LOGISTICS INDICATORS ASSESSMENT TOOL (LIAT)

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DELIVER
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Acronyms

DK	Don’t know
LIAT	Logistics Indicators Assessment Tool
LMIS	logistics management information system
LPG	liquified petroleum gas
MOH	Ministry of Health
NGO	nongovernmental organization
SDP	service delivery point
STI	sexually transmitted illness
TB	tuberculosis

6] Logistics Indicators Assessment Tool (LIAT)

Logistics Indicators Assessment Tool (LIAT)

USER'S GUIDE

Purpose

The Logistics Indicators Assessment Tool (LIAT), a quantitative data collection instrument developed by DELIVER, is used to conduct a facility-based survey to assess health commodity logistics system performance and commodity availability at health facilities. The LIAT can be used to monitor the performance of certain processes involved in the logistics management of health commodities over time, to evaluate certain outcomes of logistics interventions, to provide ongoing supervision and performance monitoring, and to monitor commodity availability.

The data collected using the LIAT can be used to calculate the following core logistics indicators:

- accuracy of logistics data for inventory management
- percentage of facilities that receive the quantity of products ordered
- percentage of facilities that maintain acceptable storage conditions
- percentage of facilities whose stock levels ensure near-term product availability (stock status)
- percentage of facilities that experienced a stockout at any point during a given period or at the time of the visit.

In addition to these indicators, the data collected can also be used to calculate additional related indicators, such as duration of stockouts, reasons for stockouts, etc. For a detailed description of the indicators, refer to the *Definitions of Indicators* in this manual, following the tool.

Supplemental questions provide additional information about the characteristics of the supply chain being assessed, such as the use of LMIS information, ordering procedures, transport systems, supervision frequency, cold chain management, and others.

Methodology

The LIAT is used to conduct a facility-based survey to collect quantitative data that will be used to calculate indicators for monitoring and evaluating logistics system performance. It is important to have stakeholder's buy-in for this type of study from the beginning to the end. The following steps outline the recommended methodology for completing this assessment.

1. Preparatory Work

a. Identify the objectives of the assessment and develop a scope of work based on the program and/or categories of health commodities to be studied.
b. Secure financing for all the study teams' costs, including travel and accommodations.
c. Review and adapt the LIAT to meet the objectives identified for the assessment, as well as to meet ongoing monitoring needs.
d. Determine the appropriate sample size and develop the sampling frame of the facilities to be visited. The main purpose of the sampling design is to avoid a convenience sample. Randomly select the facilities as much as possible.

To calculate the sample size and select sites—

- Compile a list of the total number of facilities in the country.
- Document the total number of each type of facility (warehouse, hospital, service delivery point [SDP]), and the location and distribution of facilities.
- Ensure that all parties involved agree to the criteria for the selection of sites.
- For a statistically significant sample, use a standard sampling formula, which often yields a large sample size. In case of resource constraints, visit a default number of a minimum of 100 facilities or 15% of facilities, whichever is smaller.
- Determine the sampling frame by stratifying for each type of facility in the country; evaluators should randomly select sites proportionally within each stratum, without breaking the supply chain between levels. In other words, select higher level warehouses first, then randomly select districts within selected regions, randomly select SDPs within selected districts, etc.

e. Recruit study team members. The following qualifications for study members should be considered—
   - experience in field surveys
   - willingness to commit to a 3–4 week full-time assignment
   - physical ability to travel in both urban and potentially difficult rural settings
   - familiarity with the areas to be visited and local health care system
   - detail oriented
   - good communication skills
   - fluency in local languages a plus
   - ability to work as a member of a team
   - advanced degree, preferably in public health
   - quantitative research skills
   - knowledge of logistics systems (desirable).

f. Obtain written authorization for study team members to visit facilities (where needed).
g. Prepare itineraries and logistical arrangements for study team travel and accommodations.
h. Prepare study team training curriculum. Ideally, the curriculum should include at least two days of classroom activities (review and discussion of the assessment tool), one day to field test the tool, and one day of classroom discussion to finalize the tool. Examples of curricula from past training can by obtained from DELIVER. This training should stress the importance of proper completion of surveys. Experience has shown that incomplete surveys cannot be used and are, therefore, a waste of time, energy, and money.
i. Schedule a meeting to be held at the end of the assessment to present preliminary findings to stakeholders in the country.

2. Prior to the Assessment

a. Confirm arrangements (transportation, accommodations, translation, etc.).
b. Obtain any legal travel documents needed for study team members.
c. Obtain and review any logistics forms being used in the country.
d. Agree upon the indicators and products to be studied with all the parties involved.
e. Conduct training of team members on how the assessment will be carried out and how to use the tool, closely following the guiding text provided within the LIAT.
f. Field test the tool at one or more accessible health facilities with all team members.
g. Review the results of the field test and discuss final revisions with the study team members.

h. Finalize the assessment tool. At this point, it is recommended that you list the products to be assessed in the tables of the tool.

3. During the Assessment

a. Observe as many study teams as possible conducting data collection at each level of the system being assessed.
b. Review completed questionnaires to clarify any data inconsistencies. This is a very important step to ensure the study team is collecting complete and accurate data.
c. Enter the data collected into the chosen database or spreadsheet.

4. Following the Assessment

a. Conduct data analysis.
b. Present the preliminary results, conclusions, and recommendations from the assessment to all stakeholders.
c. Write the report of results, conclusions, and recommendations.
d. Disseminate the final report to key stakeholders.

Following the tool in this booklet is a *Description of Indicators.* It includes core logistics indicators that can be calculated with the information collected when the LIAT is used for a facility survey.

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Logistics Indicators Assessment Tool (LIAT)

Interviewer's Guide

Facility Identification	Record the name of the facility and location. Using the codes provided for each question, place all other responses in the boxes on the right.
Information about Interview	Record the date the interview took place and list the names of the interviewers.
Introduction	Use the text here to guide your introduction of the survey to facility staff.
Questions 01 to 04	Receive permission to conduct the interview and record information regarding the interviewee.
Questions 101 to 121	Record responses by clearly circling either the number or letter that corresponds to the interviewee's response. Questions with letters may have multiple responses; questions with numbers have only a single response.
Questions 122 to 126	These questions are to be asked at facilities that are part of a cold chain system.
Table 1: Stock Status	Record the maximum months of stock, minimum months of stock, and order interval above the table. If the interviewee does not know these, mark DK as the response. To fill in the cells, follow the instructions above the table.
Table 2: Storage Conditions	Record observations on the main storage area (even if it is a cabinet) by responding to storage conditions 1 to 12 for every facility visited. For large storage areas that require stacking of multiple boxes, continue to complete storage conditions 13 to 17.
Table 3: Data Quality	Complete the table for all or for a selection of products.
Table 4: Forecast Accuracy	Complete the table for all or for a selection of products.
Table 5: Order Fill Rate	Complete the table for all or for a selection of products.
End Interview	Ask the interviewee/s if they want to ask you any questions. Thank them for their time and cooperation.

Facility Services and Infrastructure

Facility Identification

Name of the facility _____

Facility location

City/town: _____

Region _____ Region ..... ☐

District _____ District ..... ☐☐

Code of the facility..... Facility Code..... ☐☐

Facility Type: (1=Warehouse; 2=SDP) ..... Warehouse/SDP..... ☐

If SDP, mark type of facility: (1=District hospital; 2=Rural hospital; 3=Health centre; 4=Dispensary; 7=Other _____)..... SDP Facility Type..... ☐

If Warehouse: mark level: (1=Central; 2=Regional/provincial; 3=District ..... Warehouse Facility Type..... ☐

Operating Authority 1=MOH; 2=NGO ..... Operating Authority ..... ☐

Facility characteristics:
Tarmac to the facility? (0=no; 1=yes) ..... Tarmac ..... ☐

Operational electricity on day of visit? (0=no; 1=yes) ..... Electricity..... ☐

Operational water in the building on the day of visit? (0=no; 1=yes) ..... Water..... ☐

Operational telephone or radio on day of visit? (0=no; 1=yes) ..... External Communication..... ☐

Information about Interview

Date: _____ DAY/ ☐☐ MONTH/ ☐☐ YEAR ☐☐☐☐

Interviewer/s: _____

_____

Introduction

Introduce all team members and ask facility representatives to introduce themselves.

Explain the objectives of this survey:

Good day. My name is _____. My colleague and I are representing _____ (e.g., the MOH in the country under study). We are conducting a survey regarding the health commodity logistics system. We are looking at the availability of selected commodities and information about how you order and receive those products. We are visiting selected health facilities throughout the country; this facility was selected to be in the survey. The objectives of the survey are to collect current information on logistics system performance and stock status of key health products.

The results of this national survey will provide information to make decisions and to promote improvements. The survey has been/will be conducted again in the future to measure changes in the logistics system.

[Add any additional objectives here.]

We would like to ask you a few questions about the products and supplies available at this facility. In addition, we would like to actually count selected products you have in stock today and observe the general storage conditions. Do you have any questions?

No.	Question	Code Classification	Go To
01.	Can we continue?	Yes ..... 1 No 0	➔STOP
02.	Name and title and of person interviewed for this section		
03.	Number of years and months you have worked at this facility?	Years: _____ Months: _____	
04.	Who is the principal person responsible for managing medical supplies at this facility?	Nurse ..... 1 Clinical Officer ..... 2 Pharmacy Technician ..... 3 Pharmacy Assistant ..... 4 Pharmacist ..... 5 Medical Assistant.....6 Other (Specify) _____9	

First, ask the following questions of the in-charge or acting facility manager. After asking questions 101–126, visit the warehouse, storeroom, or storage area where the health products listed are managed. If you are referred to another staff member for the stocktaking exercise, introduce the survey goals and objectives as you did during the introduction. Hand the respondent the list of products that are included in the survey, and explain that we will refer to the list for some of the following questions.

No.	Questions	Code Classification	Go To/ Comments
101.	Do you use and fill out the following logistics forms to manage health products?		
	A. stock cards	Yes .....1 No 0	
	B. daily register	Yes .....1 No 0	
	C. other	Yes .....1 No 0	
102.	What LMIS forms do you use for reporting/ordering?		
	A. country-specific forms	Yes .....1 No 0	➔104
	B. country-specific forms	Yes .....1 No 0	➔104
	C. other	Yes (specify) _____ 1 No 0	
103.	Do LMIS reports include the following?		
	A. stock on hand	Yes .....1 No 0	
	B. quantities used	Yes .....1 No 0	
	C. losses and adjustments	Yes .....1 No 0	

104.	How often are these LMIS reports sent to the higher level? *(Circle all that apply.)*	Monthly .....A Quarterly .....B Semi-annually ..... C Annually ..... D Other _____W	
105.	When was the last time you sent an order/report for products at this facility?	Never .....1 Within the last month .....2 2 months ago .....3 3 months ago .....3 More than 3 months ago 4	
106.	How often are you supposed to send these reports to the higher level? *(Circle all that apply.)*	Monthly .....A Quarterly .....B Semi-annually ..... C Annually ..... D Other _____W	
107.	How many facilities are supposed to send LMIS reports to this facility?	_____	
108.	How many facilities submitted complete LMIS reports for the month of _____ (two months prior to survey month)?	_____ Ask to see reports and check here if verified. _____	
109.	How did you learn to complete the forms/records used at this facility? *(Circle all that apply.)*	Never learned .....A During a logistics workshop .....B On-the-job training ..... C On-the-job (self-learning) ..... D Other (specify) _____W	
110.	How many emergency orders for _____ (product of interest, e.g., contraceptives, STI drugs, etc.) have you placed in the last 3 months?	None .....0 NA.....1 1.....2 2.....3 3.....4 More than 3.....5	
111.	Who determines this facility's resupply quantities? *(Circle all that apply.)*	The facility itself .....A Higher-level facility .....B Other _____W	➔114 ➔114
112.	How are the facility's resupply quantities determined?	Formula (specify) _____ 1 Don't know .....2 Other means.....8	
113.	Who is responsible for transporting products to your facility? *(Circle all that apply.)*	Local supplier delivers .....A Higher level delivers .....B This facility collects ..... D Other (specify) .....W	➔116 ➔116 ➔116

114.	What type of transportation is most often used?	Facility vehicle .....1 Public transportation .....2 Private vehicle .....3 Boat .....4 Motorcycle .....5 Bicycle .....6 On foot .....7 Other (specify) _____ 9	
115.	On average, approximately how long does it take between ordering and receiving products?	Less than 2 weeks.....1 2 weeks to 1 month .....2 Between 1 and 2 months .....3 More than 2 months 4	
116.	When did you receive your most recent supervision visit? *Check visitors book, if necessary.*	Never received.....1 Within the last month .....2 Within the last 3 months .....3 Within the last 6 months .....4 More than 6 months ago .....5 Other (specify) _____ 9	
117.	When did you receive your last supervision visit that included drug management (e.g., stock cards checked, reports checked, expired stock removed, supplies checked)?	Never received.....1 Within the last month .....2 Within the last 3 months .....3 Within the last 6 months .....4 More than 6 months ago .....5 Other (specify) _____ 9	

Questions	**Comments**
118. Are there certain commodities that you always stock out of before resupply?	❑ Yes ❑ No
If no, skip to question 120.	
119. List the commodities you stock out of most frequently (up to 3 products).	1. _____ 2. _____ 3. _____
120. Do you always have a surplus of certain commodities before resupply?	❑ Yes ❑ No
If no, skip to question 122.	
121. List the commodities you have a surplus of most frequently (up to 3 products).	1. _____ 2. _____ 3. _____
If the study team is studying a cold chain logistics system, answer questions 122–126. If not, go to question 05, next page.	
122. Do you have a functioning refrigerator(s) to store vaccines and/or HIV test kits?	Yes..... number _____ No ..... (go to next section) Not applicable..... (go to next section)
123. To record the actual temperature, look at the internal thermometer inside the refrigerator—ideal temperature is between 0 and +8 degrees centigrade. (Note if thermometer is broken or missing.)	Temperature (in centigrade) _____

124. Are refrigerators located away from any surrounding objects (approximately ½ meter)?	❑ Yes	❑ No
125. Is the temperature chart up-to-date? (to be up-to-date, there must be an entry for the day before the visit).	❑ Yes	❑ No
126. Is there a supply of paraffin or LPG for cold chain and sterilization purposes?	❑ Yes	❑ No

Thank you for you time and information. You have been very helpful. Our remaining questions will require looking at products in the storeroom and speaking with the person who oversees the store.

When in the Store Room (if with a different person):

Introduce all team members and ask facility representatives to introduce themselves.

Explain the objectives of this survey:

Good day. My name is _____. My colleague and I are representing _____ (e.g., the MOH in the country under study). We are conducting a survey about the health commodity logistics system. We are looking at the availability of selected commodities and information about how you order and receive those products. We are visiting selected health facilities throughout the country, and this facility was selected to be in the survey. The objectives of the survey are to collect current information on logistics system performance and stock status of key health products.

The results of this national survey will provide information to make decisions and to promote improvements. The survey has been/will be conducted again in the future to measure changes in the logistics system.

[Add any additional objectives here.]

We would like to ask you a few questions about the products and supplies available at this facility. In addition, we would like to count selected products you have in stock today and observe the general storage conditions. Do you have any questions?

No.	Question	Code Classification	Go To
05.	Name and title and of person interviewed for this section.	_____	
06.	Number of years and months you have worked at this facility.	Years: _____ Months: _____	
07.	Who is the principal person responsible for managing medical supplies at this facility?	Nurse ..... 1 Clinical Officer ..... 2 Pharmacy Technician ..... 3 Pharmacy Assistant ..... 4 Pharmacist ..... 5 Medical Assistant..... 6 Other (Specify) _____ 9	
08.	Are stock cards recorded using the smallest unit of count?	Yes (always) ..... 1 No (not always)..... 0	
09.	Is there a record where quantity dispensed to patients is recorded for inpatients?	Yes ..... 1 No 0	
10.	Is there a record where quantity dispensed to patients is recorded for outpatients?	Yes ..... 1 No 0	

TABLE 1: Stock Status (January 1–June 30, 2004 and the day of visit)

Column:
1. Name of all authorized products that will be counted
2. Unit of count for the product

Note*:* Columns 1 and 2 should be filled out before questionnaires are printed for the survey.

3. Whether or not the product is managed at this facility, answer Y for yes or N if no. Note that for some products, at certain levels all facilities should manage the product. In such cases, this column should be marked Y.
4. Check if the stock card is available, answer Y for yes or N for no.
5. Check if the stock card had been updated within the last 30 days, answer Y for yes or N for no. Note: If the stock card was last updated with the balance of 0 and the facility has not received any resupply, consider the stock card up-to-date.
6. Record the balance on the stock card.
7. Record if the facility has had any stockout of the product during the most recent 6 full months before the survey, answer Y for yes or N for no.
8. Record how many times the product stocked out during the most recent full 6 months before the survey according to stock cards, if available, or to a key informant if not. Note source information.
9. Record the total number of days the product was stocked out during the most recent full 6 months before the survey.
10. Record the quantity of product dispensed to users or issued from the storeroom during the most recent 6 months before the survey. Note: If the answer to column 4 is N, record NA in this column.
11. Record the number of months the issued data represents (may be less than 6); record the months for which there is any data recorded, including 0. Note: If column 4 is N, record NA in this column.
12. Record the quantity of product in open container. Estimate the quantity of the product to 1/4, 1/2. or 3/4 full using the smaller unit of count established in column 2..
13. Record if the facility is experiencing a stockout of the product on the day of the visit, *according to the physical inventory*, answer Y for yes or N for no.
14. Record the quantity of expired products. Count all expired products on the day of the visit. If there are products that are near expiry (within one week), note in the comments section.

Maximum months of stock_____ Minimum months of stock _____ Order interval_____

Note: For any product that experienced a stockout in the last six months (including the day of the visit), please note reasons (by product).

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Note: For any product that experienced a stockout in the last 6 months (including the day of visit), please note reasons (by product).

Product	Units of count	Managed at this facility?	Stock card available? (Y/N)	Stock card updated? (Y/N)	Balance on stock card	Stockout most recent 6 months (Y/N)	Number of stockouts	Total number of days	Total issued (most recent 6 months)	Number of months of data available	Physical inventory—Store room	Stockout today? (Y/N)	Quantity of expired products
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Comments:													

TABLE 2: Storage Conditions

Items 1–12 should be assessed for all facilities for products that are ready to be issued or distributed to clients. Place a check mark in the appropriate column based on visual inspection of the storage facility; note any relevant observations in the comments column**. *To qualify as "yes," all products and cartons must meet the criteria for each item.***

No	Description	No	Yes	Comments
01.	Products that are ready for distribution are arranged so that identification labels and expiry dates and/or manufacturing dates are visible.			
02.	Products are stored and organized in a manner accessible for first-to-expire, first-out (FEFO) counting and general management.			
03.	Cartons and products are in good condition, not crushed due to mishandling. If cartons are open, determine if products are wet or cracked due to heat/radiation (fluorescent lights in the case of condoms, cartons right-side up for Depo-Provera®).			
04.	The facility makes it a practice to separate damaged and/or expired products from usable products and removes them from inventory.			
05.	Products are protected from direct sunlight at all times of the day and during all seasons.			
06.	Cartons and products are protected from water and humidity during all seasons.			
07.	Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of rodents [droppings or insects].)			
08.	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.			
09.	Products are stored at the appropriate temperature during all seasons according to product temperature specifications.			
10.	Roof is always maintained in good condition to avoid sunlight and water penetration.			
11.	Storeroom is maintained in good condition (clean, all trash removed, sturdy shelves, organized boxes).			
12.	The current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).			

The additional standards below can be applied to any facility large enough to require stacking of multiple boxes.

No.	Description	No	Yes	Comments
13.	Products are stacked at least 10 cm off the floor.			
14.	Products are stacked at least 30 cm away from the walls and other stacks.			
15.	Products are stacked no more than 2.5 meters high.			
16.	Fire safety equipment is available and accessible (any item identified as being used to promote fire safety should be considered).			
17.	Products are stored separately from insecticides and chemicals.			

Additional guidelines for specific questions:

Item 2: In noting proper product arrangement, consider the shelf life of the different products.

Item 3: Check cartons to determine if they are smashed due to mishandling. Also, examine the conditions of the products inside opened or damaged cartons to see if they are wet, cracked open due to heat/radiation (e.g., for condoms, because of fluorescent lights), or crushed.

Item 4: Conduct the discarding of damaged or expired products according to the facility's procedures (this may differ from one facility to another). Specify if procedures exist and note what they are.

Item 7: It is important to check the storage area for traces of rodents (droppings) or insects harmful to the products.

Item 8: This refers to either a warehouse secured with a lock or to a cabinet in a clinic with a key.

Item 16: Fire safety equipment does not have to meet international standards. Consider any item identified as being used to promote fire safety (e.g., water bucket, sand). Do not consider empty and/or expired fire extinguishers as valid fire safety equipment.

TABLE 3: LMIS Data Quality: Usable Stock on Hand at Time of Most Recent LMIS Report

Column:

1. List the same products as in table 1 or use a sample of those products. Include only those products that are managed by the facility. (Note: Do this before finalizing the questionnaire and making photocopies.)
2. Get the most recent LMIS report showing the selected products, and record the stock on hand from the LMIS report in column 2.
3. Write the quantity of usable stock on hand from the stock records from the time of the selected LMIS report.
4. Calculate the percentage of discrepancy by subtracting quantities of stock on hand from the LMIS report (column 2) from quantities of stock on hand from stock records (from time of LMIS report [column 3], divide this by quantities of stock on hand from stock record [column 3], and multiply by 100).
5. Note the reasons for any discrepancy.

Method/Brand/Product	Usable Stock on Hand (at time of most recent LMIS report)			
	According to most recent LMIS report	From stock ledger or stock cards from time of LMIS report	% Discrepancy (col.3–col.2/col.2) *100	Reasons for discrepancy
1	2	3	4	5

TABLE 4. Percentage Difference between Quantity Ordered and Quantity Received

Column:

1. List the same products as in table 1 or use a sample of those products. (Note: Do this before finalizing the questionnaire and making photocopies.)
2. Enter the quantity ordered for the last order period for which products should have been received (i.e., don't include open orders whose expected receipt date has not arrived).
3. Enter the date the order was placed.
4. Enter the quantity received in the last order.
5. Enter the date the order was received.

Method/Brand/Product	Quantity Ordered for Last Order Period	Date Order Placed	Quantity Received in Last Order/Procurement	Date Order Received
1	2	3	4	5

TABLE 5: Order Fill Rate to Be Calculated at Issuing Warehouses

Instructions

1. Fill in all authorized products of interest in column 1. (Note: Do this before finalizing the questionnaire and making photocopies.)
2. Obtain order forms received by this warehouse during the 3 months prior to the beginning month of the current survey (e.g., if the current survey runs from September to October, obtain order forms for the months of June, July, and August). Obtain forms corresponding to each lower-level facility to be visited during the survey and complete a separate table for each lower-level facility.
3. Obtain issues records that correspond to each order, if not shown on the order forms.
4. In the appropriate space at the top of each table, write in the name of the lower-level facility that made an order to this issuing facility during the 3 months in question.
5. Under each ordering facility, enter the quantity that was ordered by the lower level and the amount that was supplied or issued by this facility. This information is used to calculate the line order fill rate. The total order fill rate can be calculated later by determining the percentage of facilities in which quantity supplied was equal to the quantity ordered for all listed products.
6. Record any notes or comments about why orders weren't filled in their entirety.
7. Use as many pages as needed to collect data for all facilities to be visited during the assessment.

↓ Product	Name of Facility Placing Order:_____					
	Month 1		Month 2		Month 3	
	Quantity ordered	*Quantity supplied*	*Quantity ordered*	*Quantity supplied*	*Quantity ordered*	*Quantity supplied*

↓ Product	Name of Facility Placing Order:_____					
	Month 1		Month 2		Month 3	
	Quantity ordered	*Quantity supplied*	*Quantity ordered*	*Quantity supplied*	*Quantity ordered*	*Quantity supplied*
	Comments, Notes, Reasons for Underfilled Orders					

Ask the person/people you interviewed if they want to ask you any questions.

Comments or general observations on products management:

Thank the person/people who talked with you. Reiterate how they have helped the program achieve its objectives, and assure them that the results will be used to develop improvements in logistics system performance.

Notes/Comments:

Description of Indicators

Description of Indicators

The following indicators can be measured using data collected from the Logistics Indicators Assessment Tool (LIAT).

INDICATOR: Accuracy of Logistics Data for Inventory Management

Definition

For each method/brand/product of interest, this indicator measures the accuracy of logistics data as the percentage of discrepancy between (1) physical stock count and stock record count, and (2) stock record count and logistics management information system (LMIS) report count.

The calculation for each part of the indicator is:

1. **Accuracy in keeping stock records:**

$$\frac{\text{stock record count} - \text{physical stock count}}{\text{physical stock count}} \times 100$$

2. **Accuracy in transferring information to the LMIS reporting form:**

$$\frac{\text{LMIS report count} - \text{stock record count}}{\text{stock record count}} \times 100$$

Physical stock, stock record, and LMIS report count refers to the amount of each product that is shown as undamaged, not expired, and available for use in a service delivery facility or warehouse.

Physical stock count is determined by counting the stock in the store. Stock record count is recorded on forms that facilities use to track stock balances, transactions, and adjustments over time. LMIS report count is recorded in periodic reports that summarize stock balances, transactions, and adjustments over a specified period of time. The reports are transmitted from one level of the system to another.

Evaluators can report each measure of discrepancy (or agreement) by facility or in the aggregate, and they should report for each product of interest. It may also be useful to use these measures to calculate the percentage of facilities that keep accurate stock records and produce accurate reports (defined as reports showing that discrepancies for all products fall within a margin of error agreed to by the program).

Data Requirements

- physical counts of total number of products in the facility
- recorded inventory, which can be retrieved from the stock ledger or stock cards
- LMIS reports.

Data Source(s)

Facility survey/logistics site visits to all facilities or to a representative sample of facilities.

Purpose and Issues

This indicator measures the accuracy of data on product stock levels at various points in the logistics system. The indicator is essential because the supply chain relies completely on stock data to forecast, procure, and deliver the right quantities of products to storage and service delivery sites. It highlights the importance of data quality at every level of the system.

The first part of the indicator, which uses information on stock levels on the day of the site visit, provides information on how accurately the facilities are tracking their inventories. The second part, which compares the most recent available LMIS report to the inventory record balance closest to that date, provides information on the accuracy of the data being transferred to the LMIS reporting forms. Because the second half requires reviewing historical stock records, it may be difficult for evaluators to collect these data. This indicator may also check for leakage in the system, track timeliness in updating stock records, and determine the extent to which programs complete and submit LMIS reports.

Ideally, a program should not have discrepancies between the physical inventories and the two sources of stock level data but, in practice, evaluators should expect some errors. Acceptable levels of error will depend on conditions in each country. In general, discrepancies of more than 10 percent should cause concern and may require efforts to improve data quality.

Related Indicators

- percentage of facilities that keep accurate logistics data for inventory management
- percentage of facilities that completed and submitted an LMIS report for the most recent reporting period.

Indicator: Percentage of Facilities That Receive the Quantity of Products Ordered

Definition

For all products that the program is committed to supplying, this indicator measures the percentage of difference between the amount ordered in the last order period (or other defined period of time) and the amount received for that period.

$$\frac{\text{amount received} - \text{amount ordered}}{\text{amount ordered}} \times 100$$

This indicator should be calculated for each product for which an order from a higher level of the logistics system or procurement order is placed. If a mean order fill rate figure is desired for all products, the figure should be based on the absolute values of the discrepancies calculated for each product.

Data Requirements

- list of products that the program has committed to supplying or a predetermined subset of this list
- quantity of products ordered for the last order period or during a defined period of time (e.g., quarter, year) and the dates that the orders were placed for all facilities or a representative sample of facilities
- quantity of products received for the last order period or during the same defined period of time (e.g., quarter, year)
- dates that the orders were received for all facilities or a representative sample of facilities.

Data Source(s)

Facility survey/logistics site visits to all facilities or to a representative sample of facilities

Purposes and Issues

This indicator measures the order fill rate for selected products during a defined period of time. To better understand how logistics staff are managing their stock, the indicator shows if orders are being completely filled in a timely manner. It can be calculated at each facility to identify problematic products and/or suppliers. It can also be used to identify areas that need improvement at other levels of the logistics system where facilities determine their own order quantities, including the national level.

Related Indicators

- average duration of time between the date an order was placed and when it was received
- percentage of facilities that received their last four orders according to schedule.

INDICATOR: Percentage of Facilities That Maintain Acceptable Storage Conditions

Definition

This indicator measures the percentage of storage facilities that meet acceptable storage conditions. Evaluators should report this indicator for each condition listed in the LIAT.

$$\frac{\text{no. of storage facilities meeting each acceptable storage condition}}{\text{total no. of facilities visited}} \times 100$$

Data Requirements

- checklist of acceptable storage conditions
- data collected for each condition for all facilities or for a representative sample of facilities by an observer knowledgeable about storage requirements.

Data Source(s)

Facility survey/logistics site visits to all facilities or to a representative sample of facilities

Purpose and Issues

This indicator measures the conditions of storage facilities compared to a list of conditions required to protect the integrity of products. Evaluators can apply the indicator at each level of the logistics system to identify facilities that need improvement.

Evaluators should use the first part of the checklist found in the LIAT to assess all storage facilities (including small storage spaces at the SDP level). They should apply the second part of the list to larger facilities, as appropriate.

Related Indicator

- percentage of facilities meeting all (or a desired percent) of the storage conditions.

INDICATOR: Percentage of Facilities That Experienced a Stockout at Any Point during a Given Time Period

Definition

This indicator measures the percentage of facilities (service delivery points, warehouses) that experienced a stockout of a method/brand/product expected to be provided or issued by that site at any time during a specified period (e.g., the past 6 or 12 months).

$$\frac{\text{no. of storage facilities assessed that experienced a stockout of a (method/brand/product)}}{\text{total no. of facilities assessed that distribute or issue (method/brand/product)}} \times 100$$

Evaluators should calculate the indicator at all (or at a sample of) facilities that distribute or issue products. Calculate the indicator separately for each product, and aggregate the data to calculate the percentage of facilities that experienced a stockout of each product, at any time, during the specified period. Evaluators may use the stockout table in the LIAT to tabulate data required to measure the indicator.

Data Requirements

- information on stock levels of all products of interest for the past 6 (or 12) months at all levels of the system.

Data Source(s)

It is usually necessary to make a facility survey/logistics site visit at all facilities or at a representative sample. In some countries/programs, evaluators may use logistics management information systems or supervisory records, depending on the quality of the information available.

Purpose and Issues

This indicator measures product availability (or lack of) over a period of time, and serves as a proxy indicator of the ability of a program to meet clients' needs with a full range of products and services. Evaluators should use this indicator in conjunction with the stock status indicator, and interpret it with caution because facilities can avoid stockouts by rationing supplies. Other related indicators (see below) may provide more information on overall product availability. For example, duration of stockouts may help differentiate between products stocked out for a short period of time (e.g., 1–2 days) versus those stocked out for extended periods. Evaluators may assess reasons for stockouts to help program managers address the underlying causes of this logistics system failure.

If national policy dictates that different brands of the same product cannot be used interchangeably, then evaluators should monitor brands separately. If the policy allows substitution of equivalent brands, and if providers make such substitutions in practice, then evaluators can monitor different brands as a single product.

Using data for a 12-month period allows evaluators to consider seasonal variations in product use, but it may be difficult for them to obtain the historical data. Calculating this indicator using data for 6 months is less cumbersome because it requires reviewing fewer reports. If evaluators rely on fewer than 12 months of data, they should investigate seasonality issues.

Related Indicators

- percentage of facilities stocked out of any product on day of visit
- percentage of facilities fully stocked (all products) on the day of visit
- mean number of products stocked out/in on day of visit
- percentage of products stocked out/not stocked out at any time during past 6 (or 12) months
- mean number of times each method was stocked out in the past 6 (or 12) months
- mean duration of stockouts.

INDICATOR: Percentage of Facilities Whose Stock Levels Ensure Near-Term Product Availability

Definition

This indicator measures the percentage of facilities with stock levels greater than zero and below the established maximum level for each full-supply method/brand/product of interest, at a specified point in time (e.g., the day of visit).

$$\frac{\text{no. of facilities that have stock levels above zero but below the established max. level for the product}}{\text{total no. of facilities visited}} \times 100$$

Where stock levels are greater than zero but below the established minimum level, evaluators should record whether or not there is an outstanding order for replacement stock.

Evaluators can report the indicator at the facility level or aggregate it for a sample of facilities or for the entire program. At any level, evaluators should calculate and report the indicator separately for each product of interest to ensure that each product receives a unique measure. If desired, evaluators can further aggregate to construct additional indicators, such as the percentage of facilities with all full-supply products adequately stocked (see related indicators below). Averaging all products for an "average" stock level adequacy is not recommended because oversupply in one product can cancel out undersupply in another, falsely implying that average stock levels were adequate.

Data Requirements

- stock levels of all products of interest at a point in time (e.g., the day of the visit)
- maximum and minimum stock levels established by the program
- historical consumption or issues data for each product at each facility
- records of recent orders (for products below minimum levels).

Data Source(s)

To assess stock levels, it is often necessary to do a facility survey/logistics site visit at all facilities or to visit a representative sample. Evaluators may collect stock data by taking a physical inventory or by reviewing the stock ledger or stock cards. In some countries/programs, the LMIS or supervision records may provide usable stock-level data. The LMIS should also provide maximum and minimum stock levels with consumption data, by product. Service statistics or similar records may provide the needed data on consumption or issues if the LMIS does not.

Purpose and Issues

This indicator provides an overall measure of whether stock levels of products are adequate at a point in time. It helps reveal overstock situations that could lead to product expiration and wastage, and low stock levels that could result in stockouts or rationing. In applying this indicator, evaluators must carefully evaluate facilities where stock quantities are below established minimum levels. To do so, the evaluator should determine whether a new order was placed when stock levels reached the minimum. If such an order is outstanding, then the evaluator may consider stock status adequate because the order will probably arrive before the facility stocks out. If not, the stock status is inadequate.

Evaluators should apply the indicator only to products the program has committed to keeping in full supply. Stock status at a point in time for products that are not in full supply may reflect only the length of time since the last shipment arrived rather than measuring whether inventory management procedures are effective. Ideally, evaluators will measure stock status over a period of time (see related indicator below) but, for most of the time, this approach is possible only where the LMIS is automated.

Related Indicators

- percentage of time during a given period that each product of interest is adequately stocked (this indicator requires an automated LMIS system or extensive review of historical stock ledgers)
- percentage of facilities with all full supply products adequately stocked for near-term availability
- percentage of facilities that are understocked, adequately stocked, and overstocked.

For more information, please visit www.deliver.jsi.com.

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