivates outreach, encourages more convenient clinic hours, and stimulates solutions to reduce financial barriers faced by households. 2. Can stimulate improved communication and health education that may enhance care-seeking by increasing understanding and reducing social obstacles. 3. Can motivate effort and result in innovative changes to the way services are delivered through strategies that may include improved outreach to underserved areas, altered mix of health care workers, and performance awards. Incentives can be structured so it is in the provider's interest to adhere to quality standards. 4. Can strengthen management by causing service-providing institutions to examine the range of constraints they face to achieving results, and the systems, capabilities, and strategies they need to introduce to achieve them. 5. When payments are conditional on services to the poor: can improve access and equity as part of a social insurance program, a contracting process with the private sector, a system to reward public sector providers – or a combination.
1. Financial and physical barriers	Provision of per diems and vehicles to enable providers to reach remote areas	1. Can be an incentive if per diems exceed incurred travel costs and vehicles are also used for personal use.

<ol style="list-style-type: none"> 1. Financial and physical barriers 2. Information and social norms that inhibit utilization 3. Staffing challenges 4. Management challenges 5. Resource allocation inequities and inefficiencies 6. Weak and overly centralized systems for planning and management 	National-to-local transfers based on results	<ol style="list-style-type: none"> 1. Can stimulate local solutions to reduce financial barriers to access. 2. Can stimulate local solutions to increasing knowledge of the value of health interventions and counteract social norms that inhibit appropriate care-seeking by stimulating increased consumer education and implementation of demand-side incentives. 3. Can motivate effort and result in innovative changes to the way services are delivered. Incentives can be structured so it is in provider's interest to adhere to quality standards. 4. Can stimulate strengthened management through dynamics similar to those described in the first bullet. 5. Can result in innovative solutions to (a) increase access and use among the poor and improve equity, and (b) improve efficiency by stimulating local-level solutions. 6. Can contribute to strengthening planning and management at local levels.
<ol style="list-style-type: none"> 1. Financial and physical barriers 2. Management challenges 	Social insurance that provides universal coverage and pays providers based on performance	<ol style="list-style-type: none"> 1. Can be part of a PBI intervention if payment is based on results. Will also minimize household decisions to consume low-cost substitutes. 2. Can stimulate strengthened management through dynamics similar to those described in the first bullet.
<ol style="list-style-type: none"> 1. Information and social norms that inhibit utilization 	Regulations that require health screening or evidence of good health as a condition of participation in other valued programs	<ol style="list-style-type: none"> 1. Can stimulate changed behaviors. A common example is regulations that require full immunization as condition of enrolling in school.
<ol style="list-style-type: none"> 1. Stock-outs of drugs and supplies 	Contract out drug procurement, storage, and distribution	<ol style="list-style-type: none"> 1. Reward contracted entity(ies) based on satisfactory results.

I. Stock-outs of drugs and supplies	PBI in inventory management and distribution	I. Can increase responsiveness by improving management from central to regional to facility levels.
I. Stock-outs of drugs and supplies	Financial penalties for substandard quality	I. Include severe penalties for substandard quality in procurement contracts.

Source: Adapted from Eichler and Levine (2009: Table 3.1)

*Performance issue addressed:

1. Financial and physical barriers: Households can't afford to obtain quality care and/or health services are hard to reach
2. Information and social norms that inhibit utilization: Lack of information and social norms inhibit seeking recommended services
3. Staffing challenges: Inadequate supply, misedistribution, poor motivation, and poor quality of care delivered by health workers
4. Management challenges: Weak technical guidance, program management, and supervision
5. Drugs and supplies: Drugs and supplies not available, of variable quality
6. Resource allocation: Inequitable and inefficient distribution of resources for health
7. Planning and management: Weak and overly centralized systems for planning and management

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