



GSI Data Discovery and Conversion Framework

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Photo: GHSC-PSM



USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM
Procurement and Supply Management

Acronyms

USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM
Procurement and Supply Management

AIDC automatic identification and data capture

GTIN Global Trade Identification Number

IT information technology

PMDM product master data management

SCIS supply chain information system

SKU stock keeping unit

UOM unit of measure

WMS warehouse management system

Welcome to the Data Discovery and Conversion Framework



This Framework can assist in the review of a country's product master data for alignment with GSI standards, including Product and Trade Item hierarchies and alignment of GSI attributes.

By following the suggested review process, the Framework helps the implementor define the gap between current product and item structures and the ideal GSI hierarchical product and trade item structures. When evaluating the gap between current item structures and moving to specific Global Trade Item Number (GTIN) oriented structures, the Framework offers guidance on how to assess impacts on the physical supply chain—should stock keeping unit (SKU) conversions be considered, and what would be the impact on current warehousing practices if item structures were to change? A recommended data model should be informed by analysis of the feasibility for the supply chain to adopt it—are the country's supply chain systems and infrastructure capable of supporting a proposed model?

The Framework is intended as a "toolbox" for conducting data discovery, assessing the impacts of product data conversions, and formulating a Transition Plan to a new product and item structure. It provides guidance on comparing and evaluating product master data across the country's supply chain information systems (SCISs) and helps anticipate changes on the physical supply chain, including implications for the information flow of products.

THIS FRAMEWORK IS FOR YOU

This Framework is designed to help you prepare for working with countries on a path to GSI standards to achieve product traceability, with a goal of updating their product master data to support automatic identification and data capture (AIDC).

If you have a background in GSI standards and are working with ministries of health, regulatory authorities or development partners, this Framework can guide your preparation for the discovery.

Be sure to read the additional reference material at the end of the document to broaden your understanding of this task.

Data Discovery Framework Organization

Data Discovery Analysis



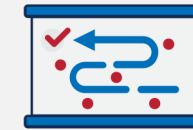
- Uses of product master data
- Mapping the supply chain and physical product and information flows
- Assessment of GSI product and trade item hierarchies
- Evaluation of product identification hierarchies and attributes

Conversion Strategy



- SKU conversion
- Physical inventory conversion
- Mitigate impacts on supply chain using GTIN as a secondary identifier

Transition Plan



- Execution of conversion strategy for GTIN alignment
- Operationalizing use of GTIN as an identifier
- Other inputs to the recommended data model

Uses of Product Master Data

Data Discovery Analysis: Begin by identifying how the country identifies and manages data about health commodities through the supply chain, including

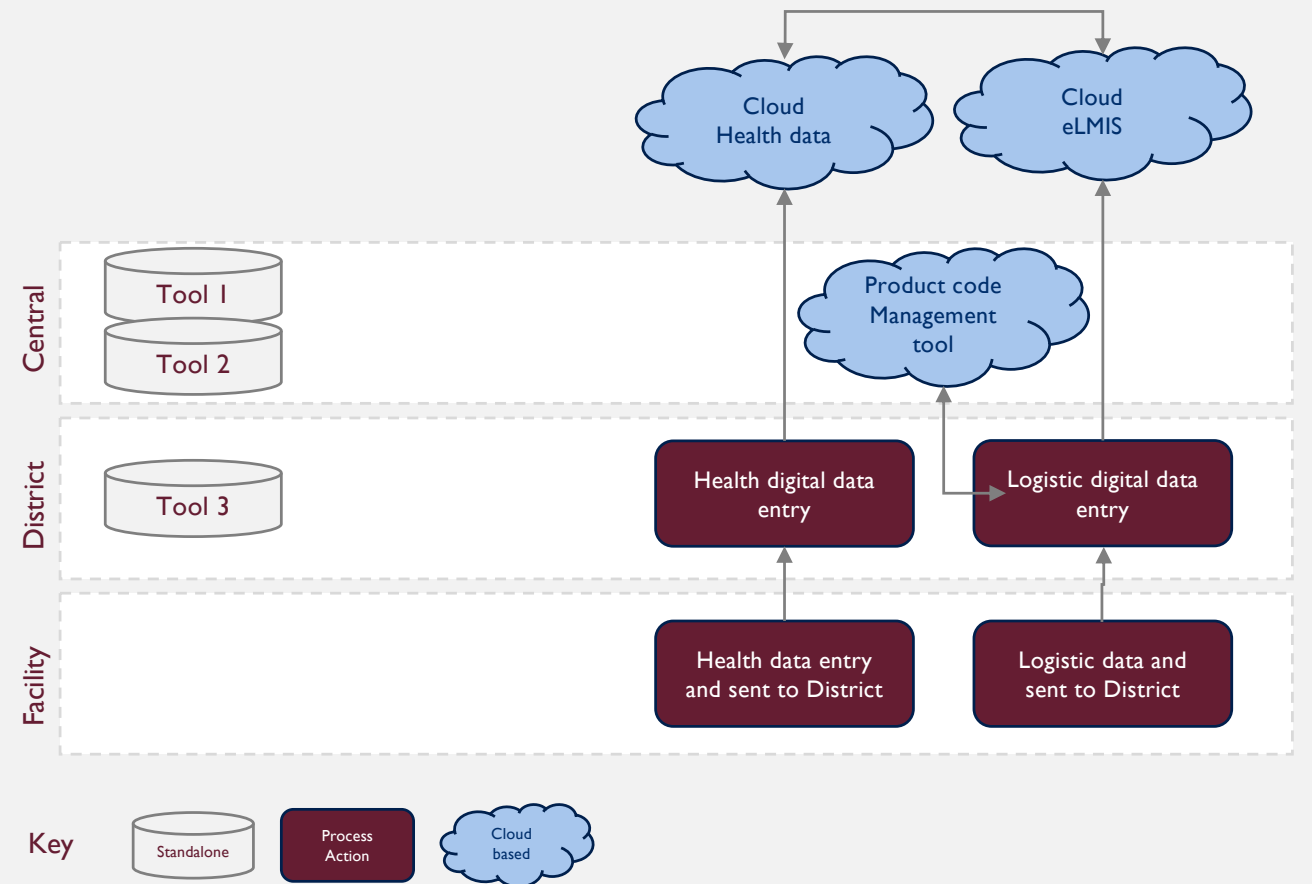
- Planning and procurement
- Physical movement of goods
- Information flow and sharing
- Decision making



Create a Map of Processes and Data

Data Discovery Analysis: Identify the systems that support healthcare delivery and which of those systems maintain Product Master Data

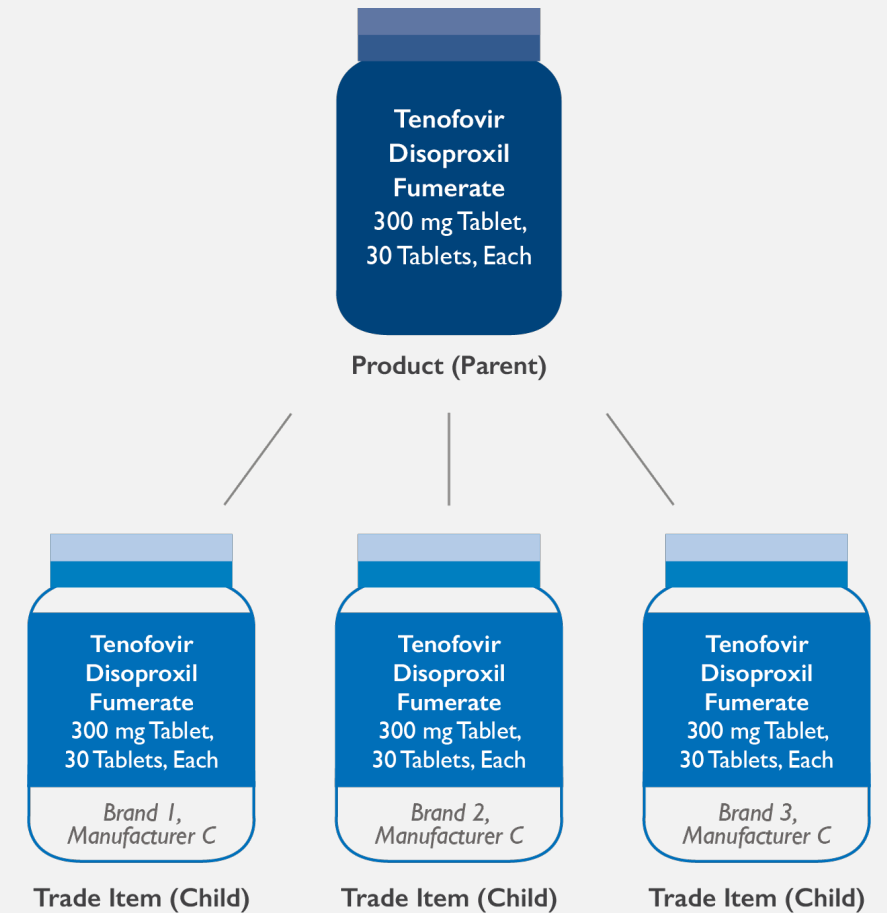
- Create a map of how healthcare and health commodities are delivered across the supply chain, including the flow of product master data across systems.
- Highlight where product master data translation is needed—between systems or processes?
- This map will inform the systems and processes to be included in the analysis of product master data, warehouse management, and distribution practices.



Data Harmonization: Product Master Data Standardization

Data Discovery Analysis:
Determine how the product is defined, at what level the Stock Keeping Unit is defined, and what initiates a new product?

- A standards-based data model will capture a generic “product” that relates to versions of that product from multiple manufacturers.
- Countries often define their SKU as a generic product that can be provided by multiple manufacturers, enabling them to have visibility to the number of treatments available to support planning, historical consumption, and replenishment/procurement.
- Manufacturers will have different packaging configurations and will have separate GTINs for each level of packaging which must be associated with the generic product.



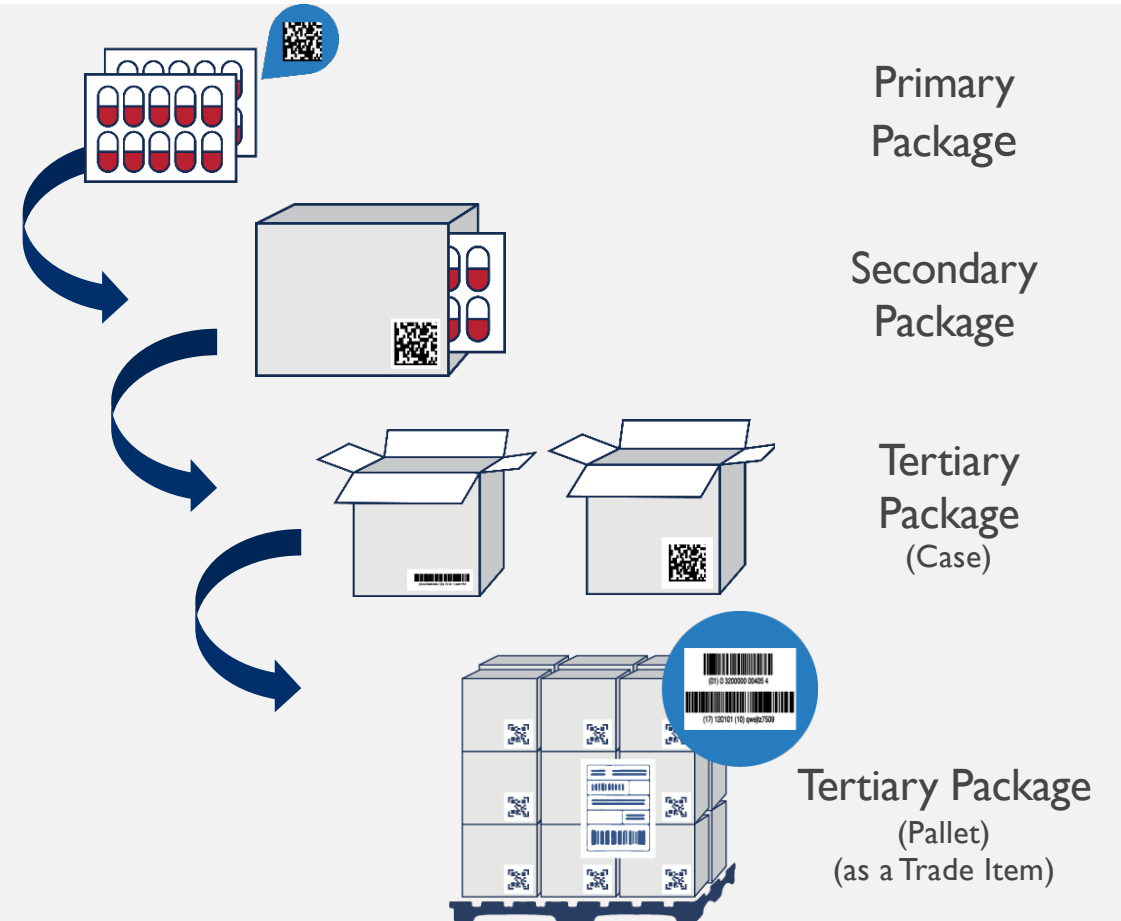
Data Harmonization with GS1 Packaging Hierarchies

Determine at what level the SKU is defined

When the SKU is defined to represent multiple manufacturers of the same product, each tertiary pack may reflect a different manufacturer's packaging configuration

Most common is at the secondary pack, often with multiple units of measure (UOM) to define tertiary packaging

In practice, a GTIN will need to be associated with each trade item, per manufacturer, and per each packaging level



Product/Item Hierarchy Analysis

How are multiple UOMs for a manufacturer's products captured?



- Are UOMs translated back to the primary SKU UOM?
- When there are multiple manufacturers of the same product, each with different packaging hierarchies, are UOMs and translations kept for each manufacturer?
- Are dimensions (weight and volume) captured for each packaging configuration?

Can the WMS or processes recognize different packaging hierarchies, such that higher level packaging can be translated to the SKU?



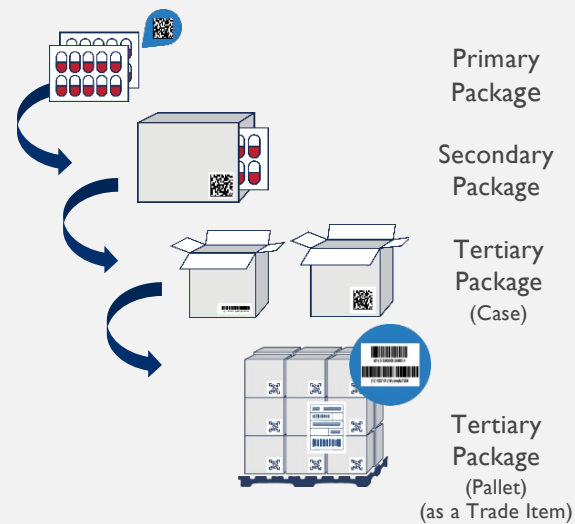
Depending upon the level that SKUs are defined:

- If product SKUs are highly generic, how are differences in manufacturer packing identified/captured/used?
- If product SKUs are more specific, like to donor, how are processes such as replenishment, planning and procurement managed?

Exercise: SKU-GTIN Alignment

Data Discovery Analysis: Identify the internal part numbering scheme and how it relates to GTIN at the trade item level

Funder 1 Manufacturer A



SKU Alignment

Unique SKU by donor?

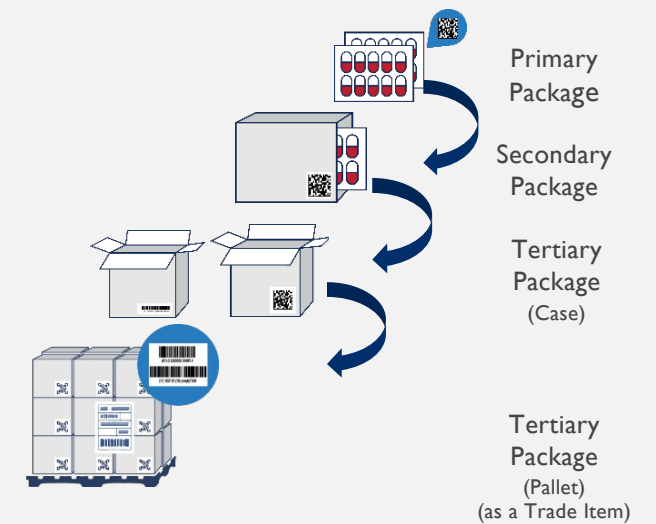
Unique SKU by manufacturer?

Unique SKU by primary/inner packaging size?

Do UOM conversions exist for secondary and tertiary packs?

Can GTINs be assigned at the unique packaging level (primary/inner, secondary, tertiary)?

Funder 2 Manufacturer B



Product Master Data Attributes Analysis

Identify how the trade item description is defined



- How are descriptions managed for common products or trade items?
- Is there a standard for establishing product/trade item descriptions?
- Can manufacturer be identified for the trade item based on description or other attributes stored with the product/trade item?
- If products are generic (multiple manufacturers for the same product) how are manufacturers captured?

Identify the attributes captured and attribute descriptions about products and trade items



- Is there a minimum set of attributes that must be captured before the item master record is considered complete?
- Are there different attributes captured depending on product type (e.g., pharmaceutical versus medical/surgical supplies)?
- Are there different attributes captured in different supply chain systems (e.g., a purchasing system of record versus a WMS of record)?
- What are the classifications and product groupings/families captured about products and trade items?

Exercise: Mapping Current Attributes to GS1 Attributes

- Identify the data attributes in use in warehouse management systems and processes.
- Evaluate data attributes driving identification, hierarchy, nomenclature, and classifications.
- Map in-country system attributes to available GS1 attributes.
- Identify country-specific attributes that cannot not be sourced from available GS1 attributes.
- Capture an overall view of product master data consistency.

Field	Data Type	Size	Required	Description
SKU	Char		Y	The PCMT SKU code for the product
Categories	Char			
Enabled	Char			
Family	Char			
Groups	Char			
Trade Item Groups	Char			
Trade Item Products	Char			
Trade Item Product Models	Char			
CMS SKU	Char			
Generic Name	Char			
Short Description	Char			
Description	Char			
Strength	Char			
Level of Prescribing	Char			

Field	Data Type	Size	Required	Description
SKU	Char		Y	Link to the PCMT SKU code for the product
Categories	Char			
Enabled	Char			I = an active SKU
Family	Char			
Groups	Char			
Trade Item Groups	Char			
GTIN	Char			UOM Barcode
GS1 Description	Char			
GS1 Short Description	Char			
GS1 Packaging Weight Unit	Char			Unit of measure of the weight of the packaging containing the products
GS1 Height	Float			The height of the trade item
GS1 Height Unit	Char			Unit of measure of the height of the trade item
GS1 Width	Float			The width of the trade item

Data Discovery Findings



Data Discovery Analysis: Based on the analysis, identify key findings and the gap between current structures and GSI product and trade item hierarchies

- Should data be converted? Does it require new products/trade items? Expand current attributes? Capture packaging hierarchies through existing systems' capabilities?
- Is a data transformation layer/tool needed to map trade item-specific GTINs to existing SKUs?
- Agree on a feasible* goal and design a detailed Transition Plan to reach that goal.

Preliminary findings: Product Master Data

2. **Hierarchy Findings:** "Base Unit of Measure" tells us the packaging associated with each item and how many units make up this packing level, but does not tell us what hierarchy is associated with it- whether it is at the each, case, or pallet level. In the example below, we can see 100 tablets make up a box (BOX/100T)

No.	No. 2	Description	Search Description	Base Unit of Measure	Vendor No.
24/4814D		Ibuprofen 400mg Tablets	IBUPROFEN 400MG TABLETS	BOX/100T	UN
24/4815D		Ibuprofen 400mg tablets	IBUPROFEN 400MG TABLETS	BOX/500T	UN
24/4816D		Ibuprofen 400mg tablets	IBUPROFEN 400MG TABLETS	B/900	

Recommendation 1: Trade item master data should be managed in a way that links the primary, secondary, and tertiary packaging levels of each trade item and its variants. Additionally, the data may include the generic instance of the product with an identification linkage to its variants. This creates a hierarchical, parent-child relationship between a containing object (i.e., parent) and one or more objects (i.e., children) that are contained. There is some effort at eLMIS to manage hierarchies by utilizing "base unit of measure" however, the data does not show hierarchical (each, pallet) relationships to other packaging variants; i.e., maintaining linkages between different identifiers for different levels of packaging.

Recommendation 2: We can see that 100 tablets make up a box (BOX/100T) for product number 24/4814D. We recommend splitting this "Base Unit of Measure" field into two: one for Packaging, and then one for the Content of the actual packaging.

*Feasibility may be constrained by "conversion" requirements, or by other factors such as SCIS constraints, as discussed in "Other Inputs to the Recommended Data Model."

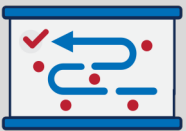
Conversion Strategy



Conversion Strategy: Identify how using GTIN as a secondary identifier will impact the country's current product master data management and warehousing practices. Determine if conversion is feasible or if other solutions are needed to create the alignment needed to support AIDC.

- Evaluate product master data management (PMDM) practices and how moving to GTIN alignment will impact current processes.
- Evaluate current stock keeping practices and if there is alignment on the definition of product and stock keeping units through the extended supply chain.
- Identify how stock keeping practices are impacted by the proposed product and trade item hierarchical data model.
- Identify conversion needed to enable use of GTIN in an AIDC environment.
 - Do Inventory balances need to be converted to new SKU's?
- Identify if data transformation tools will be needed to align GTINs with existing SKUs (if this is needed to avoid significant conversion).

Transition Plan to GTIN Alignment



Build a Transition Plan: From the analysis of GTIN mapping to current SKU schema, determine if a new SKU schema is needed, if new SKUs are to be added, or if current SKUs can be effectively mapped to each manufacturer's GTIN and packaging hierarchies

- If maintaining existing SKUs, identify how the SKU will relate to GTINs of the multiple manufacturer trade items and the associated packaging hierarchies.
- Identify if a data transformation tool will be used to correlate GTINs to existing SKUs (avoiding conversion) and how that transformation layer will be planned and deployed.
- Identify any attributes that will be added or modified to support product master data initiatives to standardize nomenclature and defining attributes, such as manufacturer packaging and UOMs.
 - Establish a data governance initiative that will own the coordination of new PMDM practices
- If converting to a new product master data model, how will the conversion be planned and executed?
 - Identify how new SKUs will be loaded into the systems used for warehousing and distribution
 - Identify how inventory balances will be allocated to the new SKUs
 - Identify the change management activities that will be needed to affect the conversion to new SKUs

Resulting Transition Plan and Next Steps

Once GTIN mapping to SKU is defined, a Transition Plan can be created, which includes:

- The mapping exercise to align SKUs with manufacturer GTINs.
- An impact assessment on how planning, warehousing, distribution, and reporting are affected by the GTIN alignment, and how those impacts will be addressed.
- A Conversion Plan on how the GTIN assignments will be implemented

Work with country stakeholders to identify roles and responsibilities for completing a Transition Plan

Identify any competing, complimentary or dependent activities in country that may impact or enhance this activity

Identify a timeline for completing a Conversion Plan



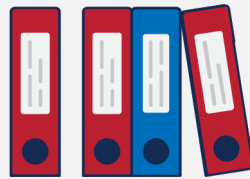
Present Resulting Transition Plan

Identify



Identify how/when GTINs will be accessible to future AIDC initiatives

Outline



Outline the benefits of any changes to product/item hierarchies, nomenclature, and attributes

Describe



Describe the mapping activities, product master data creation and any conversions needed to support the GTIN alignment

Present



Present Conversion Strategy, if one is needed, to drive GTIN alignment

Review



Review roles and responsibilities and any expectations of country to support the resulting Transition Plan

Other Inputs to the Recommended Data Model



The recommended data model will be constrained by factors such as the need to convert data and the physical supply chain if SKUs are to change—but in addition, and beyond the scope of data discovery, the recommended model should be informed by:

A country's digital strategy

- Uncover interoperability of SCIS
- What are the near- and mid-term strategy plans for SCIS maintenance and updates?

Current system capabilities

- Do their systems support the alignment of GTIN to SKU?
- Are enhancements needed or is it recommended that a third-party application provide a translation layer between GTIN and current SKU?

Data governance, including ownership of the process, may place constraints on how changes are introduced.

Are there other supply chain improvement programs planned or in progress that could impact a data harmonization effort?

Additional Resources

Template and Guidance for the Collection of Product, Item, and Trade Item Master Data Hierarchies

<https://www.ghsupplychain.org/template-and-guidance-collection-product-item-and-trade-item-master-data-hierarchies>

Product Master Data Reference Guide and Toolkit

<https://www.ghsupplychain.org/PMDMReferenceGuide>

GS1 Supply Chain Information System (SCIS) Requirements

<http://www.ghsupplychain.org/GS1SCISReqs>

Product Master Data Management Reference Guide

<https://www.ghsupplychain.org/PMDMReferenceGuide>

Data Governance Terms of Reference

<https://www.ghsupplychain.org/data-governance-terms-reference>





The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project is funded under USAID Contract No. AID-OAA-I-15-0004. GHSC-PSM connects technical solutions and proven commercial processes to promote efficient and cost-effective health supply chains worldwide. Our goal is to ensure uninterrupted supplies of health commodities to save lives and create a healthier future for all. The project purchases and delivers health commodities, offers comprehensive technical assistance to strengthen national supply chain systems, and provides global supply chain leadership. For more information, visit ghsupplychain.org.

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