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Supply & Logistics Internal Control Evaluation (SLICE) User Manual

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Terms and Abbreviations

Term	Description
Review Period	The timeframe over which the SLICE assessment analyzes the pharmaceutical commodities (e.g., 1 year, 2 years).
Commodity	The general term for inventory items in the health sector supply chain
Focus Areas	Eight primary internal activities analyzed in the SLICE questionnaire – Control Environment; Monitoring and Evaluation; Arrival and Customs Clearing; Transportation; Receiving; Storage; Distribution; and People.
Receipts	Inventory transactions at a given site related to commodities entering the site for user or further distribution.
Issues	Inventory transactions at a given site related to commodities being dispensed from the site to end-users or other points in the supply chain.
Maturity	The level of control for a given site or the distribution system as a whole. Systems demonstrating sound control over the distribution of commodities tend to be high on the maturity curve (leading) while systems with significant gaps tend to have a low maturity level (lagging).
MOH	Ministry of Health
PII	Personally identifiable information.
Port	The supply chain level in which commodities enter the country; the airport, seaport or land border.
Port-to-Patient	An analysis that traces commodities from the port of entry to the end user (patient); quantifies the level of inventory mismanagement across each level of the supply chain.
Site	The general term for physical locations (e.g., hospital, clinic or central warehouse) that are visited and assessed during SLICE.
SLICE	Supply & Logistics Internal Control Evaluation
Supply Chain Level	The 4 primary levels of the supply chain through which the commodities flow. Typically, countries have ports, a national warehouse, sub-national depots, and points of distribution to patients (e.g., clinical or hospital).
Unaccounted For Inventory	The quantity or financial value of commodities for a given site or category that are physically missing or improperly recorded.
USAID	United States Agency for International Development.
USAID Mission	Employees of USAID who work in host-countries

Introduction

SLICE Background

The United States Agency for International Development (USAID) is committed to confronting global health challenges by improving the quality, availability, and use of essential health services in developing nations. USAID works directly with local institutions to increase capacity in planning, management, and implementation of health services. A critical component to the success of these programs is the host government's health supply chain, which transports donor-funded medical commodities to patients. The government's ability to distribute commodities to patients in need is dependent on a sound supply chain with appropriate internal controls and safeguards.

In March 2011, USAID began development of methods to identify weaknesses in supply chain internal controls in sub-Saharan Africa. As a result of field trials in four countries, the **Supply Chain & Logistics Internal Controls Evaluation (SLICE)** was developed. SLICE is not an audit, but instead identifies strengths and vulnerabilities in the supply chain, quantifies levels of inventory mismanagement, and proposes recommendations to strengthen supply chain controls.

This user manual serves as a reference guide to organizations that may wish to learn more about SLICE or conduct SLICE assessments. It contains an overview of the SLICE methodology and examples of the SLICE tools, the SLICE questionnaire and the Supply Tracing and Reconciliation (STAR) tool, as well as, approaches for analyzing the data collected from these tools.

Benefits and Objectives

SLICE offers several benefits to users and stakeholders:

- Provides stakeholders with a comprehensive view of a logistics system,
- Identifies logistics and commodity security issues and opportunities,
- Raises collective awareness and ownership of system performance and goals for improvement, and
- Allows stakeholders to quantify losses and pin point control weaknesses.

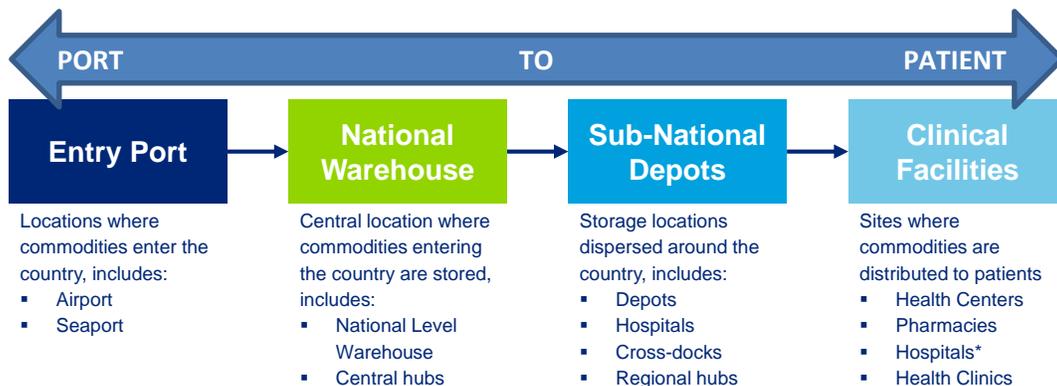
SLICE rapidly identifies and documents internal control weaknesses at each level of the supply chain from the point of entry into the country to the end-user (Port-to-Patient). The SLICE approach is flexible and easily tailored to assess supply chains for certain geographies, commodities, and other key risks. In its most basic form, the SLICE assessment seeks to achieve the four objectives described in Table 1.

TABLE 1 - SLICE OBJECTIVES

Objective	Description
Trace Inventory Movement	Trace inventory movements and volume commodities along the supply chain from the point of entry (the port) to end-user (the patient).
Identify Internal Control Risk	Review existing control practices at supply chain locations to identify potential weakness that could contribute to commodity mismanagement, expiration, damage, or loss.
Quantify Potential Unaccounted for Inventory	Calculate the potential mismanagement across supply chain locations, levels, geographies, and commodities. (Unaccounted for inventory includes theft, shortages, waste and loss which could result from a deliberate act or from the failure to record transactions accurately and completely).
Develop Solutions	Recommend internal control enhancements to mitigate the identified risks and reduce future inventory mismanagement.

SLICE is unique in that it assesses internal control weakness and traces commodity flow through the supply chain by considering risks at each point in the distribution system. SLICE assesses sites at each level of the supply chain using the SLICE questionnaire and the STAR tool. The questionnaire collects information about a site’s internal controls and STAR reconciles inventory movements across supply chain levels to calculate “unaccounted for inventory¹,” or the quantity and financial impact of inventory differences. Together, the SLICE questionnaire and STAR link unaccounted for inventory with internal control weaknesses to pinpoint risk in the supply chain. This link provides a basis for prioritizing recommendations with the potential to yield the greatest improvement to the supply chain. The resulting Port-to-Patient analysis provides a comprehensive view of losses, related weaknesses and improvement opportunities.

FIGURE 2 – PRIMARY SUPPLY CHAIN LEVELS FOR COMMODITY TRACING

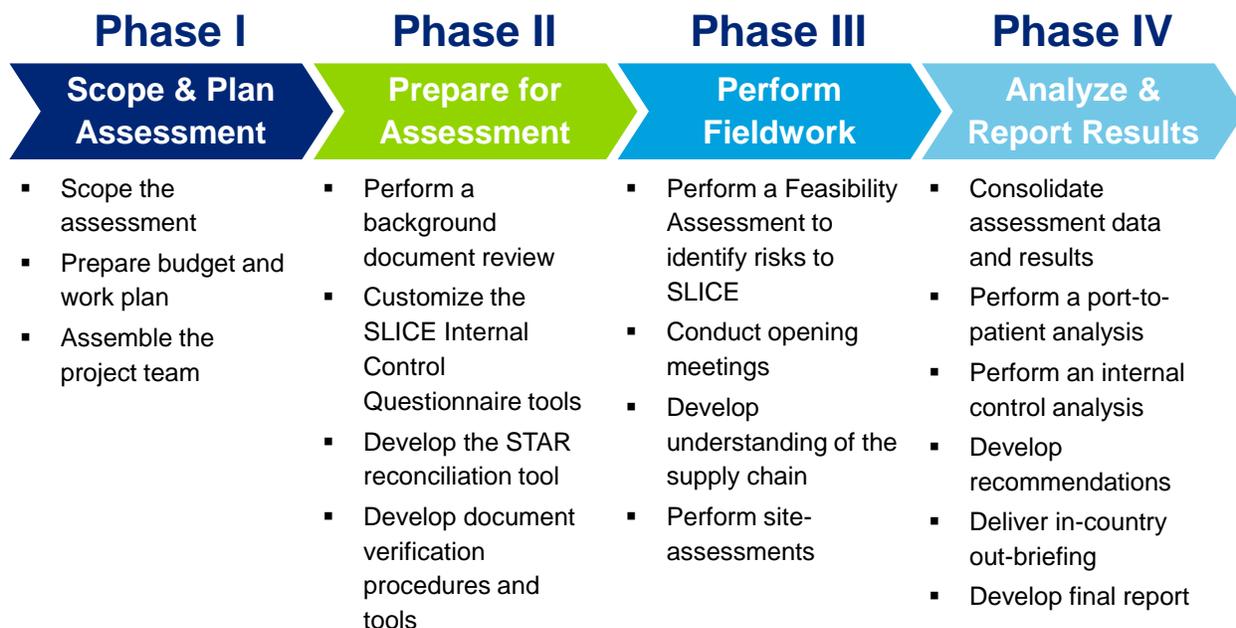


*Hospitals can as a central storage location and as a dispensary to in patient and out patient departments.

¹ Unaccounted for inventory is defined as the financial value of commodities for a given site or category that are physically missing or improperly recorded.

SLICE follows a four-phase methodology for planning the assessment, preparing tools and materials, conducting on-site assessments, and reporting results. Figure 2 below outlines the four phases and provides a summary of key activities of the SLICE methodology. The following sections of this manual provide a detailed description of each phase and associated activities. The appendix contains examples of the SLICE tools and supplemental materials.

Figure 2 - SLICE phases and key steps



Phase I: Scope & Plan Assessment

Effective planning is crucial to a successful SLICE project as each country is different and presents challenges in culture, language, organizational capacity, infrastructure, logistics, and supply chain maturity. These factors can result in unexpected circumstances that may impact the execution of the project. Project planning should consider these risks and increase the probability of project success.

Phase I consist of the following activities:

- Scoping the assessment
- Preparing the work plan and budget
- Obtaining USAID approval

1.1 Scope the Assessment

The SLICE team must conduct preliminary discussions with the USAID’s Global Health Management Team (USAID HQ) and the host-country USAID Mission to review and confirm project objectives and the scope of the assessment. Key factors include determination of in-scope commodities, transaction sampling period, site selection, and the content of deliverables.

Determine In-scope Commodities

The SLICE team should discuss and document commodity selection in detail with both USAID HQ and Mission officials. Commodity samples generally include approximately five to eight commodities. Examples include: Artemisinin-based Combination Therapy, Long Lasting Insecticidal Nets, Antiretrovirals, HIV Rapid Test Kits, and essential medicines. When determining the in-scope commodities, USAID and supporting partners should document the commodity brand, presentation, and other characteristics required for accurate identification. Additionally, the cost per unit for each in-scope commodity should be provided to the SLICE team to allow for financial analysis.

Determine Review Period

The Review Period is the timeframe over which inventory transactions are reviewed and analyzed. For example, analysis could be performed for the period of June 1st 2012 to December 31st 2012 which would include all transactions occurring between those dates. The transaction sampling period is typically 12 months, but may be longer depending on the needs of the donor community and availability of inventory records. Consider any significant changes in inventory tracking or reporting that might affect data availability such as adoptions of new information systems, major data migrations, or significant government restructuring in the health sector.

Determine Sites to Assess

The USAID mission and technical team should assist the SLICE team in obtaining a full master list of sites in the country. The list should include all ports of entry, national warehouses, hospitals, sub-national depots, and health facilities. A site sample can vary in size, but should include representation of geographic locations, each site type and supply chain level. The number of sites selected should consider factors such as population size, population density, infrastructure quality, distance to capital or provincial hubs, ease of transportation, and weather conditions.

Identify the Content of Deliverables

Work with project stakeholders to define and agree upon the list of required deliverables along with the format, timeline, and desired content. Deliverables typically include the following:

TABLE 2 - EXAMPLES OF SLICE DELIVERABLES

Deliverable	Description and Details
SLICE Questionnaire	A completed questionnaire is the primary working papers for each site assessed.
Final In-country Presentation	In-country presentation that details preliminary SLICE findings; used to obtain feedback on SLICE results and informs the final report
Final Report	Final Report with detailed analysis of questionnaire findings, statistical analysis, maturity models, and unaccounted for inventory calculations.

1.2 Prepare the Budget and Work Plan

Build a Project Plan and Schedule

The plan should include a detailed schedule of sites to visit, dates, and team assignments. The schedule should also include the type of site assessed (central, district, sub-district, Mission etc.) and GPS coordinates, or other information required to locate and identify the sites. Ensure that the schedule also builds in time for stakeholder interviews, entry and exit presentations to USAID, and time for report writing. At this time, the SLICE team should document the expected dates for the in-country opening meeting and final presentation. USAID should also communicate their desired schedule for status updates and information contained therein.

Considerations for Report Content

The SLICE team should discuss the information and analysis desired by USAID and other stakeholders. This could include statistical analysis, modeling, and extrapolation of risk and unaccounted for inventory for every location.

1.3 Assemble the Project Team

A SLICE team typically consists of three to six members, but may be larger or smaller depending on the timeline and scope. One member should be designated team lead with responsibility for coordinating daily work and communicating progress to USAID. The team lead may create smaller teams of two assessors to deploy to multiple sites concurrently.

- Team members in each sub-team should communicate in the local language where possible.
- The team should have experience in supply chain management and internal controls.
- The team should have an IT specialist to aid in extracting information.
- If additional analytics are required, consider employing a data analytics specialist or statistician.

Phase II: Prepare For the Assessment

Phase II consists of four primary activities and results in the customized materials used to perform on-site assessments:

- Background Document Review
- Preparation of the Questionnaire
- Preparation of the STAR tool

2.1 Perform a Background Document Review

Review Background Documents

The team should conduct a detailed review of background documents related to the host-country's supply chain. The team should focus on identifying known weaknesses in the distribution system and

issues that could inhibit performance of SLICE (e.g., poor documentation and data). After the review, potential project concerns should be communicated to USAID for a decision on whether to alter SLICE procedures. Documents to review include, but are not limited to:

- Previous assessment reports provided by USAID, other donor agencies, and NGOs (e.g. OIG reports, previous assessment reports conducted on the supply chain).
- Documents that relate to central warehouse programs, policies, and processes.
- Other key information recommended by USAID and other stakeholders.

Some examples of key limiting factors that might result in the decision to revise the scope of a SLICE assessment include:

- Consistent problems with documentation or record keeping identified in multiple assessments.
- Significant control deficiencies, data quality issues, or a lack of transaction documentation.
- Safety or travel concerns that may put the SLICE team at physical risk.

Complete the Planning Questionnaire

During the document assessment, the SLICE team should prepare a list of questions for completion by the USAID Mission. Questions should provide background information on the host-country supply chain such as supply chain organization, stakeholders, and risks. Appendix F contains an example of a planning questionnaire.

2.2 Customize the SLICE Internal Controls Questionnaire and Tools

The SLICE Questionnaire

The SLICE Questionnaire is a standard document developed by USAID to provide comparability between assessed sites, districts, provinces and countries. The questionnaire is consistently followed across all SLICE assessments, but could have unique language or questions based on the specific needs of a USAID mission or challenges in a country. The base questionnaire is attached in Appendix A.

The questionnaire covers key supply chain processes in eight “focus areas”. This structure breaks down the supply chain into distinct steps and allows the assessment team to pinpoint weaknesses.

TABLE 3 – SUMMARY OF THE EIGHT SLICE FOCUS AREAS

Focus Area	Description
Control Environment	Provides an overview of the organizational structure and general processes within the supply chain.
Monitoring and Evaluation	Describes how and what data is captured and shared across the supply chain and what activities are used to monitor it.
Arrival and Customs Clearing	Assesses standard customs procedures at point-of-entry. This is only applicable at sites at the start of the supply chain (e.g., airports, seaports, etc.).

Focus Area	Description
Transportation	Assesses how shipments are transported to and from the site.
Receiving	Assesses how the site inspects and documents shipments received.
Storage	Assesses how the site stores commodities, secures itself, and tracks store room stocks.
Distribution	Assesses how the site distributes commodities to other sites in the supply chain.
People	Assesses how the site hires, fires, evaluates, and pays employees.

The questionnaire is to be executed at all assessed sites, although some site types exclude non-applicable focus areas. For example, a clinic does not have an “arrival and customs clearing” activity so this focus area would be omitted in the assessment of the clinic.

Site Questionnaire Scoring

The weighting utilized by closed-ended questions reflects the strength of each question’s relationship to unaccounted for inventory noted in the analysis of all SLICE assessments completed to date. The weights are used to score each site and to support the quantitative analysis of weaknesses correlated with the unaccounted for inventory calculated for each site through STAR. (Note: As additional SLICE assessments are completed, USAID might consider updating question weights accordingly.)

Collecting Data Elements

The SLICE team should collect site specific data elements to uniquely identify each site and to facilitate further analysis. Each of the following items below should accompany the questionnaire for each site.

TABLE 4 - SUPPLEMENTAL DATA ELEMENTS

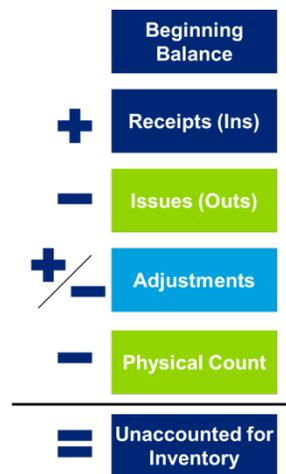
Element	Description
Site Name	Legal site name according to MOH documentation.
Province or State	Province or state where the site is located.
Site Type	Accurate documentation of the site type is crucial to ensuring stratification of site types in the data analysis.
Supply Chain Type	Some countries have multiple supply chain systems for distribution.
Site Size	Facility size is different in each country. It can include average daily prescriptions filled, average daily shipments and receipts, or catchment population.
Interviewees	The key personnel, titles, and their responsibilities.
GPS Coordinates (optional)	GPS coordinates allow easy location of sites while in country in addition to allowing the team to overlay SLICE results on a map.

2.3 Develop the STAR Reconciliation Tool

Calculate Unaccounted for Inventory

The second component of the SLICE assessment, the Supply Tracing and Reconciliation, is used to determine the unaccounted for inventory, or amount of commodities that have been mismanaged, lost, or misreported at each assessed site. When preparing the STAR tool, consider that the reconciliation is needed for each of the 6-8 in-scope commodities at each site. A template for a standard SLICE reconciliation is provided in Appendix B for reference. Later, in Phase IV, the reconciliations are combined to create a Port-to-Patient reconciliation, which traces the commodities through the supply chain. The basic formula for the reconciliation is shown in Figure 3.

FIGURE 3 - THE STAR RECONCILIATION FORMULA



Note: Unaccounted for inventory may be positive or negative. If a site fails to record a transaction, it is possible that actual inventory is larger than the stock card records. On the other hand, if commodities are mismanaged, the reconciliation would show a shortage of inventory. SLICE typically reports both numbers separately to illustrate the magnitude of inventory

An important component of the STAR reconciliation is the review of inventory movements between facilities. This identifies discrepancies between shipping sites (e.g., national warehouse, depot) and receiving sites.

FIGURE 4 – UNACCOUNTED FOR INVENTORY IN TRANSIT CALCULATION



In Phase IV, the Port-to-Patient analysis is performed to identify unaccounted for inventory quantities at each point in the supply chain and linkages between them, providing a comprehensive view of supply chain weakness.

2.4 Develop the Document Verification Process and Tools

Information obtained through interviews and reported inventory quantities should be confirmed through a review of supporting documentation. The following are example supporting documents that may be used in this process:

TABLE 3 - SUPPLY CHAIN SUPPORTING DOCUMENTS

Data Element	Description
Electronic Records	Consolidated electronic records of central inventory transactions are the primary source of data for analysis. These records provide quantities on hand, received, and shipped. These also provide an independent source to verify the amounts shipped to other locations in the supply chain.
Stock Cards, Registers and Order Forms	Stock cards serve as a secondary source of data at the central level and can be used to supplement or verify the electronic records. In smaller facilities, they are usually the only source of data when no electronic records are available.
Waybill/Invoice	Third-party documentation provides an independent source of transactions and the quantity of commodities being transported from one site to another.
Goods Received Note	A document signed by the shipping and receiving parties to act as a receipt. Sometimes this document is the same as the waybill.
Internal Requisition Form	Used as proof of deliveries at hospitals and health centers; documents the distribution of a commodity from the hospital storeroom to other wards, the lab, and dispensary or ART clinic.
Out Patient Department Registers	Records commodities dispensed at clinical facilities from the pharmacy to individual patients. They include the patient’s name, date, prescription, but do not often include the exact amount dispensed to the patient due to the challenge of recording pill-level usage.

Different sites have different sample sizes, though these may vary in practice due to the volume of transactions a site has during the transaction sampling period or other limiting factors. The following table details the recommended sample sizes for each site type:

TABLE 6 - TYPICAL SAMPLE SIZES FOR DOCUMENT VERIFICATION

Site Type	Suggested Sample Size
National Warehouses	30 total (15 receipts, 15 issues)
Sub-national Depots	20 total (10 receipts, 10 issues)
Hospitals	20 total (10 receipts, 10 issues)
Health Clinics and Centers	10 total (5 receipts, 5 issues)

Document verification involves tracing the transaction date, quantity, and destination from the stock card to the supporting document. In addition, execution, or signing, of the document by the shipping and receiving party is verified. The following represents an example of format used to record the results:

FIGURE 4 - DOCUMENT VERIFICATION FORMAT EXAMPLE

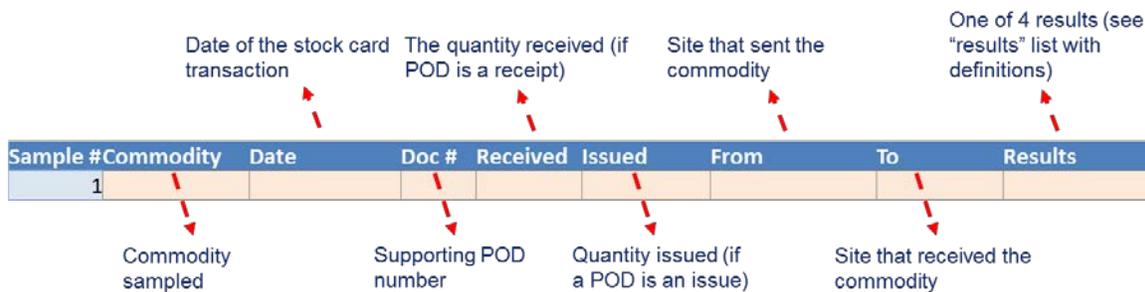


TABLE 7 - DOCUMENT VERIFICATION RESULTS LIST

Result Category	Definition
Fully Executed	Document produced, all information matches
Partially Executed	Document produced, quantities correct but signature or other information missing
Produced, Incorrect Quantity	Document produced but had incorrect quantity
Could Not Produce	Document could not be produced

These categories allow the assessor to perform analysis that provides insight into the quality of records on the site. Assessors should note any irregular observations such as damaged documents, poor filing, or lack of original copies in a notes section accompanying the document verification. Sample documents that do not meet the fully executed criteria should be copied or photographed and retained by the SLICE team.

Phase III: Perform Fieldwork

The primary objective of Phase III is to collect data on site for development of recommendations. Phase III consists of three major activities:

- The Feasibility Assessment.
- National Level Opening Meetings.
- Performance of On-Site Assessments.

3.1 Perform a Feasibility Assessment to Identify Risks to SLICE

SLICE may be subject to limitations because of poor or limited data. To mitigate this risk, an on-site feasibility assessment at least one week prior to the arrival of the full team should be conducted. The goal of the feasibility assessment is to determine whether sufficient data is available to conduct an assessment of inventory transactions and stock levels. If data is limited, alternate procedures can be utilized to capture data from secondary sources.

The Feasibility Assessment focuses on the national level data, as a way to rapidly assess data quality. The primary objective of the assessment is to:

- Review the completeness and accuracy of inventory records to support tracing procedures across each level of the supply chain,
- Identify alternative sources of data, and
- Estimate the level of effort and procedures required to access alternate sources of data.

The SLICE team member should record the results of the activities above and communicate them to USAID to determine next steps. The following points should be considered:

- Are sufficient secondary sources available to provide reliable results?
- What is the burden and level of effort needed to overcome the data limitations?
- Can statistical modeling or other methods overcome the limitations?

3.2 Conduct Opening Meetings

Upon completion of the Feasibility assessment, the entire SLICE team deploys to the host country. The SLICE team should lead meetings with key stakeholders to kick-off SLICE and encourage cooperation with local staff.

Meet with the USAID Mission

The SLICE team should hold an opening meeting with the USAID Mission to review the details of the assessment including confirmation of:

- In-scope commodities including brand, presentation, and pricing of each unit
- Number of locations to assess and timeline
- Significant concerns from both the SLICE team and USAID
- Expectations of both the Mission and the SLICE team

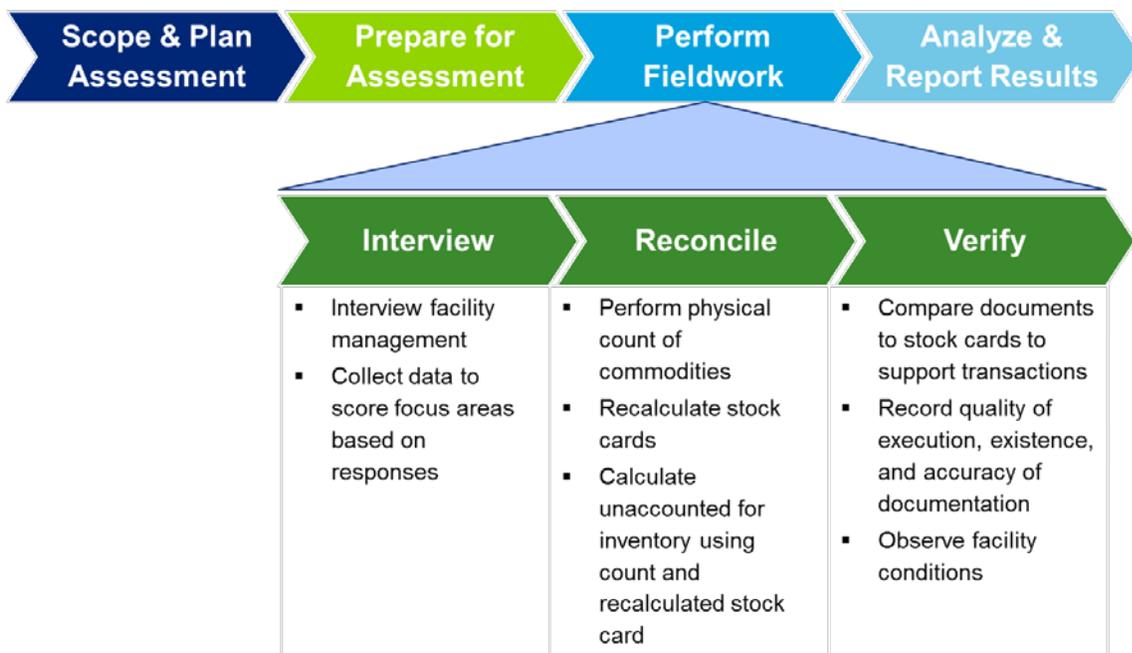
3.3 Develop an Understanding of the Supply Chain

It is critically important that the SLICE team confirm knowledge gained from the background document review to develop a detailed understanding of the host-country’s supply chain operations. Meetings should focus on understanding the organizational structure, management practices, and characteristics of the host country’s supply chain.

3.4 Perform Site Assessments

After reviewing the results of the feasibility assessment and the decision to move forward, the SLICE team uses the previously developed work plan to deploy to selected sites to perform SLICE assessments. Work typically begins at the national level (including the ports), then moves to the sub-national and clinical facility level. At each assessed sites, the tools prepared in Phase II are used to complete three primary activities conducted: interview, reconcile, and verify.

FIGURE 6 – PHASE III PRIMARY ACTIVITIES



INTERVIEW

Upon arrival at each assessment site, the team should conduct an introductory meeting with site management. In certain countries, district health offices or county health team oversees sub-national and clinical facilities. In these cases, the SLICE team should also visit their office prior to assessments in their jurisdiction to obtain necessary permission. Several items should be covered in each meeting:

- Clearly explain the purpose of SLICE.
- Present any credentials from MOH or USAID.
- Identify the Chief Pharmacists, staff, or others to interview for each focus area.

- Request the needed documentation such as stock cards and PODS for your transaction sampling period, and SOPs.

While the basic assessment is the same for each site type, the national warehouses and ports require specific considerations. The graphic below summarizes which of the eight focus areas of the questionnaire are completed for each site type.

TABLE 8 - FOCUS AREAS INCLUDED BY SITE TYPE

Focus Area	Port	National Warehouse	Sub-National Depot	Hospital, Health Center, Clinic
Control Environment	X	X	X	X
Monitoring and Evaluation	X	X	X	X
Arrival and Customs Clearing (Port)	X			
Transportation	X	X	X	X
Receiving	X	X	X	X
Storage	X	X	X	X
Distribution	X	X	X	X
People	X	X	X	X

Interviews are performed with staff management or the person most directly in charge of the relevant focus area. In rural sites, a Chief Pharmacist or Officer-in-charge is often the contact for all focus areas. At larger sites such as ports and the national warehouse, however, each focus area may require an interview with different people. While it is desirable to obtain the best sources of information for interviews, if the SLICE team travels to a remote or distant site and management is not present to conduct an interview, they should continue with available staff.

Document the interviewee’s name, title and contact information; request and record basic site information including the supplemental data outlined in the Phase II preparation work. The Assessment Team should be sure to document the information as provided by the interview participants and any interesting facts, risks, or significant concerns that arise during the interview that may not necessarily be directly related to a specific question.

Reconcile

Locate each in-scope commodity in the warehouse (note: some warehouses may have multiple locations). Count each commodity and record the quantity on hand along with related expiration dates and batch numbers. Be sure to verify if any commodities in the picking station are already recorded on the stock card; if not, include commodities in the picking station in the count.

Review Supporting Documentation

The reconciliation should tie quantities counted and reported to stock cards and other supporting documentation as needed (e.g., way bills, dispatch notes, order forms and registers). A detailed

reconciliation process example can be found in Appendix B. Remember, when performing the reconciliation:

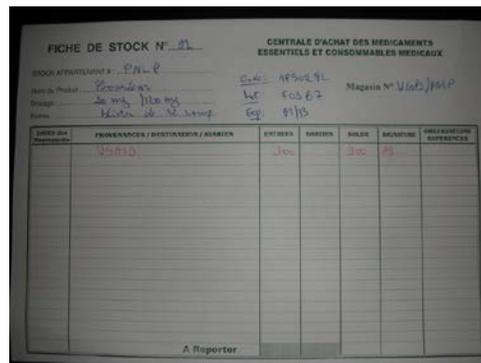
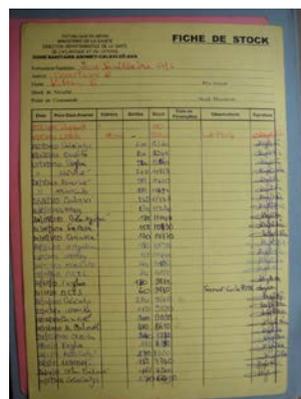
- Always take a picture of stock cards when available
- Ensure the unit of reconciliation is consistent across sites,
- Ensure the proper brands and presentations are being traced, and
- Note all missing stock cards or data (indicate missing batch numbers if possible)

An individual calculation should be performed for each in-scope commodity. To review stock card transactions, select entries during in the transaction sampling period from stock cards and locate the appropriate shipping documentation or patient records supporting the transaction. If stock cards are missing, follow-up with the site staff to determine if the cards may be located elsewhere. For electronic records, request that a report for the requested dates be emailed or saved on a flash-drive. Key information on the stock card and the documentation should be compared that includes:

- Date of the transaction.
- Quantity of goods received or shipped (receipts/issues).
- Proper execution and signing by both the receiving and shipping party.
- Proper use of MOH or government approved documentation.

The results should be recorded and notes taken on items that do not match. Keep in mind that filing systems can be disorganized and prevent you from locating documentation; any documents that cannot be located should be considered as missing. Additionally, records may be illegible or have strange notes on them; ask what the marks mean and how they are used. In many cases, these marks may account for commodities that were returned or not accepted due to damage or expiration. Inquire about any processes that may be in place around any strange markings or documentation issues.

FIGURE 7 – STOCK CARD EXAMPLES



Verify

While observations can be made at virtually any time, assessors should be sure to ask permission prior to taking any photographic, scanned, or copied materials. Examples might include:

- Photos of warehouse storeroom conditions

- Photos of vehicles used in transport
- Walkthroughs of information system access with interviewees
- Visually confirming security systems to confirm doors, locks, alarm systems, CCTVs, warehouse security personnel,
- Photos of documents such as SOPs, inventory counts, and posters, and
- Photos of any irregular storage conditions, damage, or expiration.

Phase IV: Analyze & Report Results

The reporting phase represents the culmination of the work performed in all phases of the assessment. The results of Phase III are consolidated in an in-country presentation to USAID of preliminary findings. After, the team returns to their home office and creates a draft and final report, completing the SLICE assessment. The following activities are conducted in Phase IV:

- Consolidation of Phase III Results
- Creation of the Port-to-Patient analysis
- Performance of an internal control analysis
- Development of recommendations
- Drafting of the final report

4.1 Consolidate Assessment Data and Results

The results of the interviews, reconciliations, and document verification from each site assessed must be consolidated. Typical methods of linking and summarizing data include relational databases, Excel tools, or other auditing software. The exact format may vary from assessment to assessment, but it must be performed in a way that meets several objectives:

- Links questionnaire, reconciliation, and documentation verification data.
- Links shipments from one sampled site receipts to other down-stream sampled sites.
- Provides data fields to allow breakdown of all data in several different ways:
 - By commodity
 - By geography (province, state, or regions)
 - By site type
 - By supply chain level (national, sub-national, and clinical facility)

4.2 Perform a Port-to-Patient Analysis

Unaccounted for inventory is calculated at each level in the supply chain, starting with the port and ending at the clinical facilities which distribute to patients. The Port-to-Patient analysis utilizes the reconciliation calculations at each of these levels to provide a comprehensive view of unaccounted for inventory across the supply chain. Together, all levels are linked to report system wide unaccounted for inventory. Analysis should focus on identifying where the risks are in the supply chain. Common trends consider for analysis include:

- Trends by commodity
- Trends by supply chain level
- Trends by site type
- Trends by geography

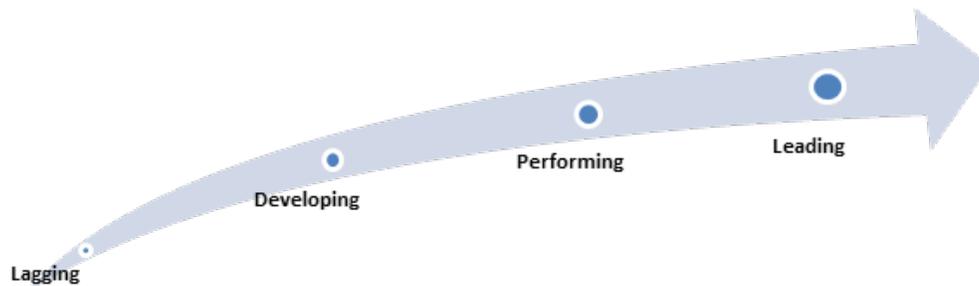
4.3 Perform an Internal Controls Analysis

The internal controls analysis is a deep dive into the data collected in SLICE questionnaires. The following sections represent the types of analyses that can be conducted with the questionnaire data and some leading practices for performing the analyses.

Score the SLICE Questionnaires

At the end of on-site fieldwork, the team will have collected between 20-40 questionnaires. To conduct effective questionnaire data analysis, score the questionnaires both at the aggregate site level and by focus area using the weights provided by USAID. Next, normalize the scores on a 100-point scale (from 0 to 100)². The resulting normalized scores place each site on the SLICE Maturity Model. The model is divided into quartile ranges from lagging to leading, which indicate the strength of internal controls at a given site relative to its peers across all SLICE assessments and provide insight into the risk of inventory mismanagement at each site.

FIGURE 8 – THE SLICE MATURITY MODEL



Lagging 0-25	Developing 25.1-50	Performing 50.1-75	Leading 75.1-100
The entity has minimal or no internal controls in place to address basic policies and procedures.	The entity has controls in place to meet basic policies and procedures. Control gaps might exist and execution is not consistent.	The entity has designed and implemented controls to meet policies and procedures. There are no (or minor) gaps in the program, but execution of the program might have minor inconsistencies	The entity has designed, implemented and consistently executes controls to meet policies and procedures. There are no gaps and control execution is consistent and reliable

² For a more detailed systematic process for score calculation and normalization, see Appendix D.

Conduct Internal Control Data Analyses

Unaccounted for inventory totals should be compared to their respective site scores and questionnaires. The team should look for trends in total unaccounted for inventory in the Port-to Patient analysis and attempt to identify the cause using questionnaire data. For example, if sites with low receiving focus area scores have high unaccounted of inventory totals with no other commonalities, this may point out deficiencies in receiving across the country. Primary characteristics to consider include geographic trends, commodity trends, site type trends, and supply chain level trends.

Analyze Qualitative Observations

During the SLICE assessment, the team gathers a large amount of qualitative notes and observations not formally included in the internal controls questionnaire. These provide valuable insight into key supply chain internal control weaknesses. The SLICE team should review qualitative notes and identify any significant trends, risks, or internal control weaknesses that may not have been captured directly by the questionnaire.

Create Preliminary Recommendations

The recommendations are the culmination of the work done for the SLICE assessment. They incorporate information from the questionnaire, reconciliation, and qualitative observations to develop strategies to mitigate commodity mismanagement, reduce product damage, expiration, and loss.

Preliminary recommendations are a “rapid assessment” of data collected and serve as the basis for the final in-country presentation to USAID. The preliminary recommendations are used to highlight the primary observations and provide a preview of the deeper analysis to be contained in the final report. It is important to note that any recommendations – even if preliminary – should have concrete analytical support and take into account a country’s supply chain capacity.

4.4 Deliver In-country Outbriefing

The preliminary findings are incorporated into a presentation to the USAID Mission and local stakeholders. This report typically takes 1 week to develop prior to leaving the country and takes the form of a PowerPoint presentation.

The audience includes USAID Mission staff as well as any additional stakeholders invited by the Mission (e.g. representatives of the country’s Ministry of Health and sometimes other donors). The in-country presentation has previously included the following components:

- Preliminary observations by supply chain level,
- Unaccounted for inventory figures by supply chain level,
- Initial findings for unaccounted inventory across the distribution system,
- Additional steps necessary leading to and following the Final Report

4.5 Develop Final Report

The report incorporates more detailed data analyses of the reconciliation, Port-to-Patient analysis, and questionnaire. The Final report, unlike the in-country presentation, is presented in an electronic document format (usually Microsoft Word) and provides more detailed observations, recommendations, and supporting calculations. Emphasis is placed on relating quantitative measures such as scores and unaccounted for inventory to internal control weakness. All observations should be supported by quantitative data, where possible. The Final Report includes several items:

- An executive summary
- A project overview discussing methodology and approach
- Overview of the host-country's supply chain
- Assessment analysis:
 - Analyses include, but not limited to:
 - Unaccounted for Inventory analysis
 - Score analysis
 - Analysis of Observations
 - Each analysis should be presented in several different ways that include:
 - High level or cross-cutting issues
 - Commodity Analysis
 - Geographic Analysis
 - Site type analysis, etc.
- Recommendations
- An annex with supporting calculations

System Wide Unaccounted for Inventory (includes sites not assessed)

If requested by USAID, the SLICE team can estimate the level of risk and potential losses for each site in the country – going beyond the typical report which is based on the sample of sites assessed. Assessing potential unaccounted for inventory across the entire country involves statistical and econometric methods that predict the relationship between factors like site size, type, geographic location, transaction volume, and other factors to unaccounted for inventory. The exact methodology used for the analysis is dependent on country-specific factors relating to the number of sites, etc. The value of an extrapolated unaccounted for inventory number is the ability to estimate the level of mismanagement across the entire country.

Other Reporting Considerations

Several additional tools and analytical methods (not part of the base SLICE methodology) are often employed during reporting. The SLICE data collection processes allow for collection of detailed supply chain data. Country data (e.g., population, mortality, corruption index) can be combined with this information to design new analysis and insight to supplement the report. Some examples of additional analysis include:

- SLICE Assessment Results Mapping (using GPS)
- Econometric Analysis

- Risk Modeling
- Extrapolation of unaccounted for inventory to create a country wide total
- Additional quantitative procedures around specific documents or transaction types

Final Report

The SLICE team submits a draft of the Final Report approximately two or three weeks after the final in-country presentation. USAID and host country stakeholders make comments on report, offer feedback, and requests changes or additional analysis. The SLICE team makes edits and responds within the agreed upon timeframe with an updated report. The Final Report incorporates additions and changes requested by USAID HQ and Mission staff on the Draft Report. However, additional comments and revisions may still be requested after submission of the Final Report. When the report is deemed satisfactory, USAID accepts the report and the SLICE assessment is complete. Workpapers and evidence are archived for future reference and client requests.

Appendix A - Questionnaire

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
	Monitoring and Evaluation				
ME1	What types of data are tracked in the facility?				
ME1_1	Stock keeping			1	
ME1_2	Transactional			-1	
ME1_3	Consumption			1	
ME1_4	No data captured or tracked			-4	
ME2	How is data shared across supply chain locations?				
ME2_1	Manual Ledger			-1	
ME2_2	Electronic Tools (integrated application)			-2	
ME2_3	Information is not shared			1	
ME3	What type of data is shared across supply chain locations?			-1	
ME3_1	Inventory Counts			1	
ME3_2	Expiration, damage, loss			-1	
ME3_3	Information is not shared or reviewed			-1	
ME4	Who analyzes product movements across supply chain locations? (Cross facility reconciliation)				
ME4_1	Coordinated Donors			1	
ME4_2	National warehouse			-1	
ME4_3	Essential Medicine Program			-1	
ME4_4	Nobody			-1	
ME5	What systems are used in the environment?				
ME5_1	Computer Applications (electronic)			-1	
ME5_2	Card system (manual)			-1	
ME5_3	No system			1	
ME6	Who has access to the information systems in place?				
ME6_1	Only management			1	
ME6_2	Only facility supervisors			-1	
ME6_3	Only authorized users (if not mgmt. or supervisors)			-1	
ME6_4	Access is not controlled			-1	
ME7	Who has authority to modify records in the information system?				
ME7_1	Only authorized users			1	
ME7_2	No users			-1	

³ The "Possible Scores" in Annex A are illustrative weighted scores used in previous assessments. Future teams can update question scoring and weights in conjunction with USAID.

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
ME7_3	All users			-1	
ME8	Is user accountability for records modification maintained?				
ME8_1	Yes – Electronically Controlled			-1	
ME8_2	Yes - Manually Controlled			-1	
ME8_3	Not Controlled			-1	
ME9	How are records (paper or electronic) updated, archived and maintained?				
ME9_1	Formal records management process			1	
ME9_2	Record storage location secure			-1	
ME9_3	Archive process defined			1	
ME9_4	Records maintenance program does not exist			-1	
ME10	Does the order management process have visibility to inventory attributes?				
ME10_1	Current inventory quantities			-1	
ME10_2	Safety stock for each commodity			-2	
ME10_3	Frequency of reordering			-1	
ME10_4	Quantity of reordering			1	
ME10_5	Expiration dates			-1	
ME10_6	Insufficient Attributes Captured			-1	
ME11	How is data analyzed and reviewed?			1	
ME11_1	Independent review and analysis			1	
ME11_2	Analysis is performed every month			1	
ME11_3	Data is not analyzed across the supply chain			-1	
ME12	How often is an independent pharmaceutical physical inventory audit conducted across the entire supply chain?				
ME12_1	Monthly			-1	
ME12_2	Quarterly			-1	
ME12_3	Yearly			1	
ME12_4	Never			-1	
ME13	Who reviews the information from each location?				
ME13_1	An independent party (i.e., donor, commodities program)			1	
ME13_2	Only location personnel			-1	
ME13_3	Nobody			-1	
	Receiving				
R1	Describe the standard requisition process				
R1_1	Documented Process			1	
R1_2	Defined			-1	
R1_3	Common Form			1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
R1_4	No consistent process			-1	
R2	Who is notified of incoming shipments?				
R2_1	Defined & Documented notification process			1	
R2_2	Facility management			-1	
R2_3	Too many receiving personnel			-1	
R2_4	No notification			1	
R3	Describe the standard receiving procedures				
R3_1	Documented Process			1	
R3_2	Defined			1	
R3_3	Common Form			-1	
R3_4	No consistent process			-2	
R4	Describe the standard inspection procedure?				
R4_1	Documented Process			1	
R4_2	Defined			1	
R4_3	Common Form			-1	
R4_4	No consistent process			-1	
R5	What types of indicators are used for inspection?				
R5_1	Expiration Date			-4	
R5_2	Quantity			1	
R5_3	Broken / ripped packaging			-1	
R5_4	Missing pills from blister pack			1	
R5_5	No inspection of products			-1	
R6	Describe the receiving exception policy				
R6_1	Documented Process			1	
R6_2	Defined			-1	
R6_3	No consistent process			1	
R7	How is receipt (or delivery) of goods documented?				
R7_1	Signed Proof of Delivery (POD)			1	
R7_2	No documentation			0	
R8	Describe the procedure when expired (or near expiration) products are found during receiving inspections.				
R8_1	Refuse to accept			1	
R8_2	Accept with documented return assurance			2	
R8_3	Accept and put in storage			-1	
R9	How quickly are inventory records (paper or electronic) updated upon receipt?				
R9_1	Updated as product is received			2	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
R9_2	Updated the same day as product received			-1	
R9_3	Updated the next day or longer			1	
R10	Who is involved in the inspection process?				
R10_1	Facility Receiving Personnel			3	
R10_2	National Program Personnel			0	
R10_3	Donors			-1	
	Storage				
S1	Describe the standard storage procedures				
S1_1	Documented process			1	
S1_2	Defined process			-1	
S1_3	No defined process			-2	
S2	What computer applications are used to track stock?				
S2_1	Single application for all commodities			-1	
S2_2	None			1	
S2_3	Multiple Applications Used			2	
S3	Describe the process to conduct an inventory count.				
S3_1	Team used to conduct inventory			1	
S3_2	Count by One, Reconcile to Records by a Second Person			1	
S3_3	Variances not investigated to resolution			-1	
S3_4	No inventory counts			-1	
S4	How frequently is an inventory conducted for this facility?				
S4_1	Monthly			-1	
S4_2	Quarterly			-1	
S4_3	Twice a year			-1	
S4_4	Annually			-1	
S4_5	No inventory conducted			1	
S5	When was the last inventory conducted?				
S5_1	Matches outlined frequency			-1	
S5_2	Last scheduled inventory skipped			-1	
S6	How frequently are stock cards reconciled to computer records?				
S6_1	With every transaction			1	
S6_2	Daily			-1	
S6_3	Monthly			-1	
S6_4	Quarterly			-1	
S6_5	Never			-1	
S7	How are reconciliation exceptions - handled?				

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
S7_1	Recorded on exception report or log			-1	
S7_2	Communicated to management			1	
S7_3	Communicated to donor			0	
S7_4	No follow-up on exceptions			-1	
S8	Is there an orderly method of shelving products in the facility?				
S8_1	Stored Orderly			-1	
S8_2	Designated location			-1	
S8_3	Master map to show exact location			0	
S8_4	National coordinated shelving system			-1	
S8_5	Stored overhead to prevent tampering			0	
S8_6	No orderly shelving method			1	
S9	What factors are reviewed during inventory counts?				
S9_1	Expiration Dates			-9	
S9_2	Quantity			1	
S9_3	Damage			-1	
S9_4	Stock room temperature			-1	
S10	How is computer equipment checked for updates, viruses, etc.?				
S10_1	Routine maintenance checks			0	
S10_2	No review for functionality and security			-2	
S11	Describe the procedures for damaged or expired products?				
S11_1	Segregated and held until approved for disposal (or return)			1	
S11_2	Management verifies damage & quantity			1	
S11_3	Donor notified prior to return (or disposal)			-1	
S11_4	Committee signs forms authorizing disposal			1	
S12	How is disposal conducted?				
S12_1	Disposal performed according to government policy			1	
S12_2	Approved by authorized management / committee			-1	
S12_3	Disposal practices not consistent with policy			-1	
S13	Is there sufficient room for all products to be stored orderly?				
S13_1	Stockroom has room for all products			-1	
S13_2	Stockroom has room for all non-expired products			-1	
S13_3	Stockroom does not have space for existing product on hand			-1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
S14	What are the storage area conditions?				
S14_1	Clean			1	
S14_2	Dry			-1	
S14_3	Sheltered from sunlight			1	
S14_4	Temperature controlled			-1	
S14_5	Electricity			1	
S15	Is there a plan to check and maintain facility equipment & cleanliness?				
S15_1	Plan			1	
S15_2	No Plan			0	
S16	Are commodities labeled in the storage area to prevent mix-up or loss?				
S16_1	Shelved separately for easy identification			-1	
S16_2	Carton labeled correctly			-1	
S16_3	Stored in alternate boxes			-1	
S17	How are returned goods handled when they come back to the facility?				
S17_1	Initially quarantined			4	
S17_2	Inspected			3	
S17_3	Restocked per guidelines			1	
S17_4	Restocked immediately			-1	
S18	Are there precautions taken to prevent unauthorized access to storage areas?				
S18_1	Double locks with independently controlled keys			1	
S18_2	Camera monitoring used 24 hours a day			1	
S18_3	Barring windows and doors			1	
S18_4	Limited access to authorized persons only			1	
S18_5	Locks with controlled keys			1	
S18_6	Monitoring of entry and exits			1	
S18_7	Colored uniforms by area or position			-1	
S18_8	Cameras with recording			1	
S18_9	Escort requirements			-1	
S18_10	Facility is not locked			1	
S19	What types of security guards are used?				
S19_1	Sufficient number of guards for facility size			1	
S19_2	No security guards			0	
S20	Who has afterhours access to the storage facility?				
S20_1	No unauthorized access after hours			1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
S20_2	Facility management (clinic personnel)			1	
S20_3	Access allowed any time of day			-4	
S21	Are commodities insured during storage?				
S21_1	Full value insured			1	
S21_2	Partial value insured			0	
S21_3	No insurance			1	
S22	Are insurance claims filed timely on behalf of the storage facility?				
S22_1	Facility management files within one week			1	
S22_2	Insurance claims are not filed			1	
S22_3	Claims are filed everyday (frequency TBD)			1	
S23	Has anything ever gone missing?[Please Describe]				
S23_1	No			12	
S23_2	Yes			0	
	Distribution				
D1	Describe the standard procedures for receiving, processing and filling orders.			-	
D1_1	Documented Process			-1	
D1_2	Orders reviewed for reasonableness			-1	
D1_3	Defined			-1	
D1_4	Common Form			-1	
D1_5	No consistent process			1	
D2	Describe the process for determining who can make order requests				
D2_1	Documented process			1	
D2_2	Defined process			-1	
D2_3	No defined process			1	
D3	Describe the standard process to release orders?				
D3_1	Standard process in place			-1	
D3A	Minimum Expectations				
D3A_1	Received from approved requestor			0	
D3A_2	Proper documentation and approvals			0	
D4	How are requests prioritized?				
D4_1	Urgency of need			-1	
D4_2	Geography of the receiving facility			1	
D4_3	When the order was received			-1	
D5	How are documents created for commodity distribution?				
D5_1	Created before each transaction to be signed by both parties			1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
D5_2	Created during the transaction			-1	
D5_3	Created after replenishment			1	
D5_4	Not created			1	
D6	How frequently are stock records updated on stock cards (on-hand, shipped, received)?				
D6_1	With every transaction			1	
D6_2	Daily			-1	
D6_3	Monthly			1	
D6_4	Quarterly			0	
D6_5	Not updated timely			-1	
D7	How are orders filled?				
D7_1	Orders fulfillment follow first-to-expire, first-out (FEFO)			-5	
D7_2	Orders filled with as close to complete cases as possible			1	
D7_3	Orders shipped short if product unavailable			0	
D7_4	Loose packs are sent			0	
D8	Are receivers notified of expected pickup time frame?				
D8_1	Appropriate notification provided			1	
D8_2	No notification provided			-3	
D9	Is Proof of Delivery (POD) documentation properly used and executed?				
D9_1	Yes			2	
D9_2	No			0	
D9A	Minimum Expectation				
D9A_1	Satisfactory evidence through samples			0	
D9A_2	Sign off by sender and receiver			0	
D9A_3	Quantity sent			0	
D9A_4	Type of Commodity			0	
D9A_5	Date of delivery (pickup)			0	
D9A_6	Destination			0	
D9B	Bonus Factors				
D9B_1	Batch Number			0	
D9B_2	Quantity Requested			0	
D9B_3	Expiration date			0	
D10	What elements of commodity shipments are reviewed prior to leaving the facility?				
D10_1	Completeness of order			-1	
D10_2	Supervisor Signoff			1	
D10_3	No review			-1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
D11	What is the procedure for leaving products with the receiving location?				
D11_1	Authorized receiver must be present and sign for correct quantity and product type			1	
D11_2	Receiver must be present			1	
D11_3	Left at predetermined storage site			-4	
	People				
PE1	What type of review are personnel subjected to before hiring?				
PE1_1	Background check			1	
PE1_2	Reference check			1	
PE1_3	No independent check performed			-1	
PE2	Describe the process to determine if potential employees have the minimum educational requirements to succeed?				
PE2_1	Education Requirements defined by position			-1	
PE2_2	No defined requirements			0	
PE2A	Follow-up				
PE2A_1	Tell me about your educational background			0	
PE2A_2	What are the requirements for your position?			0	
PE3	How are job roles and responsibilities communicated to employees?				
PE3_1	Written job duties			1	
PE3_2	Written procedures manual			-1	
PE3_3	No defined roles and responsibilities			-1	
PE4	How are personnel trained?				
PE4_1	Training required for performance evaluations			0	
PE4_2	Training on periodic basis			-1	
PE4_3	Continuing training on the job			-1	
PE4_4	Experienced employees partnered with non-experienced			1	
PE4_5	Training verified by management before working alone			1	
PE4_6	Certification requirement (recertification periodically)			0	
PE4_7	Inconsistent training provided			-1	
PE4_8	No training provided			-2	
PE5	How are employees evaluated for job performance?				
PE5_1	Review includes inventory and financial metrics			0	
PE5_2	Annual performance review			1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
PE5_3	No evaluation			-1	
PE6	How are employees recognized for good performance?				
PE6_1	Bonus payments			-1	
PE6_2	Salary increase			0	
PE6_3	No recognition for good work			-1	
PE7	How is access and authority revoked if an employee leaves?				
PE7_1	Procedures to notify stakeholders are documented			1	
PE7_2	Assets (keys, access codes) taken from employee			-1	
PE7_3	No formalized system in place			1	
PE8	How is the delegation of authority policy documented?				
PE8_1	Defined by Org Chart			-1	
PE8_2	Other			-1	
PE8_3	No policy			-2	
PE9	How often are employees scheduled to be paid?				
PE9_1	Daily			0	
PE9_2	Weekly			0	
PE9_3	Bi-weekly			0	
PE9_4	Monthly			-1	
PE10	What is the basis for compensation?				
PE10_1	Government defined structure			-1	
PE10_2	No defined compensation structure			0	
PE10B	Example Attributes				
PE10B_1	Performance			0	
PE10B_2	Education			0	
PE10B_3	Training			0	
PE10B_4	Years of experience			0	
PE11	Are employees paid timely?				
PE11_1	Yes, paid on schedule			1	
PE11_2	Sometimes paid on schedule (2-3 late incidents)			0	
PE11_3	Never paid salary on schedule (more than 3 late incidents)			-1	
PE12	Are employees paid in full?				
PE12_1	Yes, always paid in full			-1	
PE12_2	Sometimes paid in full (2-3 incidents of short pay)			0	
PE12_3	Never paid in full (more than 3 incidents of short pay)			1	
PE13	Have any employees recently been disciplined or fired for violating policies? [Please explain]				

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
PE13_1	Yes			-1	
PE13_2	No			0	
	Control Environment				
CE1	<i>Describe the roles and responsibilities of your agency.</i>				
CE2	<i>What role does your agency play in the distribution or oversight of essential medicines?</i>				
CE3	<i>Who are the key stakeholders in the country for malaria and HIV/AIDS commodities?</i>				
CE4	<i>Which world (or other foreign) agencies are active in the country with health and humanitarian programs?</i>				
CE5	<i>Which agencies are donating HIV and malaria commodities?</i>				
CE6	<i>Are you aware of the Good Governance for Medicines (GGM) Program [Phase 1, 2 or 3]?</i>				
CE7	<i>Describe how all donor groups are coordinated and how your agency works with other organizations to provide support for supply chain oversight and control?</i>				
CE8	<i>Which organizations play a role or have influence over state decisions related to pharmaceuticals (pharmacist unions, community groups, etc.)?</i>				
CE9	<i>How frequently does the stakeholder working group meet? Describe the communication.</i>				
CE10	<i>Who is accountable for commodities in the supply chain? [Describe each point]</i>				
CE11	<i>Describe the written agreement (e.g. MOU) between the key stakeholders (e.g., host government, MOH, USAID, PSI, etc.)?</i>				
CE12	<i>Please describe the public sector organizations that provide oversight for pharmaceutical accountability such as the supreme audit institution or inspector(s) general.</i>				
CE13	<i>How are audit recommendations, results of inappropriate behavior and other concerns documented and tracked to resolution?</i>				

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
CE14	<i>Does the MOH/central government make available the national policies, reports and supporting documents to the public and civil society organizations (CSOs)?</i>				
CE15	<i>How do citizen groups engage in oversight of or influence pharmaceutical policies?</i>				
CE16	<i>How is information on public policy and decisions shared with citizens?</i>				
CE17	<i>How are citizens educated about essential medicines (e.g., safe, controlled distribution)?</i>				
CE18	<i>Does the country have an informal commodities market for ACTs?</i>				
CE18_1	<i>No informal markets</i>				
CE18_2	<i>Illegal informal markets</i>				
CE18_3	<i>Legal informal markets</i>				
CE19	<i>Describe civil disturbances, border or regional conflicts, natural phenomenon or upcoming political events?</i>				
CE20	<i>Describe examples of corruption in the past 6 months; past 12 months; and past 3 years.</i>				
CE21	<i>Describe active anti-corruption organizations in the country.</i>				
CE22	<i>Is there an operational code of ethics for professional management of governmental health personnel?</i>				
CE23	<i>Are commodity prices established at the national level? (ask at each location)</i>				
CE24	<i>How are jobs advertised and awarded?</i>				
CE24_1	<i>Job descriptions for open positions</i>				
CE24_2	<i>Job postings</i>				
CE24	<i>Describe the process for employee performance evaluation and compensation review.</i>				
CE25	<i>Describe the compensation structure for employees.</i>				
CE26	<i>Describe when and how timely employees are paid for work performed.</i>				
CE27	<i>Describe the training provided to personnel in supply chain facilities. (Orientation for new staff, on-going training, qualified trainers)</i>				

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
CE28	What types of training are provided and how often is the training offered and knowledge verified?				
	Ports and Customs				
P1	How are products shipped by air?				
P1_1	Dedicated chartered flights			1	
P1_2	Commercial mix cargo			0	
P1_3	Commercial dedicated flights			1	
P2	How are products shipped by truck (from another country)?				
P2_1	Contracted local third-party shipper			1	
P2_2	USAID coordinated (DELIVER, JSI, etc.)			1	
P2_3	Various groups organized as needed			0	
P3	What type of security check do they conduct on drivers?				
P3_1	Criminal background check			1	
P3_2	Reference check			1	
P3_3	Driving record check			1	
P3_4	No check of any type performed			-1	
P4	How are products shipped by boat?				
P4_1	Chartered ship			1	
P4_2	Commercial mix cargo			1	
P4_3	Donor coordinated (DELIVER, JSI, etc.)			1	
P4_4	Various groups organized as needed			1	
P5	How are products insured during transit?				
P5_1	Transit provider has policy			1	
P5_2	Donor coordinated policy			1	
P5_3	MOH policy			1	
P6	How are shipments scheduled?				
P6_1	Arrival only on business days			1	
P6_2	Large single loads			1	
P6_3	Multiple batches			0	
P6_4	Weekend or holiday			-1	
P7	How are cartons labeled?				
P7_1	Labeling matches client request			1	
P7_2	Purchase order (PO) information for tracking purposes			1	
P7_3	Carton labeling color coded			1	
P7_4	Unique labeling for government commodities			1	
P8	How are shipments packaged for port arrival?				
P8_1	Palletized			1	
P8_2	Shrink wrapped for specific location			1	
P8_3	Clearly marked and labeled			1	
P9	Segregated from other shipments			1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
P9_1	Loose cartons			-1	
P9_2	Comingled with other shipments			-1	
P10	Is there a policy or procedure to grant authorization to pick up commodities at the customs clearing location?				
P10_1	No defined process			1	
P10_2	Defined and documented process			1	
P11	P10 - Who is notified of orders and incoming shipments?				
P11_1	Donor			1	
P11_2	MoH			1	
P11_3	Local stakeholders			1	
P11_4	Media			-1	
P11_5	Other			0	
P12	P11 - How are parties noted above notified of expected shipment arrival?				
P12_1	In writing			1	
P12_2	Phone call			1	
P12_3	In person			1	
P12_4	Email			1	
P12_5	No notification			-2	
P13	P12 - How far in advance is expected arrival date communicated?				
P13_1	15 days			0	
P13_2	5 days			1	
P13_3	Day of arrival			1	
P13_4	After delivery			-1	
	Transportation				
T1	Describe transportation procedures				
T1_1	Defined protocols and delivery signoffs			1	
T1_2	Includes protocols for delivery exceptions			1	
T1_3	Security methods to protect commodities			1	
T1_4	No documented policy			-1	
T2	What information is recorded per delivery?				
T2_1	Sufficient Information Recorded			2	
T2_2	Insufficient information recorded			-1	
T3	How is accountability defined in carrier contract agreements?				
T3_1	Defined service level targets			1	
T3_2	Incentives / Penalties			1	
T3_3	No documented agreement			-1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
T4	How are inventory movements captured?				
T4_1	Barcode by carton			1	
T4_2	Paper delivery notes			1	
T4_3	Periodic position call in			1	
T4_4	After transaction is complete			-1	
T5	How are vehicle deliveries and routes planned?				
T5_1	A transportation plan is in place			1	
T5_2	No coordinated plan for deliveries			-1	
T6	Is there a routine analysis to compare actual trips to the scheduled trips?				
T6_1	GPS or another technology used			2	
T6_2	Drivers mileage is monitored			1	
T6_3	Drivers log used to track movements			1	
T6_4	No analysis is conducted			-1	
T7	How do procedures change throughout the year (e.g., rainy season)?				
T7_1	Additional quantities delivered			1	
T7_2	Alternate delivery methods (i.e., plane)			1	
T7_3	No contingency plans			-1	
T8	What security emergency procedures are in place?				
T8_1	Independent escort with shipment			2	
T8_2	Vehicle communication systems (CB or cell phone)			1	
T8_3	Chase cars			1	
T8_4	No security consideration in place			-1	
T9	Do the vehicles used for transportation have sufficient capacity to store commodities in a controlled environment?				
T9_1	Flatbed trucks have tarps to secure the commodities			1	
T9_2	Trucks are insulated			1	
T9_3	Vehicles have no interior storage			-1	
T9_4	No locks to ensure interior is secure			-1	
T10	How are vehicles inspected to ensure safety and maintenance tasks are up-to-date?				
T10_1	Safety & Maintenance plan in place			1	
T10_2	Maintenance issues reported and logged			1	
T10_3	No maintenance plan			-1	

Question No	Question	Interviewer Observation	Interviewee Response	Possible Score ³	Notes
<i>T11</i>	<i>What protocols are in place to prevent unauthorized access to vehicles and transport equipment?</i>				
<i>T11_1</i>	<i>Locks</i>			1	
<i>T11_2</i>	<i>Keys are accounted for</i>			1	
<i>T11_3</i>	<i>Seals (Entry Prevention)</i>			1	
<i>T11_4</i>	<i>No security measures in place</i>			-1	
<i>T12</i>	<i>Are transportation vehicles insured?</i>				
<i>T12_1</i>	<i>Fully insured (vehicle and cargo)</i>			1	
<i>T12_2</i>	<i>Vehicle only</i>			0	
<i>T12_3</i>	<i>No vehicle insurance</i>			-1	
<i>T13</i>	<i>Is cargo insured?</i>				
<i>T13_1</i>	<i>Full value insured</i>			2	
<i>T13_2</i>	<i>Partial value insured</i>			1	
<i>T13_3</i>	<i>No cargo insured</i>			-2	
<i>T14</i>	<i>Is the fleet size sufficient to serve the supply chain?</i>				
<i>T14_1</i>	<i>Yes</i>			2	
<i>T14_2</i>	<i>No</i>			-1	

Appendix B – Reconciliation Format Example

Commodity	Beginning Balance mm/dd/yyyy	Total Ins	Total Available	Total Outs	Other Adjustments	Calculated Balance	Stock Card Ending Balance	Physical Count	UFI	UFI %	Total UFI Amount, USD
Drug Name, Brand, Presentation	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J) %	(K) \$ -

Item	Source / Calculation
A	The beginning balance as of the transaction sampling period start date from the stock card
B	Sum of all receipts from the transaction sampling period
C	(A) + (B)
D	Sum of all shipments, or issues, for the transaction sampling period
E	Sum of all adjustments and enter in (E) (it may be necessary to follow-up on the validity of the adjustments; the team should document their purpose where possible)
F	(C) - (D) +/- (E)
G	The ending balance as of the physical count on the stock card
H	The SLICE physical count
I	(H) – (F)
J	(I) / (C)
K	(I) x the per-unit-cost provided by USAID

Appendix C – Recommended Stakeholder Interviews

<ul style="list-style-type: none"> • Ministries of Health (e.g. health service department, national programs for disease controls, etc.), Finance, and Customs and Importation • Medicine/Pharmaceutical Regulatory Authorities • Procurement agencies • MOH committee members (e.g., national directors of public health programs) 	<ul style="list-style-type: none"> • National quality control laboratories • Audit departments (internal, external, and state auditors) • Nongovernmental organizations engaged in health service activities • International donor organizations (e.g., the Global Fund, WHO, UNICEF, UNDP, USAID and the World Bank) • Professional associations (medical association) • The Inspector General 	<ul style="list-style-type: none"> • Ethics committees, institutional review boards • Implementing partners (e.g., JSI, MSH) • Relevant transportation companies, airports, seaports • Regional Health Teams • LFAs or other audit type functions used by donors • Regional management (county health teams)
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Appendix D – Scoring and Consolidating Questionnaires

The following outlines some of the steps required to effectively score and consolidate internal control questionnaires in Appendix A.

1. When using the Questionnaire in Appendix A, add all “yes” answers for each focus area to obtain the *raw focus area score* for each site’s applicable focus areas (typically 5 for most sites).
2. Determine the *maximum focus area score* by adding each focus areas question weights greater than 0.
3. Determine the *minimum focus area score* by adding each focus area’s question weights less than 0.
4. Normalize each focus area score individually: $(\text{raw focus area score} - \text{minimum focus area score}) / (\text{maximum focus area score} - \text{minimum focus area score}) * 100$, excluding all non-applicable questions and focus areas.
5. Add all “yes” answers for all prompts to obtain each site’s *raw site score* (includes all applicable focus areas).
6. Determine the *maximum site score* by adding each site’s question weights greater than 0.
7. Determine the *minimum site score* by adding each site’s question weights less than 0.
8. Normalize each actual site score whole: $(\text{raw site score} - \text{minimum site score}) / (\text{maximum site score} - \text{minimum site score}) * 100$, excluding all non-applicable questions and focus areas.
9. Use the normalized site and focus area scores for reporting purposes and data analysis

Appendix E – Feasibility Assessment Detailed Procedures Example

Step 1: Interview National Warehouse Management

The SLICE team member's primary focus should be on interviewing national warehouse management. Questions focus on data availability and storage format across the supply chain. Examples of questions include:

- How is information stored – electronically or manually? What types of tools are used (i.e. Sage ACCPAC, Excel, Access, etc.)?
- How long have you been using your current tools? Was the data recently migrated?
- Have there been any recent changes to your warehouse and logistics standard operating procedures (SOPs) or policies that could affect data reporting and availability?
- Have you noted any problems in data reporting from down-stream sites? What is the quality of that reporting?
- Who is in charge of the reporting process of your down-stream partners?
- Are there pervasive data or documentation issues we should be aware of at the central level or at other levels of the supply chain?
- Can you walk me through your data updating processes? What significant concerns do you have about inventory management practices?

Step 2: Analyze Data Quality and Availability at the National Warehouse

An inability to obtain complete national warehouse data can create significant constraints as the project moves forward. Confirming this data ensures the team is able to trace and calculate the amount of unaccounted for inventory in transit between the national and sub-national level. Data availability could be confirmed through two exercises:

Activity 1: Trace an example through the national warehouse

1. Locate the individual responsible for maintaining central level shipment data. Ask them to walk you through data entry processes and document retention policies.
2. Explain that a goal of SLICE is to identify risk in the supply chain by calculating unaccounted for inventory from Port-to-Patient and require the ability to trace shipments throughout the supply chain.
3. Ask the individual to trace receipt and subsequent shipment through the national warehouse records with you; ask questions about supporting documentation such as requisitions and waybills as required.
4. Consider if employee's ability, data completeness, data quality, or processes may inhibit performance of the assessment.
5. If data is a problem, determine if it is possible to electronically or manually reconstruct transactions, and document these constraints.

Activity 2: Obtain and verify a complete list of receipts and shipments from the national warehouse

1. Obtain a complete list of all receipts and shipments with destination information for all in-scope commodities for the transaction sampling period.
2. Obtain any available third party procurement data from donors, NGOs, or other independent sources regarding procurement quantities of in-scope commodities received at the National Warehouse.
3. Perform analysis to confirm the following information is present in the records:
 - a. Receipt quantity and donor information.
 - b. Destination and quantity of shipments.
 - c. Commodity names and descriptions (enough to identify them properly).
 - d. Presentation or packing information (e.g. if quantities are recorded by box, ensure that the number of units in each box is specified and understood).
 - e. Program under which the commodity falls (e.g. AIDS, Tuberculosis, Reproductive Health)
4. Using third party data, confirm that receipts at the National Warehouse are significantly complete by comparing procured commodities to commodities received at the national warehouse.
5. Confirm shipments to supply chain sites are mostly complete.
6. Look for patterns or trends in data such as long-running negative balances, sudden spikes, many unexplained adjusting entries, or other information that may indicate a problem with data quality.
7. Follow-up with the national warehouse to determine if gaps or missing data can be overcome, or can be completed using data sources. Estimate the level of effort required to overcome the constraints.
8. Document the results.

Appendix F – Planning Questionnaire

Question	Response / Comments
1. What are the key stakeholders who play a role in pharmaceutical programs in the country?	
2. Who are the key people (names and titles) of who we should meet with in the country from each stakeholder group?	
3. Do we have permission to schedule meetings with these stakeholders (from #2 above) or is there an alter method which is preferred (e.g., official introductions from USAID and other donors)?	
4. How would the relationship between the Donors, coordinating groups and the central medical store be characterized?	
5. Are there certain groups, districts or provinces that you feel we should visit to get a complete view of the supply chain in the country?	
6. Do you have any existing supply chain assessment reports you can share or the End-Use verification?	
7. What is the current labor situation in the country? Have there been indicators of an upcoming strike by pharmaceutical workers?	
8. When do the drug commodities typically transfer to local ownership and control?	
9. Where do commodities arrive in country (Airport, Trucks)? Is a seaport utilized?	
10. Does the mission have a Risk & Security Officer (RSO) or similar to serve as a point of contact for our local teams in case of emergency?	

Appendix G – Data Modeling and Analyses

This appendix outlines examples of advanced analyses and modeling techniques for SLICE data. These examples are for illustrative purposes only and do not represent comprehensive approaches. Development of these tools is the responsibility of the contractor in coordination with USAID.

Modeling

Modeling serves as a useful tool for refining the quantitative elements of SLICE and providing the client with engaging, interactive tools to supplement analysis in the final reports. Modeling techniques can rely on econometric methods that leverage SLICE data to improve understanding of the size, location, and cause of unaccounted for inventory. Common techniques include estimating country wide unaccounted for inventory based on data collected from a population sample, pinpointing locations of greatest unaccounted for inventory, and testing custom scenarios. Modeling can also help overcome an environment with inconsistent or questionable data and by using other variables and publicly available data sets to help gain an understanding of system-wide loss; these variables could include site transaction volume, population and disease trends, sub-national demographics, facility catchment sizes, and a host of development indicators (e.g. World Bank, WHO, IMF).

Data Collection

Data models require the collection of statistically significant data so an assessment team should collect adequate sample sizes that represent all nodes or major components of the supply chain. Key elements to consider include site types (regional hub, hospital, health center, rural health post), geographies (border areas, or locations both near and far from the capital), and commodity mix. The team should finalize the decision to create a model prior to departure to enable collection of adequate data and samples.

Examples of Analysis

SLICE assessment teams have previously employed three types of modeling analysis: scenario-based analysis, geo-locational mapping, and risk modeling. These do not represent an exhaustive list of options but serve as examples of various approaches to data analysis.

Scenario Based Analysis

Scenario based modeling can help overcome the problem of unreliable or incomplete sample data by providing a range of possible outcomes, allowing the client to support quantitative findings with qualitative information based on past experience. Modeling multiple scenarios using a regression model can greatly inform recommendations by providing insight into characteristics that contribute to lower quantities of unaccounted for inventory. For example, the SLICE team can analyze variables and coefficients to determine how much influence they have on unaccounted for inventory and each other. In a previous assessment, eight variables were used to estimate potential future unaccounted for inventory: site beginning balance, total receipts, total shipments, site type, supply chain channel, catchment size, number of types of drugs carried, and local county population.

Geo-locational Mapping and Visual Analysis

SLICE data is well suited for visual modeling such as overlaying data on a map, which gives users a visual explanation of loss and geographic area. Mapping can include only raw SLICE data (based on sample population findings), modeled data (using pre-existing data sets), or a mix of the two. In addition to the unaccounted for inventory, GUI modeling can incorporate components from the internal control questionnaire to identify common qualitative site attributes. Location based modeling can highlight key gaps in certain internal controls or focus on certain specific focus areas or pre-identified weaknesses, to draw correlations (e.g. distance from capital and likelihood of loss) and help developing tailored mitigation strategies and recommendations.

Risk Modeling and Simulation

Risk modeling and simulation represent the most sophisticated type of model. Risk modeling helps improve decision making by aiding users to measure the results of their decisions. Risk models allow users to simulate implementation of internal controls or changes to supply chain processes and view the results for comparison. In addition, risk models include controls to alter supply chain characteristics such as the amount of commodities flowing into the country, levels of stock outs, or increases/reductions in transport capacity. This allows the user to test different decision scenarios and estimate, which may be most effective in mitigating risk in the supply chain based on future expected future conditions. Risk models often include with geo-locational mapping functions to include graphical elements that summarize data intuitively.