Health Products Coding: Pharmacie Populaire du Mali

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About SIAPS

The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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Key Words

Stock keeping unit, catalogue, inventory, product codes, Logistics Management Information System, Central Medical Stores, supply chain, warehouse operations, Pharmacie Populaire du Mali

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ACRONYMS

ART	antiretroviral therapy
ARV	antiretrovirals
EAN	International Article Number
LMIS	Logistics Management Information System
PPM	Pharmacie Populaire du Mali
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SKU	stock keeping unit
SOP	standard operating procedure
UPC	Universal Product Code
USAID	US Agency for International Development
WMS	warehouse management system

INTRODUCTION

Stock keeping units (SKU) are uniquely identified products (differentiated by brand, size, color, model, etc.) in a storage facility, and are therefore documented separately in inventory management systems. SKU are sometimes called product codes, or in some cases part numbers, and are usually numbered or coded in a unique way so that they cannot be confused with any other product in storage.

Every SKU is assigned a unique identification number that is often the same as (or is tied to) the item's International Article Number (EAN) or Universal Product Code (UPC).[1] Typically, an SKU is associated with any purchasable item in a store or catalogue.

A good **SKU** will at least contain the following:

- Product name
- Price
- Serial number
- Short description
- Source – origin
- Comment/remark
- Other

Product codes do not need to be tied to the EAN or UPC; however, they must be distinctive to avoid confusion with any other item in the storage facility, such as:

- The same medicine in different presentations.
- The same product from different manufacturers.
- The same item located in different storage facilities.

Benefits of Coding Products

Product codes serve as a proxy name for longer item descriptions (e.g., "*Lame porte objet pour microscopie en verre L=76mm-I+26mm-H+1mm, extrémité depolie blanc - - boîte 50*" has **86** characters). They serve to speed up the processes of data entry and inventory management. Coding products correctly makes it easier to search, find, and reference products from lists, purchase order forms, invoices, etc. It helps avoid repetition of listed items.

Being a unique identifier of each product in the warehouse, product coding offers the system the following advantages:

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[1] Business Dictionary. "Stock keeping unit (SKU.)" Retrieved at:
http://www.businessdictionary.com/definition/stock-keeping-unit-SKU.html

- Greater process efficiency by reducing the repetition of commodities in the item master files, hence reducing waste and minimizing the risk of "congesting" the inventory list with unwanted items or incorrect product names.

- Reduction in errors from improper entry of inventory into records.

- Rationalization and improvement of inventory management:

  o Find hidden items
  o Manage space
  o Profit management; focus on fast moving items

- The codes may also be used in the product catalogue, which makes it easy for buyers to select specific items that could easily be confused with another item of similar name but with different strength, formulation, or even pack sizes.

- In more specific cases, product codes may be used to identify specific commodities that are to be supplied to unique clients due to their limitations, e.g., donated products; products for special programs, such as antiretroviral therapy (ART) and malaria.

Rationale for Having Product Codes in the Pharmacie Populaire du Mali

Within the framework of the warehouse improvement activities implemented in the Pharmacie Populaire du Mali (PPM), including process re-engineering, the creation of standard operating procedures (SOP), and information systems upgrades, there was also a need to create product codes.

Efficient, well-run warehouses usually have their inventory uniquely identified by codes. These codes will help the PPM better account for its stock activity and their whereabouts within the inventory. Every variation in a stock item should have its own unique product code. At the time of this writing, the PPM did not have a system in place to uniquely identify each product. The full product name, including form, strength, and other basic information was being used.

Product codes are essential for efficient product management by a good warehouse management system (WMS) or Logistics Management Information System (LMIS). Codes can streamline the selection, procurement, quantification, inventory management, and distribution processes. They will provide PPM management with easy-to-obtain information on sales volumes, profit margins by product, product volume/demand for better storage space management, and to address special conditions for each item/product.

In addition, the PPM will be able to have a product catalogue that will make it easier for its customers to know what products can be sourced from the PPM. The catalogue will use the product codes to facilitate easy selection and help avoid errors and confusion on the part of the ordering personnel when it comes to selecting the right product.

Objective

The main purpose of developing product codes for the PPM is to standardize and improve inventory management practices at the PPM, to provide input to the PPM's product master list, and to integrate the list throughout the commodity information system.

In addition, the codes will be used in the product catalogue for clients to order from.

PROCESS OF DEVELOPING PRODUCT CODES FOR THE PPM

In creating the codes for PPM products, the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program employed a systematic approach that included the following key steps:

- Development of a roadmap to implement the codes through a consultation with the PPM and key stakeholders.
- Literature review: product codes used by other organizations.
- Rapid situational analysis.
- Options analysis for product codes.
- Workshop.

Product Codes Used by Other Organizations

It is important that the PPM's inventory is set up correctly. With the introduction of product codes, inefficiencies found when examining the list of stock items may be addressed. Traceability throughout the PPM's supply chain is expected to improve, as are procurement and supply planning processes and management of customer orders. Various product code options used in other sectors and by similar organizations in developing countries are summarized in the table 1.

Table 1. Summary of different code designs used by various organizations

Organization	Code Design Framework	Observations/Comments
Echostar Tee Shirt (USA online product)[2]	14 characters (alphanumeric) - Source/Manufacturer: 2 characters - Type of product: 3 characters - Brand: 4 characters - Size: 2 characters - Color: 3 characters	This example is from a different sector; however, the code design reflects key parameters that can be useful in a public pharmaceutical supply chain. Example: T-shirt, large, dark red = TEE-LRG-RED
Angola – CECOMA	8 characters: (alphanumeric) - Product category: 2 characters - Product sub-category: 2 characters - Number within sub-category: 2 characters - Formulation: 2 characters	The design of this coding system could have issues because some codes begin with the number 0; (best practices suggest that this should be avoided). Example: Amoxicillin 500 mg capsule = 06020102
Kenya – MEDS	6 characters (alphanumeric) - Product name: 3 characters	Key considerations for the PPM, such as form/formulation, are missing. Example: Amoxycillin capsules 250 mg, 1,000

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[2] Brightpearl. "Understanding SKUs". Retrieved at: http://pages.brightpearl.com/rs/135-BBD-722/images/Understanding-SKUs.pdf

Organization	Code Design Framework	Observations/Comments
	• Product number based on name: 3 characters	pack = AMO001
DRC – FEDECAME (2007)	14 characters (alphanumeric) • Family: 4 characters • Name: 4 characters • Strength: 2 characters • Additional variation: 1 character	This code is not ideal because it contains several types of separators (dash and underscore), adding an unnecessary layer of complication. Example: Amoxycillin, 250 mg, Caps, 500, Vrac = DORA_AMOX2C-_1
South Africa (Rx Solution codes)	15 characters (alphanumeric) • Generic name: 5 characters • Strength: 4 characters • Form: 2 characters • Pack size: 4 characters	This form of coding suits the PPM and can be easily adjusted by adding specific codes for supplier or project/client to reflect what is needed in Mali. Example: Amoxycillin 250 mg capsule (500 capsule) = T01024600270168

Rapid Situational Analysis

Using the PPM's logistics management information system, LogiPPM, it was possible to obtain a list of all the items in stock (more than 3,500) by name, and the category for each item, e.g., contraceptives or antiretrovirals (ARV). However, this list could not be considered a catalogue.

A quick analysis of the PPM's most updated product list extracted from LogiPPM revealed several deficiencies:

- No product codes were assigned.

- The categories assigned to products were not always accurate, e.g., laboratory reagents were found under the ARV category (e.g., "*Celldyn Emerald 18 Diluent reagent (PNUD) Solution - 10 L*").

- On one of the lists containing approximately 1,100 items, up to 160 products were found to be repeated once and sometimes twice, creating 169 additional products. This was discovered by performing a simple sorting exercise using Microsoft Excel. This methodology had the limitation that it could only find identical product names; therefore, if any character in a product's name was not identical, it would not have been identified as repeated. In any case, this methodology provided a good indication that the list contained a large number of redundant products.

- Products were repeated in different categories. For example: "*ABX Minilyse LMG (PNUD) Solution - 1 L*" is listed in two categories: "*ARV: Antirétroviraux*" and "*PNUD: Infections Opportunistes (IO.)*" "*Paracetamol Comprimé 500 mg plaquette 10*" was found in three categories: "*PNUD: Infections Opportunistes (IO,)*" "*E: Voies Orales en Blister, Collyres et Pommades,*" and "*A: Produits de la Chaîne Froide, Tests et Réactifs.*"

- The funding sources listed also showed repetition in some cases, with variation in the nomenclature. Acronyms were not defined in the list.

  o HCNLS / HCNLS-BAD
  o PSI-FM/ PSI-MALI / PSI-MALI USAID
  o USAID / USAID-PNLP
  o VPP/ FM-VPP
  o For 605 items (not counting repetitions), the names of the sources were not listed.

No.	Categorie	Nom du produit
13	ARV : Antirétroviraux	ABX Minilyse LMG (PNUD) Solution - 1 L
283	PNUD : Infections Opportunistes (IO)	ABX Minilyse LMG (PNUD) Solution - 1 L
14	ARV : Antirétroviraux	ABX Minotrol 16 TWIN-PACK (2N) (PNUD) Solution - unité
15	ARV : Antirétroviraux	ABX Minotrol 16 TWIN-PACK 2N (PNUD)/ITL - (2x2,5ml) -
284	PNUD : Infections Opportunistes (IO)	Acetate de sodium (PNUD) - PH 5.2 10 L
533	C : Voies Orales en Vrac, Injectables et Galéniques	Acetylsalicylate de lysine Injectable 1 g flacon
534	C : Voies Orales en Vrac, Injectables et Galéniques	Acetylsalicylate de lysine Injectable 500 mg flacon
535	C : Voies Orales en Vrac, Injectables et Galéniques	Aciclovir Comprimé 200 mg boîte 100
285	PNUD : Infections Opportunistes (IO)	Aciclovir (PLAN-MALI) Comprimé dispersible 200 mg plaquette 10
286	PNUD : Infections Opportunistes (IO)	Aciclovir(PNUD) Comprimé 200 mg boîte 25
536	C : Voies Orales en Vrac, Injectables et Galéniques	Acide acétylsalicylique Comprimé 500 mg boîte 1000
683	E : Voies Orales en Blister, Collyres et Pommades	Acide acétylsalicylique Comprimé 500 mg plaquette 10
1036	A : Produits de la Chaîne Froide,Tests et Réactifs	Acide acétylsalicylique Comprimé 500 mg plaquette 10
826	D : Dispositifs Médicaux et Produits Chimiques	Acide Alcoolique 3%(3%HCL 37%in95%ethanol)UN292 - - flacon 500 ml
537	C : Voies Orales en Vrac, Injectables et Galéniques	Acide Ascorbique Comprimé 500 mg boîte 100
538	C : Voies Orales en Vrac, Injectables et Galéniques	Acide Ascorbique Comprimé 500 mg boîte 1000
684	E : Voies Orales en Blister, Collyres et Pommades	Acide Ascorbique Comprimé 500 mg plaquette 10
1037	A : Produits de la Chaîne Froide,Tests et Réactifs	Acide Ascorbique Comprimé 500 mg plaquette 10
539	C : Voies Orales en Vrac, Injectables et Galéniques	Acide Ascorbique Injectable 500 mg / 5 ml ampoule 5 ml
685	E : Voies Orales en Blister, Collyres et Pommades	Acide Benzoique + Acide Salicylique Pommade 6 % / 3 % tube 40 g
1038	A : Produits de la Chaîne Froide,Tests et Réactifs	Acide Benzoique + Acide Salicylique Pommade 6 % / 3 % tube 40 g

Figure 1. Example of repeated products identified through sorting

Options Analysis for Product Code Design

For the purposes of the product nomenclature, the following issues were considered:

- Type of numbering system to be developed:

  o Intelligent (significant) or sequential (non-significant). Each has advantages and disadvantages that should be considered in the context of the PPM. If a significant product coding system is selected, the structure of the number must also be decided.
  o Alphanumerical or numerical.

- Desired length of codes.
- What data, if any, will the code need to carry with it to enable other business processes?

Given the health supply chain situation in Mali, the existence of specific programs, and other factors, such as technology available at the PPM and staff skills, the technical team proposed minimum requirements for the product codes. Four product code scenarios were proposed, as follows.

Scenario One – 18 Characters: Codes Based on Commodity Family

- Pharmaceutical family/category, e.g., medicines, diagnostics, supplies, equipment (3 characters, alphanumeric): This attribute could be a first indicator of product location for warehouse employees assuming that each family would be stored separately, e.g., all diagnostics in one place, all medical equipment in another.
- Product name (4 characters)
- Strength (3 characters)
- Formulation/form (2 characters)
- Pack size (3 characters)
- Supplier (3 characters)

Example: the code for the product, *Abacavir sulfate (Abamune) (PNUD) Comprimé 60 mg boîte 60* found on the PPM's product list would be ***MED100700321105PND***.

Pharmaceutical product family	Code
Medicines	MED
Diagnostics	RXD
Supplies	SUP
Equipment	EQP

Generic name	Code
Amoxicilline	1001
Artemether	1002
Tramadol	1003
Ceftriaxone	1004
Efavirenz	1005
Zidovudine	1006
Abacavir sulfate	1007

Strength	Code
3%	001
2%	002
60mg	003
20mg/1ml	004
300mg	005
25/500mg	006

Form	Code
Tablet	211
Sirop	311
Injectable	411
Poudre	511
Neant	611
Solution	312

Pack size	Code
Unit	01
1 gr	02
1 L	03
10g tube	04
boite 60	05
boite 90	06
2 ml sachet	07

Supplier	Code
USAID	AID
PNUD	PND
Plan Mali	PML
HCNLS	HCN
HCNLS BAD	BAD
FM-VPP	VPP
PSI FM	PSI
PSI Mali	PSM
UNFPA	UNF

Figure 2. Option 1 for product codes

Scenario Two – 14 Characters: Codes Based on Disease Programs

- Health/disease program, e.g., tuberculosis, HIV, malaria, family planning, essential medicines (2 characters): This attribute could be a first indicator of product location for warehouse employees or to differentiate between identical products used for more than one program.
- Generic name (4 characters)
- Strength (3 characters)
- Formulation/form (2 characters)
- Pack size (2 characters)
- Source (to differentiate between donated or purchased products) (1 character): This attribute would indicate to warehouse personnel whether a product should be distributed for profit. Donations received by the PPM must also be donated downstream.

Example: the code for the product, *Abacavir sulfate (Abamune) (PNUD) Comprimé 60 mg boîte 60* found on the PPM's product list would be **HV1007T100305A**.

| HV | 1007 | T1 | 003 | 05 | A |

Source	Code
Donation	A
Procurement	B

Program	Code
HIV	HV
TB	TB
Malaria	MA
Essential medicines	EM
Oportunistic infections	OI
Family planning	FP
Maternal child health	MC
Neglected tropical diseases	NT

Generic name	Code
Amoxicilline	1001
Artemether	1002
Abacavir sulfate	1003
Ceftriaxone	1004
Efavirenz	1005
Zidovudine	1006
Abacavir sulfate	1007

Form	Code
Tablet	T1
Sirop	S1
Injectable	S3
Poudre	P1
Neant	N1
Solution	S2

Strength	Code
3%	001
2%	002
60mg	003
20mg/1mL	004
300mg	005
25/500mg	006

Pack size	Code
Unit	01
1 gr	02
1 L	03
10g tube	04
boite 60	05
boite 90	06
2 ml sachet	07

Figure 3. Option 2 for product codes

Scenario Three – 15 Characters: Codes Based on Product Profile Only

- Product name (4 characters)
- Strength (3 characters)
- Formulation/form (2 characters)
- Pack size (3 characters)

- Supplier (3 characters)
- Similar to scenario one, but without including a product family attribute in the code.

Example: the code for the product, *Abacavir sulfate (Abamune) (PNUD) Comprimé 60 mg boîte 60* found on the PPM's product list would be ***100700321105PND***.
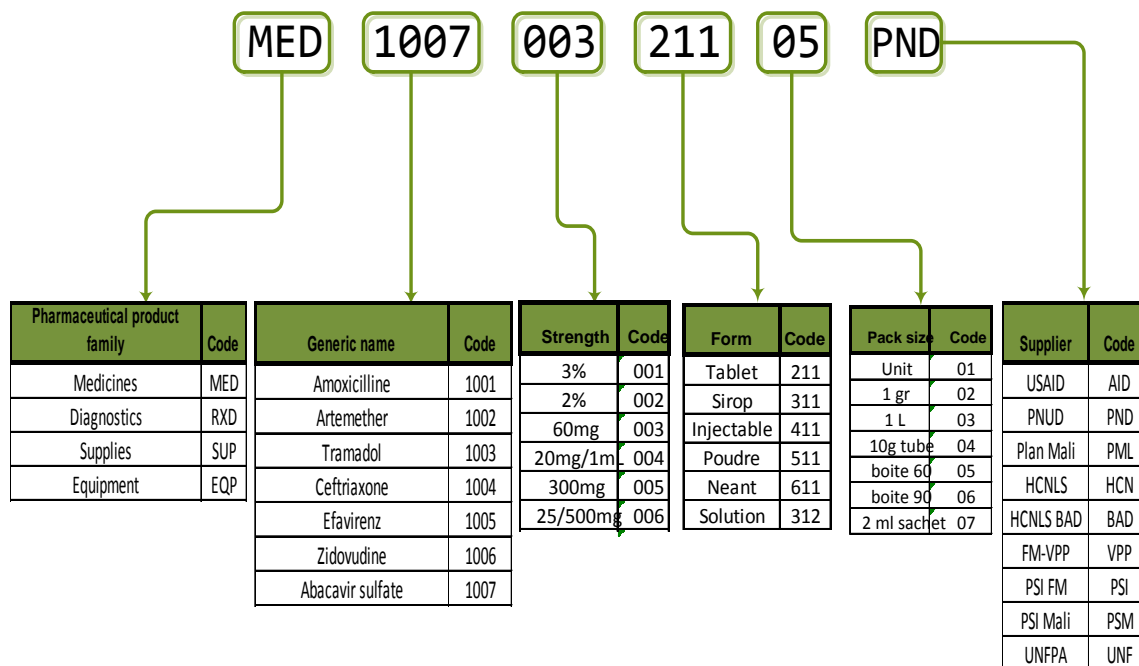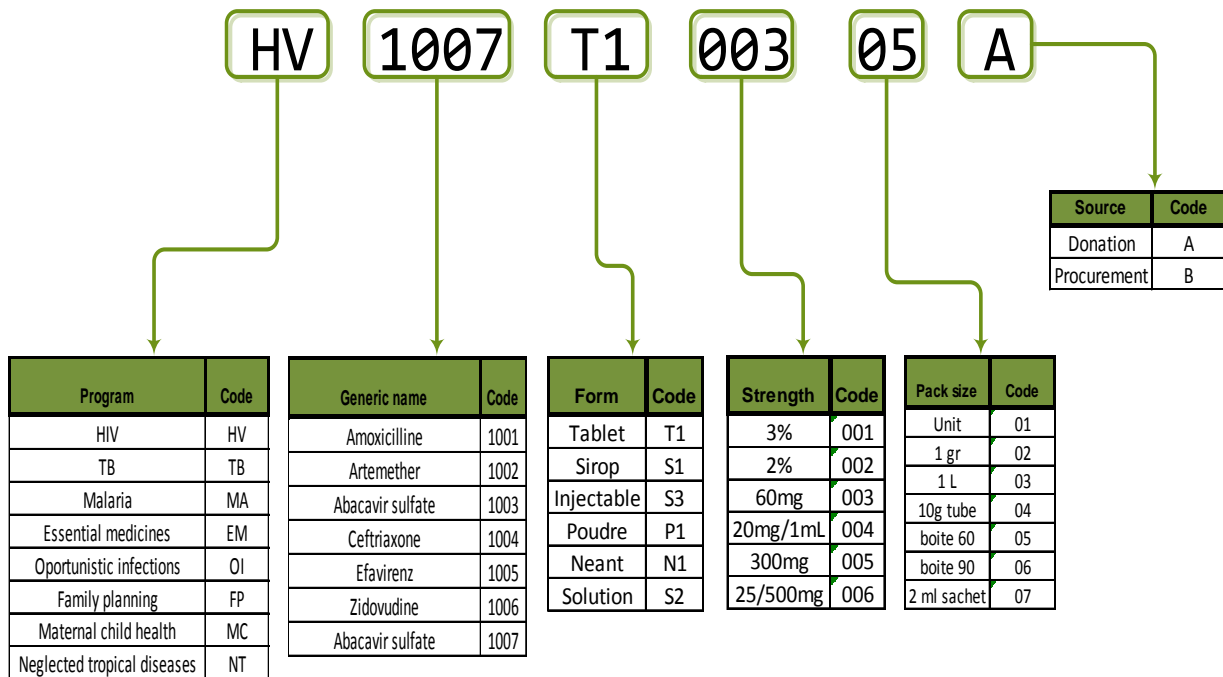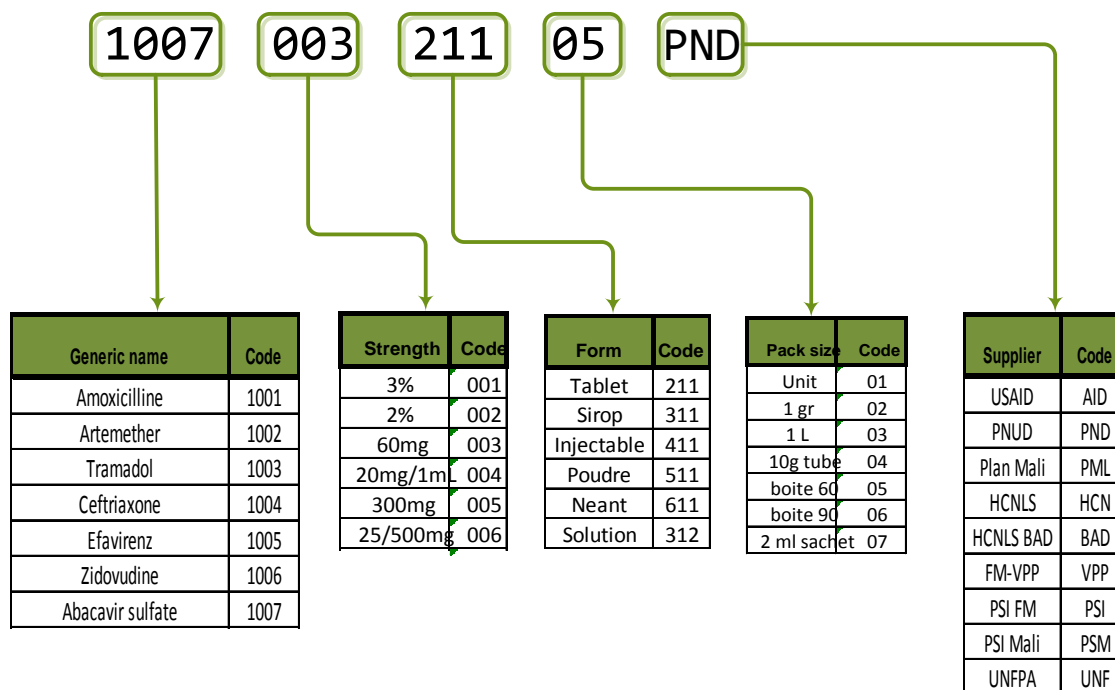

| 1007 | 003 | 211 | 05 | PND |

Generic name	Code
Amoxicilline	1001
Artemether	1002
Tramadol	1003
Ceftriaxone	1004
Efavirenz	1005
Zidovudine	1006
Abacavir sulfate	1007

Strength	Code
3%	001
2%	002
60mg	003
20mg/1mL	004
300mg	005
25/500mg	006

Form	Code
Tablet	211
Sirop	311
Injectable	411
Poudre	511
Neant	611
Solution	312

Pack size	Code
Unit	01
1 gr	02
1 L	03
10g tube	04
boite 60	05
boite 90	06
2 ml sachet	07

Supplier	Code
USAID	AID
PNUD	PND
Plan Mali	PML
HCNLS	HCN
HCNLS BAD	BAD
FM-VPP	VPP
PSI FM	PSI
PSI Mali	PSM
UNFPA	UNF

Figure 4. Option 3 for product codes

Scenario Four – Pure Sequential Codes

- Numeric only
- Numbers are sequential and meaningless
- The size of the product code (number of characters) will be determined by the number of products managed by the PPM. Since the PPM does not manage more than 9,999 different products, the length of the code would not need to be over four digits.
- The code should not begin with the number zero.

Table 2. Option 4 for product codes

Product Name	Product Code
Chlorpromazine comprimé 100 mg boîte 30	3001
Chlorpromazine injectable 25 mg/ml ampoule 2 ml	3002
Chlorure de sodium injectable 10% ampoule 10 ml	3003
Chlorure de sodium poudre flacon 50 g	3004
Cholesterol (PNUD) solution 4 x 100 ml	3005

Workshop

In March 2016, SIAPS conducted a two-day consensus workshop in Bamako to review and correct the PPM's product lists and to select the product codes. Attendees included selected staff from the PPM, SIAPS/Mali, and SIAPS headquarters. The work included:

- Critical review and categorization of products by experts for each product category.
- Identification of waste and correction/rationalization of the PPM product lists.
- Selection of new product codes for the PPM based on options presented by SIAPS.

RESULTS FROM THE WORKSHOP

Rationalization of Product Lists

The working group reviewed all the PPM's product lists: essential medicines, tests and reagents (diagnostics), and medical supplies by:

- Completing the list of products with all technical specifications and information required for coding.

- Correction of input errors for the products listed.

- Removal of repeated product names.

- Rationalization of the lists based on expert opinions and review of sales data.

A total of 1,019 products (29%) were taken off the lists due to repetition, misspelling, demand history, etc.

- The essential medicines list was reduced by 42% (from 1,084 to 632 products).
- The list of laboratory supplies/reagents was reduced by 46% (872 to 468 products).
- The medical supplies list was reduced by 10% (from 1,571 to 1,408 products).
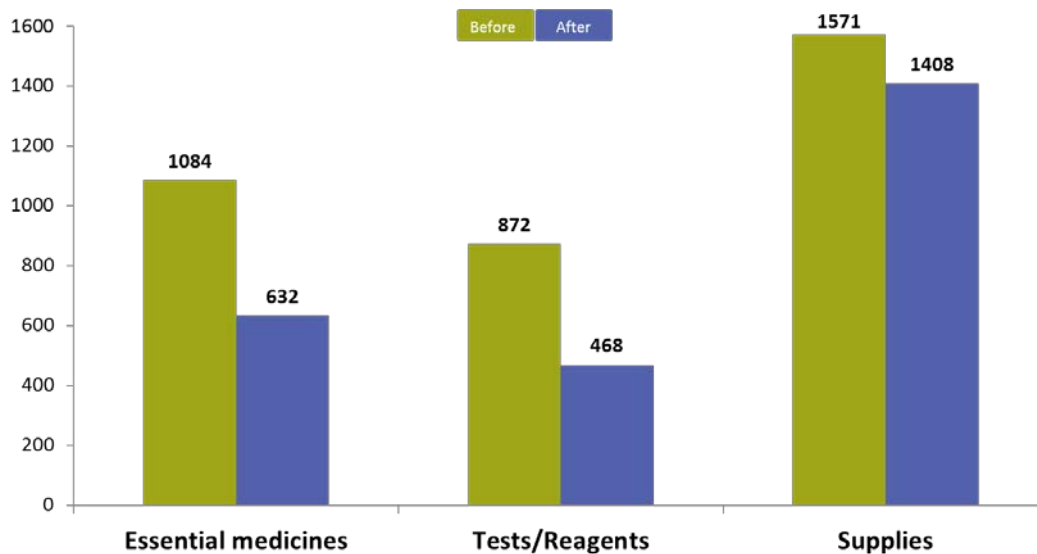

Figure 5. Systematic rationalization of PPM products lists

Selection of New Product Codes for the PPM Based on Options Provided

Workshop participants reviewed the four product code options presented by SIAPS:

- Limitation of the number of characters: for easy entry and managing the codes, the number of characters should be limited to only those necessary.

- Product category: participants deemed the ABC category to be an important identifier of the product and thus decided to have this included in the codes.

- Storage condition: another characteristic that was deemed of paramount importance for the participants at the workshop.

Through a comparative analysis of the four different coding options by the working group, it was concluded that:

- A simple sequential product numbering (option 4) may not offer specifics that are desired by the PPM (upstream and downstream supply chain) as well as for clients' use of the codes.

- Of all presented scenarios, scenario 1 was preferable due to easier adaptability to current needs of the PPM.

- However, a fifth option would be created by adding the following information to the codes: product category (ABC), program, and storage condition (regular, cold, etc.).
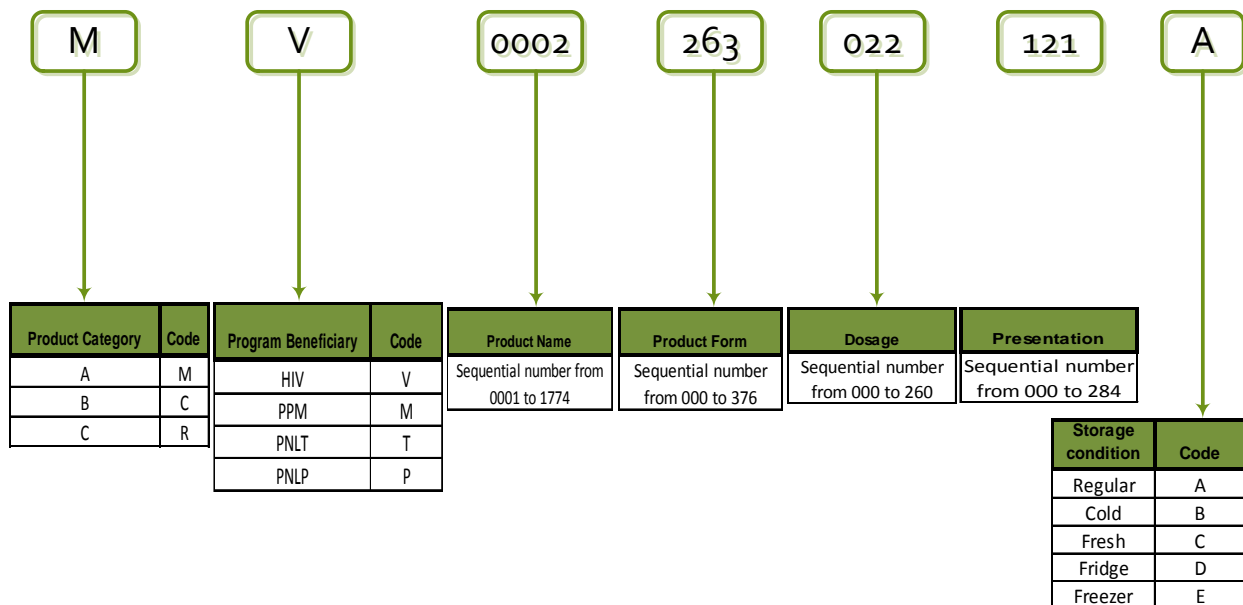
| M | V | 0002 | 263 | 022 | 121 | A |

Product Category	Code
A	M
B	C
C	R

Program Beneficiary	Code
HIV	V
PPM	M
PNLT	T
PNLP	P

Product Name
Sequential number from 0001 to 1774

Product Form
Sequential number from 000 to 376

Dosage
Sequential number from 000 to 260

Presentation
Sequential number from 000 to 284

Storage condition	Code
Regular	A
Cold	B
Fresh	C
Fridge	D
Freezer	E

Figure 5. Selected product code

With the selected nomenclature, PPM agreed on 16-digit product codes. Compared to how the PPM previously listed its products, this will significantly improve the efficiency of supply chain operations by reducing redundant items (repeated, misspelled, etc.) from the product lists, streamline and rationalize procurement and quantification, improve vendor management, simplify and lessen mistakes in order preparation and fulfillment for PPM's customers, among other benefits.
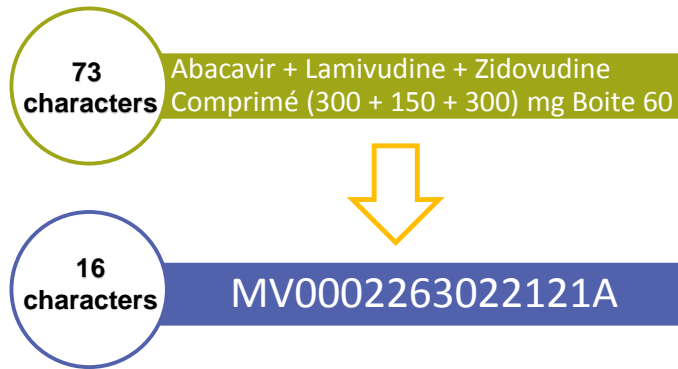

Figure 6. Comparison of product nomenclature before and after coding

NEXT STEPS: IMPLEMENTATION OF PRODUCT CODES FOR THE PPM

To establish the PPM's product codes and product catalogue, SIAPS will continue supporting the PPM through implementation of the following activities:

1. Creating the first version of the product catalogue:

   ✓ All products stocked at the PPM have now been assigned codes as per the coding nomenclature presented above as option 5. The first ever PPM product catalogue has been created in French. An internal version of the catalogue is provided in annex 1.

2. Linking the codes to the stock in the warehouse:

   ✓ Progress will be dependent on the implementation of the new WMS because the current LMIS used by the PPM, LogiPPM, is not capable of managing 16-digit codes. At the time of this writing, the implementation of the WMS was in process: funds have been procured; SAGE has been selected as the vendor, however, the module to be procured is being discussed and agreed upon between the PPM and the donor (Government of the Netherlands).

3. Develop SOPs:

   ✓ New SOPs will need to be developed for the periodic revision of product codes, e.g., new product entry, inactivation, and any amendment. SOPs should include schedules for revision/updates of the codes.

4. Training and orientation of human resources:

   ✓ Employees will need to receive orientation on the new product codes and their use, and the entry, inactivation, and amendment of any product code when the SOPs are finalized and approved.