Supply Chain Information Systems
Maturity Model

USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM
Procurement and Supply Management
Agenda

• Supply Chain Information Systems
• Supply Chain Information Systems Maturity Model
• The Nepal Example
• Feedback and Q&A
Supply Chain Information Systems
What is Today’s Supply Chain?

Supply Chain Complexities
- Expanding beyond traditional flows of commodities from manufacturers to end consumers/patients
- Orchestrating all processes from planning to execution to final consumption
- Increasing number of diverse SC partners, donor initiatives, and resulting parallel SCs

Key
- While such factors make Public Health SC more complex, it is imperative to adopt a holistic approach to organize & operate our SC.
How do we address Complexities?

Learning to rethink our approach to focus on:

• Efficient and effective supply chains with well coordinated processes & timely information exchange
• Transforming from reporting or data entry system to real time transaction processing system
• Systems that are overarching across critical processes and not just limited to specific supply chain areas or levels or specific

Existing system approaches concentrate mostly on:

➢ A limited number of supply chain areas such as warehousing or inventory management
➢ Specific supply chain levels such as Central Medical Stores, District Pharmacies
➢ Specific programs/initiatives such as USAID Task Order 1 (HIV) or Task Order 3 (Reproductive Health)
SCIS are foundational in supporting efficient flow of physical commodities from manufacturer to patients.

In addition, SCIS are essential in facilitating strategic and tactical objectives including planning, control and decision making.

Effective SCIS should
• Improve the **consistency** to deliver right products to patients
• Improve **efficiencies** across SC processes
• Reduce **lead times** in processing and delivering commodities
• Enhance the effectiveness of SC **decisions**
• Provide better **visibility and control** of the overall SC
Why are SCIS Important?

Importance of SCIS

- Coordinated execution of SC processes essential for efficient flow of commodities
- SCIS form the back bone in managing & coordinating the physical, informational & process flow from planning to consumption of commodities
- Without effective SCIS, commodities as well as data/information will move at a slower pace limiting visibility, impeding decision-making and ultimately impacting the ability to serve patients
What are key SCIS Functionalities?

- SCIS Functionalities have been organized based on the Supply Chain Operations Reference (SCOR) model and the American Productivity & Quality Center (APQC) Process Classification Framework.
- Key elements of SCOR model and APQC framework have been leveraged and tailored as appropriate:

<table>
<thead>
<tr>
<th>PLAN</th>
<th>SOURCE</th>
<th>DELIVER</th>
<th>RETURN</th>
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<tbody>
<tr>
<td>Forecasting &amp; Planning</td>
<td>Procurement</td>
<td>Order Management</td>
<td>Returns &amp; Recalls</td>
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<tr>
<td>Supplier &amp; Contracts</td>
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<td>Warehouse Management</td>
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<td>Transportation &amp; Distribution</td>
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*About SCOR & APQC*
### How are SCIS Organized?

#### Technical, Foundational and Cross-Cutting Capabilities

<table>
<thead>
<tr>
<th>Master Data Management</th>
<th>Interoperability</th>
<th>Track and Trace</th>
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<tbody>
<tr>
<td>Product Master</td>
<td>Commodity Tracking</td>
<td>Commodity Tracking</td>
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<tr>
<td>Facility/Location Master</td>
<td>Traceability</td>
<td>Traceability</td>
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<tr>
<td>Supplier Master</td>
<td>Product Authentication</td>
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#### Forecasting & Planning System

<table>
<thead>
<tr>
<th>Forecasting &amp; Planning System</th>
<th>Procurement System</th>
<th>Warehouse Management System</th>
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<tbody>
<tr>
<td>Demand Planning</td>
<td>Procurement Processing</td>
<td>Inbound Processing</td>
</tr>
<tr>
<td>Supply Planning</td>
<td>Fulfillment Visibility</td>
<td>Inventory Management</td>
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<tr>
<td>Plan Distribution</td>
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<td>Outbound Processing</td>
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#### Supplier & Contract Management System

<table>
<thead>
<tr>
<th>Supplier &amp; Contract Management System</th>
<th>Order Management System</th>
<th>Transportation Management System</th>
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<tbody>
<tr>
<td>Sourcing &amp; Contracting Strategies</td>
<td>Requisitioning</td>
<td>Route Management</td>
</tr>
<tr>
<td>Tender Management</td>
<td>Requisition Approval</td>
<td>Transportation Execution</td>
</tr>
<tr>
<td>Contract Authoring</td>
<td>Inventory Visibility</td>
<td>Freight Audit and Payment</td>
</tr>
<tr>
<td>Supplier Information Management</td>
<td>Requisition Fulfillment</td>
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<td>Order Visibility</td>
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#### Supply Chain Functional Capabilities

<table>
<thead>
<tr>
<th>Technical, Foundational and Cross-Cutting Capabilities</th>
<th>Supply Chain Functional Capabilities</th>
<th>USAID Global Health Supply Chain Program</th>
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### How is this approach different?

<table>
<thead>
<tr>
<th></th>
<th>Existing Approaches</th>
<th>SCIS</th>
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<tbody>
<tr>
<td><strong>Processes</strong></td>
<td>Data is captured into the system after the transactions are performed</td>
<td>Systems drive the transactions thus capturing data real time as transactions are performed</td>
</tr>
<tr>
<td><strong>Visibility</strong></td>
<td>Delayed visibility of transactions &amp; data</td>
<td>Real time data visibility</td>
</tr>
<tr>
<td><strong>Data Integrity</strong></td>
<td>Certain or most data captured manually impacting data integrity &amp; quality</td>
<td>Systems driving the transactions ensure data integrity</td>
</tr>
<tr>
<td><strong>Decision-making</strong></td>
<td>Delayed access to data impedes effective decision making</td>
<td>Real time availability of data enhances decision making</td>
</tr>
<tr>
<td><strong>Interoperability</strong></td>
<td>Tend to operate in a siloed fashion</td>
<td>Holistic implementation ensures SC systems are integrated to facilitate transaction processing &amp; trouble-shooting</td>
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Supply Chain Information Systems Maturity Model
What is the Model?

Maturity Levels

- SCIS capabilities have been categorized across four maturity levels
- Maturity levels defined to facilitate phased incremental implementation of capabilities
- Capabilities within each maturity level grouped to promote stabilization of SC processes before progressing to the next level
Who will use the Model?

**Intended Users**

- Country Field Office Team
- USAID Mission
- Country Supply Chain Leadership
- System Implementation Partners
- Other Donor Organization Teams
How will the Model be used?

**Intended Usage**

- As guidance to self-evaluate current capabilities & gaps
- As a framework to prioritize capabilities to be implemented based on desired benefits, strategic objectives, and constraints
- As a basis to define system requirements for desired SC capabilities during RFx events and system implementations
- As a tool to develop tailored roadmaps for implementing SCIS
**SCISMM – Potential Next Steps**

- **Forecasting & Planning System**
  - Level 1: Standardized templates to accumulate monthly demand & supply data
  - Level 2: Integration to accumulate weekly/monthly data from transactional systems
  - Level 3: Multiple forecasting templates and methods
  - Level 4: Multi-level hierarchical enterprise planning

- **Supplier & Contract Management System**
  - Level 1: Supplier Master Data Management
  - Level 2: Annual/multi-year procurement plans based on forecasts
  - Level 3: Supplier performance measurement using data from transactional systems
  - Level 4: Multiple stocking strategies such as VMI, drop ship

- **Procurement System**
  - Level 1: Capture purchase order in the system close to real-time (weekly)
  - Level 2: Use system generated/initiated POs
  - Level 3: Integrate with suppliers to send POs electronically
  - Level 4: Integrates with CMS and WMS for drop shipping etc.

- **Order Management System**
  - Level 1: Capture order
  - Level 2: Print POs
  - Level 3: Track PO milestones for better planning
  - Level 4: Drop shipping integrating with procurement system

- **Warehouse Management System**
  - Level 1: Manage inventory levels by updating receipts, shipments
  - Level 2: Real time processing of all warehousing tasks
  - Level 3: Real time updates to CMS and Procurement
  - Level 4: Use of hand-held devices for all warehousing tasks

- **Transportation Management System**

- **Returns & Recalls System**

- **Analytics**
  - Level 1: Aggregate inventory variance
  - Level 2: Aggregation is handled via reports manually piling & loading
  - Level 3: EDI integrations supported by GSS standards such as QFP, GIN through use of GS1 standards
  - Level 4: Continuous monitoring for data quality and any exceptions

- **Interoperability**
  - Level 1: Use of standardized data such as master data with plashearers for GSS standards
  - Level 2: Master data management and synchronization across systems
  - Level 3: EDI integrations supported by GSS standards such as QFP, GIN through use of GS1 standards
  - Level 4: Data Warehouse with standard ETMs and analysis trend across years

- **Track & Trace**


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**Maturity Roadmap facilitates phased incremental implementation of SCIS**

**Maturity Roadmap is tailored to the unique needs and context of different countries**

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**USAID Global Health Supply Chain Program**
The Nepal Example
Approach to Building Nepal SCIS Roadmap

• Used eLMIS initiative to determine the target capabilities that would be introduced based on business requirements for planned implementation
• Evaluated current systems and processes to assess the gap between current and planned
• Evaluated the selected software to understand how these requirements would be addressed
• Began to layout planned future capabilities based on the Maturity Model versus 2017/2018 evaluation
• Assembled the roadmap of capabilities
### SCISMM: Nepal Illustration

- Identified capabilities from the Maturity Model that were available in the eLMIS system and those planned to be deployed in 2017/2018
- Evaluated the current capabilities (pre eLMIS) to understand how the planned capabilities could be deployed
- Made adjustments based on how much of the gap could be accomplished

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
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<tbody>
<tr>
<td><strong>Maturity Level</strong></td>
<td><strong>Basic Warehousing Operations (Manual, if not automated)</strong></td>
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#### Benefits

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
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<tr>
<td><strong>Improved accuracy of inventory data</strong></td>
<td><strong>- Reduced manual effort in data entry/capture and processing transactions</strong></td>
</tr>
<tr>
<td><strong>Improved inventory control and management</strong></td>
<td><strong>- Improved data integrity and hence accuracy</strong></td>
</tr>
<tr>
<td><strong>- Better tracking of inventory (at batch level)</strong></td>
<td><strong>- Increased visibility of inventory statuses such as expiring etc</strong></td>
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#### Capabilities

<table>
<thead>
<tr>
<th>Inbound Processing</th>
<th>Outbound Processing</th>
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<tr>
<td>- Update inbound shipment details including shipment#, item, uom, quantity, and expiration date (at least through upload feature) on weekly basis</td>
<td>- Perform pick, pack and ship and update the status in the system, manually if not automated</td>
</tr>
<tr>
<td>- Enter or upload received items’ details in to the system</td>
<td>- Capture details of outgoing shipment (Requisitions) including requisition#, products/items, quantities, expiration date and delivery dates (manually, if not automated, within a week of performing the transactions)</td>
</tr>
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<table>
<thead>
<tr>
<th>Inventory Management</th>
<th>Foremost in pick, pack and ship, and update the status in the system, manually if not automated</th>
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<tbody>
<tr>
<td>- Manually generate cycle counts and provide ability to print cycle count sheets for warehouse personnel to perform counts</td>
<td>- Capture details of outgoing shipment (Requisitions) including requisition#, products/items, batch#, expiration date, quantities and delivery dates based on the associated outbound order in the system</td>
</tr>
<tr>
<td>- Manually generate physical counts and print physical count sheets for the whole warehouse</td>
<td>- Generate cycle and physical counts automatically and print count sheets</td>
</tr>
<tr>
<td>- Provide different inventory statuses allow ad-hoc inventory adjustments</td>
<td>- Provide ability for supervisors to accept or reject count discrepancies</td>
</tr>
<tr>
<td>- Track inventory at bin level (location, bin, aisle etc)</td>
<td>- Track batch level details</td>
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#### Level 1 Maturity

**Basic Warehousing Operations (Manual, if not automated)**

- **Level 1 Maturity**: Basic Warehousing Operations (Manual, if not automated)
  - Warehousing Operations through electronic data, barcodes and system managed transactions

#### Level 2 Maturity

- **Level 2 Maturity**: Basic Warehousing Operations (Manual, if not automated)
  - Improved accuracy of inventory data
  - Improved inventory control and management
  - Better tracking of inventory (at batch level)
  - Increased visibility of inventory statuses such as expiring etc
Current and Future Capabilities Mapped

- Assemble the current capabilities and assess what future capabilities should be targeted
- Reassess future capabilities based on capacity for change
Establish Priority of Capabilities

- Future capabilities were added to the roadmap based 1st on existing capabilities not yet deployed; 2nd based on need
- Added capabilities throughout the project and limited others
- Will reassess the roadmap frequently to balance with what is actually being completed on the roadmap

<table>
<thead>
<tr>
<th>Level 2</th>
<th>Level 3</th>
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<tr>
<td>Warehousing Operations through electronic data, barcodes and system managed transactions</td>
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<tr>
<td>- Reduced manual effort in data entry/capture and processing transactions</td>
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<td>- Improved data integrity and hence accuracy</td>
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<td>- Better tracking of inventory (at batch level)</td>
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<tr>
<td>- Increased visibility of inventory statuses such as expiring etc</td>
<td></td>
</tr>
<tr>
<td>Realtime Transaction Processing and Automated workflow management for warehouse personnel</td>
<td></td>
</tr>
<tr>
<td>- Real time data provides superior accuracy in inventory visibility and hence decision making</td>
<td></td>
</tr>
<tr>
<td>- Increased efficiency of warehouse personnel</td>
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**Inbound Processing**
- Capture inbound shipment details including batch details through EDI from the shipping facility/supplier
- Receive items through use of barcode scanners
- Generate putaway tasks as soon as items are received
- Manually assign putaway tasks to warehouse personnel
- Generate barcodes for pallets/cases to be used during putaway, storage, picking etc

**Outbound Processing**
- Capture requisition details through EDI
- Generate picklists and tasks for warehouse personnel
- Print picklists, pack tasks etc
- Assign picklists/tasks to warehouse personnel
- Create shipments and assign carrier information
- Publish shipment information to requisition management system and other systems such as reporting and to receiving facilities
- Integrated with order management system to provide real time updates regarding the outbound shipment

**Inventory Management**
- Generate cycle and physical counts automatically and print count sheets
- Provide ability for supervisors to accept or reject count discrepancies
- Track inventory at bin level (location, bin, aisle etc)
- Track batch level details

**Inventory Management**
- Assign counts to warehouse personnel based on work load (randomly for cycle counts)
- Integrate through EDI to provide real time process updates on inventory adjustments

**Define storage/bin locations within the warehouse - Receiving, Staging, QC, Forward Pick, Bulk Pick etc and assign location numbers (GLNs where applicable)**

**Inventory Management**
- Integrate through EDI to provide real time process updates on inventory adjustments

**Outbound Processing**
- Notify warehouse personnel about the incoming shipment so as to plan for space etc
- Receive items through barcode scanners and associate against an existing ASN so as to close the ASN upon complete receipt
- Assign putaway tasks to warehouse personnel based on factors such as skill, work load etc
- Assign picklists/tasks to warehouse personnel
- Create shipments and assign carrier information
- Publish shipment information to requisition management system and other systems such as reporting and to receiving facilities
- Integrated with order management system to provide real time updates regarding the outbound shipment
The roadmap is capabilities (middle) achieved over time (top) across geography or organization (bottom)

Current Capabilities inform the initial period

Future periods are the roadmap, frequently reassessed

Add capabilities for technology as needed
Keys to Assemble the Roadmap

• Prerequisite capabilities in the physical supply chain must be met in order to consider many of the system capabilities – e.g., managing inventory using a FEFO model is a prerequisite to a system’s batch management functions

• Current capabilities include multiple systems to be analyzed

• Later phases include stretch goals that often rely on new technology investments

• Frequently reassess the future targets based on accomplishments
Feedback and Q&A
Additional Resources
ABOUT SCOR & APQC

**About SCOR**

The SCOR® model is the product of the Supply Chain Council (SCC), a global non-profit consortium whose methodology, diagnostic and benchmarking tools help organizations make dramatic and rapid improvements in supply-chain processes. SCC established the SCOR® process reference model for evaluating and comparing supply-chain activities and performance. The SCOR-model captures the Council’s consensus view of supply chain management. It provides a unique framework that links business process, metrics, best practices and technology into a unified structure to support communication among supply chain partners and to improve the effectiveness of supply chain management and related supply chain improvement activities. The SCC was organized in 1996 and initially included 69 practitioner companies meeting in an informal consortium. Subsequently, the companies of the Council elected to form an independent not for profit trade association. The majority of the SCC’s members are practitioners and represent a broad cross-section of industries, including manufacturers, distributors, and retailers. Equally important to the Council and the advancement of the SCOR model are the technology suppliers and implementers, the academicians, and the government organizations that participate in Council activities and the development and maintenance of the Model. At the time of this release, the Council has approximately 800 corporate members worldwide and has established international chapters in Australia/New Zealand, Latin America, Greater China, Europe, Japan, Southeast Asia, and Southern Africa with additional requests for regional chapters pending.

The Supply-Chain Council is interested in providing the widest possible dissemination of the SCOR model. The wide-spread use of the model results in better customer-supplier relationships, software systems that can better support members through the use of common measurements and terms, and the ability to rapidly recognize and adopt best practice no matter where it originates.

Global companies such as Intel, BASF, GE Oil & Gas and Ingersoll Rand use SCOR model to improve their supply chain efficiencies.


**APICS - American Production and Inventory Control Society**

**About APQC**

APQC (American Productivity & Quality Center) helps organizations work smarter, faster, and with greater confidence. It is the world’s foremost authority in benchmarking, best practices, process and performance improvement, and knowledge management. APQC’s unique structure as a member-based nonprofit makes it a differentiator in the marketplace. APQC partners with more than 500 member organizations worldwide in all industries. With more than 40 years of experience, APQC remains the world’s leader in transforming organizations. APQC’s Process Classification Framework®(PCF) is the most used process framework in the world. It creates a common language for organizations to communicate and define work processes comprehensively and without redundancies. Organizations are using it to support benchmarking, manage content, and perform other important performance management activities. Organizations such as HP, Royal Philips, Pearson and Children’s Hospital of Philadelphia use APQC Process Classification Framework to implement process improvements.

(Source: https://www.apqc.org/about)

**APQC – American Productivity & Quality Control**
The USAID Global Health Supply Chain-Procurement and Supply Management project provides commodity procurement and logistics services, strengthens supply chain systems, and promotes commodity security. We support USAID programs and Presidential Initiatives in Africa, Asia, Latin America, and the Caribbean, focusing on HIV/AIDS, malaria, and population and reproductive health commodities.