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Philippines Department of Health Distribution Assessment and Management Information System Review:

Exploratory Visits for Determination of Next Steps

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Abstract:
This report present the findings from a Philippines Department of Health distribution assessment and management information and MIS Review conducted in December 2014. The assessment included a review of the current DOH distribution system for all their health commodities, determining feasibility to monitor the performance of a 3PL contractor, as well as an LMIS landscape analysis and necessary requirements for system improvements.

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Acronyms

3PL	third party logistics provider
BC	business continuity
B/L	bill of lading
CCB	Change Control Board
CCTV	closed circuit television
CPAR	corrective preventative action report
DBMS	database management system
DOH	Department of Health
eLMIS	electronic logistics management information system
FEFO	first-to-expire, first-out
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
IMS	Inventory Management System
IRP	invoice receipt of property
IA&M	Identity Access & Management
ICT	information, communication, and technology
IT	information technology
KMIS	Knowledge Management Information Systems (department within DOH)
KMT	Knowledge Management Team
LMD	Logistics Management Department (department within DOH)
LMIS	logistics management information system
MIS	management information systems
MNCH	maternal, newborn, and child health
MOS	months of stock
NCPAM	National Center for Pharmaceutical Access and Management
NGO	nongovernmental organization
NOSIRS	National Online Stock Inventory Reporting System
PMP	Performance Monitoring Plan
POD	proof of delivery
POMS	Procurement Operations Management System
SICC	shippers instruction commodity content

SLA	service-level agreement
SME	subject matter expert
SMRS	Supply Management and Recording System
SOP	standard operating procedure
STTA	short-term technical assistance
TB	tuberculosis
USAID	U.S. Agency for International Development
WMS	warehouse management system

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Introduction

With a population of 100 million people, the Philippines is currently one of the fastest growing economies in the Asia-Pacific and, globally, across emerging markets. However, 42 percent of Filipinos still live below the international poverty line of U.S.$2 a day. The Philippines also face high rates of maternal and neonatal mortality and a high incidence of tuberculosis (TB). In addition, an estimated 22.3 percent of women have an unmet need for family planning.

Within this context, the U.S. Government, through the U.S. Agency for International Development (USAID) works to strengthen the capacity of the Philippines' Department of Health (DOH), local government units (provinces, municipalities and cities), and the private sector to increase the availability and accessibility of quality maternal, newborn, and child health (MNCH) and family planning services by helping the public sector become more efficient and effective.

In April 2014, the Health Policy Development Program–Phase 2 (HPDP2) project, implemented by the UPecon Foundation, Inc., and funded by USAID/Philippines; assessed the status of the implementation for the family planning logistics management system. The assessment foundoverstocking or stockouts of products at facilities, primarily due to (1) the absence of reliable and timely information and improper planning, because there was no functioning logistics management information system (LMIS); (2) irregular delivery schedules to lower levels that caused delays in the procurement process or delays by the third party logistics provider (3PL); and (3) organizational and communication challenges between the Family Health Office and other DOH departments, as well as with the regional, provincial, and municipality health offices.

Following these findings, USAID/Philippines requested support from the USAID | DELIVER PROJECT to (1) assist HPDP2 and the DOH in assessing the LMIS landscape and the necessary requirements; and (2) assess the current DOH distribution system for all their health commodities, as well as monitoring the performance of the 3PL contractor.

The following sections in this report present the findings from the assessments conducted by two technical teams in December 2014. Short- and long-term recommendations are provided for each activity, as well as key strategic recommendations for improving and strengthening the Philippines' public health supply chain.

Objectives

The overall key objectives for the assessments were to—

- Understand the current landscape of the distribution of public health commodities and use of the management information systems (MIS)
- Identify stakeholders, partners, and other nongovernmental organizations (NGOs) that distribute health commodities.
- Assess the capabilities of the current 3PL and capacity of the DOH to monitor and manage the 3PL.
- Review and document existing and available supply chain software.
- Identify strengths, weaknesses, and recommendations/options for improving logistics data.

Assessment Methodologies

The assessment methodology consisted of the following:

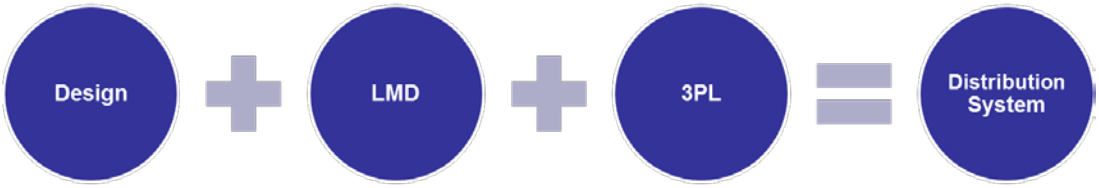
- Review DOH policies and procedures.
- Review other related documents, including the 3PL contracts from 2012–2014, distribution invoices, software operational manuals, the National Online Stock Inventory Reporting System (NOSIRS) training manual, and Supply Management and Recording System (SMRS).
- Interview, in-depth, the DOH directors and managers, including health program managers, the Logistics Management Division (LMD), Knowledge Management Information Systems (KMIS) Division, and the National Center for Pharmaceutical Access and Management (NCPAM).
- Interview the 3PL providers.
- Review the systems of the NOSIRS and the 3PLs' warehouse management systems (WMS).
- Visit the LMD and 3PL warehouses, one provincial health office (Bulacan), and two municipalities health offices/rural health units.

See appendix A for the full schedule and list of people interviewed.

Distribution Assessment Framework

To fully assess the 3PL performance, the team felt that the entire DOH distribution system needed to be reviewed in order to understand all factors which could impact the 3PL's performance as well as the capacity of the LMD to monitor. The team looked at each piece of the complete DOH distribution system and reviewed the strengths, weaknesses, and challenges for each of the three main components: the distribution system's design, the LMD, and the 3PL provider (See figure 1).

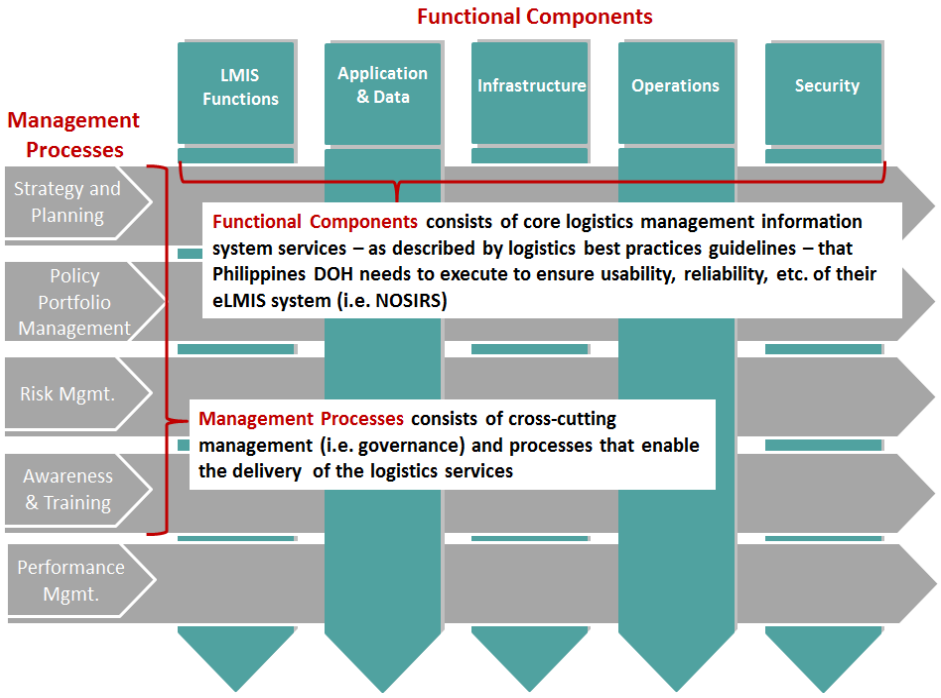
Figure 1. DOH Distribution System Components



MIS Review Frameworks

To assess the MIS applications, the team used two frameworks, focusing on the strategic and application levels of the identified systems. The strategic level assessment (see figure 2) was used to examine and cross-cut both the management processes and functional components as they relate to the governance of the main application used for commodity management—the NOSIRS—an online application used to record receiving and issuance of commodities and products. But, the application-level assessment examines the NOSIRS application, based on the quality attributes, as they relate to the readiness and sustainability of the NOSIRS.

Figure 2. Strategic Framework Approach



In addition to the assessment frameworks, the team used a maturity model to assess both the strategic and application components, as illustrated in tables 2, 3, and 4. The maturity model describes the maturity of the strategic and application levels. Its goal is to provide USAID and Philippine's DOH with a—

- place to start
- common language and a shared vision
- framework for prioritizing actions
- way to define what improvement means for the organization
- recommended course of action for the DOH.

The maturity is made up of indicators that are organized into sequential steps, ranging from 1 to 5. A *level 1* indicates the lowest level of functional capabilities, while *level 5* represents the most advanced or mature level of application functionality. Both the strategic and application levels were independently reviewed and assessed to determine which level most accurately describes the current capabilities of the governance and the quality attributes of the application.

A low-capability maturity rating does not mean an organization is performing poorly, but that the LMIS captured within the application and MIS capabilities can be enhanced to be more consistent and responsive.

Each of the quality attributes identified are described in tables 1, 2, and 3.

Table 1. Strategic Framework Management Processes Maturity Model

Capability	Level 1	Level 2	Level 3	Level 4	Level 5
Strategy and Planning	➢ Strategic planning is not taking place ➢ Stakeholders needs to be captured ➢ Ad hoc approach to management processes	➢ Has strategic planning, but not used consistently ➢ Stakeholders needs are documented occasionally ➢ Has budget process, but not documented	➢ Strategic planning taking place consistently ➢ Most stakeholder needs documented ➢ Has budget process, and is documented	➢ Well defined, detailed strategic planning ➢ Stakeholder needs are documented in detail ➢ Budget process well defined; is measured and controlled	➢ Strategic planning extensively used and monitored ➢ Stakeholders participate actively in needs definition ➢ Budget linked to strategic plan and process improved annually
Policy Portfolio Management	➢ No policies or standards in place	➢ Policies or standards in place, but not documented, used consistently, or are missing key elements	➢ Policies or standards in place and well documented	➢ Well defined and detailed policies and processes ➢ Policies and processes measured and controlled	➢ Quantitative and qualitative measures used to endure compliance ➢ Policies and standards continuously improved through metrics analysis
Risk Management	➢ Risks identified and addressed ad hoc	➢ Risks identified periodically using repeatable processes	➢ Standardized risk management processes and metrics defined and is use	➢ Risk management role and responsibilities defined ➢ Risks actively tracked and managed	➢ Risk management efficiently and effectiveness tracked ➢ Ongoing improvements and refinements based on results
Awareness Training	➢ No awareness and training initiatives in place	➢ Have some training programs	➢ Training and awareness programs defined and available	➢ Performance objectives for awareness and training established and used as criteria in managing processes	➢ Continually improving awareness and training performance through incremental and innovative process and technological improvements
Performance Management	➢ Ad-hoc performance and compliance	➢ Performance and compliance processes defined, but not used consistently	➢ Performance and compliance processes documented and used consistently	➢ Performance and compliance processes measured and controlled ➢ Timely information provided	➢ Real-time performance and compliance data provided ➢ Continually improving performance and compliance using data

Table 2. Strategic Framework Functional Components Maturity Model

Capability	Level 1	Level 2	Level 3	Level 4	Level 5
LMIS Functions	➢ Ad hoc LMIS process in place	➢ Have standard LMIS processes, but not used consistently	➢ Processes are well defined and documented ➢ LMIS process is used consistently throughout DOH	➢ Processes are measured and controlled ➢ Have quantitative objectives for quality and process performance; are used to manage	➢ Continually improving LMIS process performance through incremental and innovative process and technological improvements
Application and Data	➢ No or standalone procurement application	➢ Available, but not used consistently	➢ Government-wide LMIS in place ➢ System supports organizational objectives	➢ Are monitored and measured ➢ Performance measures are collected and statistically analyzed	➢ Continually improving application performance through incremental and innovative process and technological improvements
Infrastructure	➢ Unstructured IT infrastructure	➢ Basic IT infrastructure in place	➢ IT infrastructure adequate to handle current load with potential for downtime	➢ Well-designed infrastructure that provides high availability	➢ Infrastructure upgraded to ongoing requirements and usage changes
Operations	➢ Ad hoc IT operations ➢ Few processes are defined and success depends on individual effort	➢ Basic operations processes are established ➢ Necessary disciplines are in place to repeat earlier successes	➢ IT operations are documented, standardized, and integrated into standard processes	➢ Measurements of the IT operations and service quality are collected ➢ Operations are quantitatively managed	➢ Continuous process improvements enabled by quantitative feedback from the processes and from piloting innovative ideas and technologies
Security	➢ Organization recognizes that security should be addressed ➢ No structured security practices in place	➢ Security practices are planned and managed	➢ Security practices are performed according to a defined process using approved, tailored versions of standard, documented processes	➢ Detailed security measures are collected and analyzed. Provides an understanding of capability and an improved ability to predict performance	➢ Security effectiveness goals are established, identify improvements to the standard process, and analyzed for potential changes to the standard process

Table 3. Application Quality Attributes Maturity Model

Capability	Level 1	Level 2	Level 3	Level 4	Level 5
Maintainability	➢ Unable to undergo changes	➢ Changes are possible, but require extensive efforts and difficult to implement	➢ Changes are possible with moderate efforts required to the programming and migration efforts	➢ Changes are possible with minimal effort and easily ported to new platforms and architecture	➢ Application can undergo changes with ease and structured approach ➢ Practice of structured change management practices
Reusability	➢ Unable to duplicate and re-use in other applications ➢ Proprietary platforms and programming languages	➢ Able to duplicate and re-use, but requires extensive efforts for re-programming and migration to new target platform ➢ Hybrid platforms use both open source and proprietary solutions	➢ Able to duplicate and re-use but requires minimal efforts for re-programming and migration to new target platform	➢ Duplication and re-use of application functionality is easily integrated into other applications ➢ Standard data formats	➢ Complete use of open source technology and portable to other applications with minimal effort and technical changes ➢ Shared database model
Inter-operability	➢ Does not adhere to standards ➢ Cannot interface with external applications	➢ Interface capabilities possible, but none exist ➢ Lack of adherence to standards	➢ Interaction with external/legacy applications that use different data formats	➢ Adhere to standards ➢ Standard data formats	➢ Adhere to standards ➢ Use open source data exchange formats ➢ Single database model used across multiple applications
Scalability	➢ Cannot expand from current state ➢ Users incur regular delays in response and long completion times	➢ Requires extensive re-design efforts to accommodate increased work load ➢ Cannot queue excess work and process it during periods of increased load	➢ Expands, but may require extensive cost and effort	➢ Can expand with minimal effort	➢ Architecture is already integrated to easily accommodate growth and extra work load ➢ Users experience is fast and effortless
Usability	➢ Too much interaction (excessive number of clicks) required for a task ➢ Incorrect flow of steps in multistep interfaces ➢ Cumbersome application design ➢ No function capabilities	➢ Requires training for end-user to accomplish tasks ➢ Cumbersome process to accomplish functional tasks ➢ Design is cluttered ➢ Excessive functionality	➢ Fairly intuitive ➢ User requires training to properly use the application ➢ Has functionality, but not user-friendly	➢ Is intuitive ➢ Requires minimum training ➢ Provides online help ➢ Has a user-friendly design	➢ User is able to easily navigate application with no formal training ➢ Very intuitive ➢ Application screen designs are self-navigating ➢ All functionality is used for end-user requirements

Design Qualities

Maintainability is the ability of the system to undergo changes with a degree of ease. These changes could impact components, services, features, and interfaces when adding or changing the functionality, fixing errors, and meeting new business requirements.

Reusability defines the capability of components and subsystems to be suitable for use in other applications and in other scenarios. Reusability minimizes the duplication of components and, also, the implementation time.

Run-Time Qualities

Interoperability is the ability of a system or different systems to operate successfully by communicating and exchanging information with other external systems that external parties write and run. An interoperable system makes it easier to exchange and reuse information internally, as well as externally.

Scalability is the ability of a system to either handle increases in load without impact on the performance of the system, or the ability to be easily expanded.

User Qualities

Usability defines how well the application meets the requirements of the user and consumer by being intuitive, providing good access for users, and result in a good overall experience for the user.

In the following section of the document, the findings for each of the electronic logistics management information system (eLMIS) applications are presented and described, based on the functional and technical models described in this section. In addition to the findings, the maturity level and suggested improvements are given for each of the individual areas.

Note: Optional suggested improvements were not provided for maturity level ratings 3 and above.

DOH Distribution Assessment

The main goal of this component of the activity was to review the DOH distribution system and determine the feasibility of developing and implementing a performance and monitoring plan for the current 3PL provider. To effectively monitor and evaluate the performance of the distribution system, **all** elements of the distribution system must be organized, well-designed, resourced appropriately, and capable of meeting the requirements. As mentioned earlier, the team looked at the three main components that comprise the distribution system: the distribution system's design, LMD, and 3PL provider.

Distribution System Design

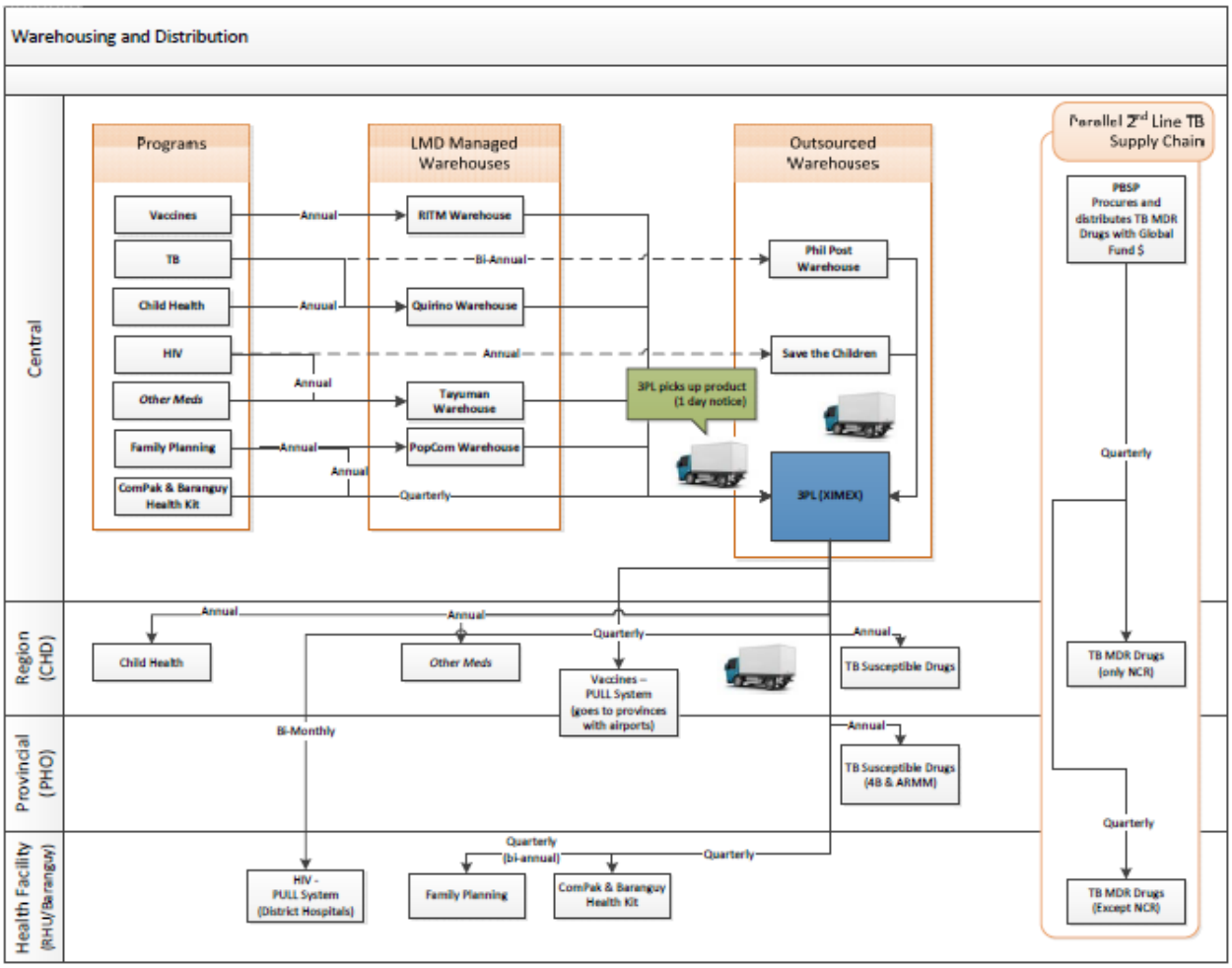
Current State

Figure 3 shows the DOH's current distribution system. The programs, LMD, and 3PL activities are shown at the top as the central level. The regional-, provincial-, and health facility– levels are below. The figure shows how the 3PL distributes the product from each program—from the central level down to the next level by program.

The figure only shows the 3PL's distribution responsibilities. For example, for family planning, the 3PL is responsible for delivering product to the health facility–level, which can be seen in the figure. However, for first line tuberculosis (TB) drugs (susceptible), the 3PL provider is only responsible for delivering product to the regional level, or provincial level in the case of region 4B and Autonomous Region in Muslim Mindanao (ARMM). The region or province is then responsible for moving the commodities further down to the health facilities.

Note: The team was only able to meet with the TB, child health, family planning programs, and NCPAM, which manage the ComPack and Barangay health kits. Thus, information obtained for the other programs was provided through discussions with the LMD, HPDP2, and the 3PLs and might differ in practice.

Figure 3. Current DOH Distribution Structure



Challenges

The DOH's distribution system for public health commodities, as a whole, lacks a clear systematized design; and it appears to be disorganized. Inventory control procedures were not observed and a common set of distribution frequencies or schedules was not apparent. In addition, various supply chain levels receive product from different programs adding to the confusion. Furthermore, the DOH's multiple programs have their own agreements with suppliers as to when to deliver to the LMD, but do not communicate with the LMD. Multiple deliveries are made to the LMD warehouse without advance notification; sometimes they overload the warehouse and operational capacity.

All programs have various requirements for distribution frequencies to the lower levels; each program dictates distribution to the different levels of the supply chain. For example, the child micro-nutrients program requires annual delivery to the regional level; while family planning has products delivered to the health facility–level once a quarter.

In addition, there is a lack of clarity and communication on acceptable lead times for picking and packing at the LMD-run warehouses and acceptable turnaround time for the 3PL provider to pick up shipments from the LMD warehouses. Also, the facilities do not always seem to be aware of or ready to accept deliveries; this indicates another gap in communications.

Furthermore, it does not appear that the different levels of the distribution system have documented maximum, minimum, or emergency order point stock levels, making national pipeline monitoring very challenging.

Logistics Management Department

Current State

The LMD at the DOH manages all warehousing and all distribution of government-procured public health commodities. During the time the team conducted the assessment, the DOH had a turnover in administration. Positions associated with the previous administration were being turned over throughout the department; as a result of the change, the organogram was also rearranged.

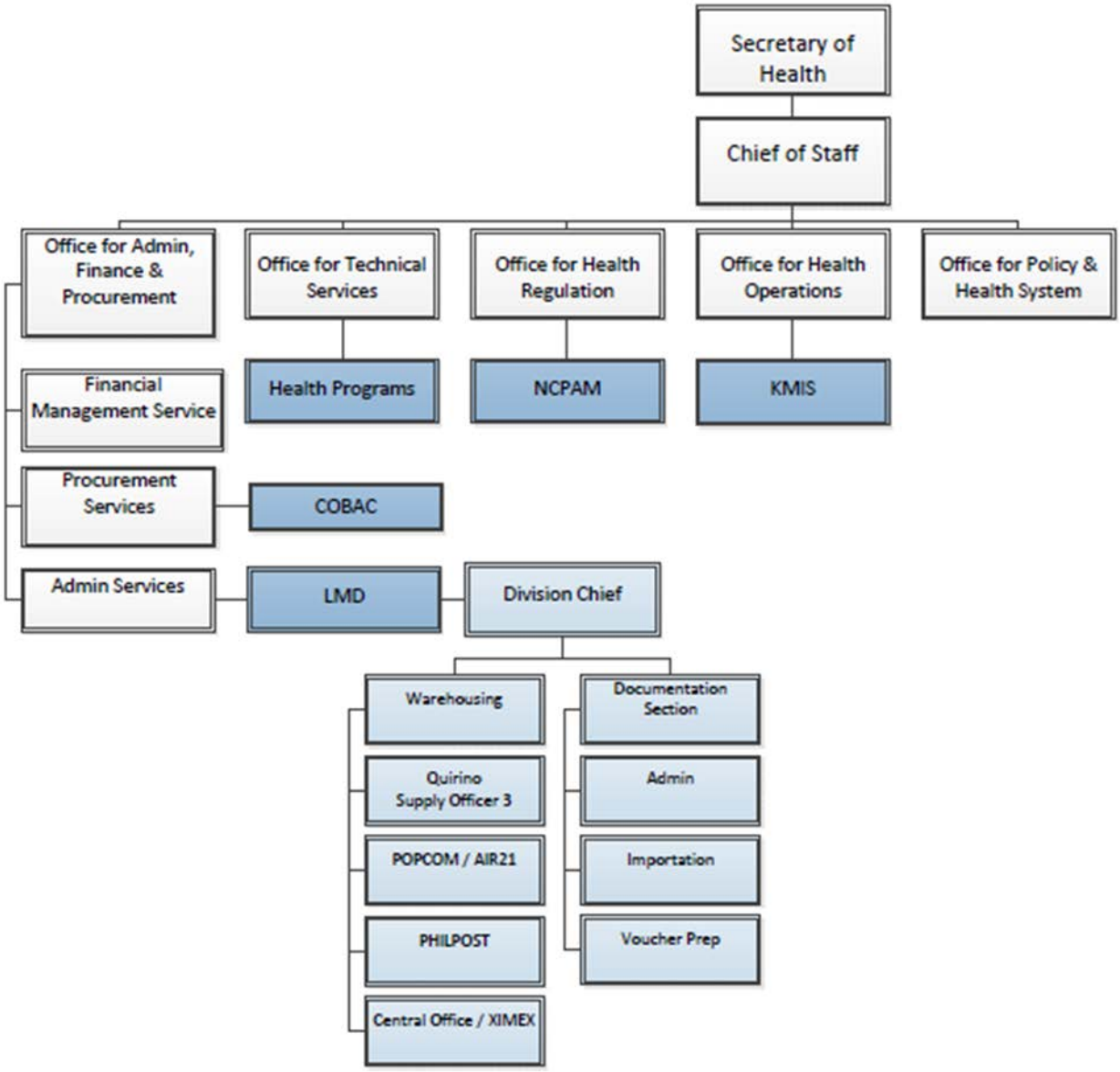
Figure 4 represents the current—as of December 2015—DOH organogram with the LMD's anticipated organizational structure (highlighted in light blue). Shown in dark blue are each of the offices/departments within the DOH that play some role in distributing public health commodities: health programs; NCPAM; KMIS; Central Office Bids and Awards Committee (COBAC) under the Procurement Division; and the LMD.

Currently, the LMD's mandate focuses on warehousing commodities and preparing shipments for distribution. Day-to-day activities are transactional; the LMD has little-to-no role in the strategic side of the warehousing and distribution process as a whole.

LMD's current role and responsibilities, following a commodity arrival from a supplier, includes—

1. Suppliers notify LMD of incoming deliveries, but only for products going directly to LMD warehouses.
2. The LMD coordinates with programs, and 3PL when applicable, for quality checks on newly arrived product.
3. The LMD receives allocation plans (distribution plan) from programs after suppliers deliver procurements.
4. The LMD completes the bill of lading (B/L) and the invoice receipt of property (IRP) for each facility shipment.
5. The LMD communicates with 3PL when product is ready to be picked up and distributed (sometimes product is picked up for storage only) and gives them the B/L and IRP.
6. Third party logistics provider notifies LMD of deliveries and sends invoices to LMD for processing.

Figure 4. Philippines Department of Health Organogram



There are currently seven warehouses that are directly or indirectly managed by the LMD and providing commodities for distribution by the 3PL. The following are observations made by the TA providers or relayed during interviews:

- Tayuman (visited)
  - LMD's largest and primary storage space
  - currently stores: equipment, essential medicines, Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) product
  - good racking and equipment in place.
- Quirino (visited)
  - second largest storage space

  - stores essential medicines
  - good racking and equipment in place.
- Popcom
  - stores family planning product
  - very basic storage space (no racks)
  - no formal supervision
- RITM
  - refrigerated storage for vaccines program product
  - not operated directly by LMD, but they make supervisory visits.
- PhilPost
  - warehouse space is outsourced to PhilPost
  - stores TB product.

Challenges

While the team observed numerous challenges affecting the LMD, they could be grouped into two categories: external and internal.

External challenges

As noted above, the LMD's role is limited to the transactional activities listed above. The assessment team found that the LMD does not have the mandate to manage the complete supply chain, or even just the distribution piece, making it a challenge to effectively manage activities for which it is currently responsible.

The LMD has no voice in how often supplier deliveries arrive and in what quantities. This significantly affects their warehousing space because they usually receive large shipments from multiple suppliers once a year. The team also found that the LMD often does not have enough advance notice of when programs will want shipments to go out to the regions, provinces, or health facility level. Without this advance notice, the LMD is forced to prepare all shipping documents—the B/L and IRP—for each shipment, manually, in a short period of time, often being forced to delay shipments while they complete the paperwork.

The LMD—and therefore the entire DOH—has no visibility into facility stock status because, currently, there is no functioning LMIS. Therefore, programs, who are currently dictating distribution schedules and quantities, are operating a *blind push system*; with no idea whether or not the products are actually needed. Without an LMIS, forecasting is not based on consumption records, only population and target data. This means shipments down to the various levels are often declined because they already purchased the product themselves, or already have enough in stock. Then, the LMD must store extra unneeded product in their warehouses.

Another major challenge affecting the LMD, under the current procurement regulations handed down by the DOH, is its ability to sign only annual contracts with the 3PL. Negotiating a contract every year is time consuming; as seen this year, it can lead to gaps between contracts if issues arise. In addition, without a multi-year agreement, the 3PL provider has little incentive to look for ways to

increase efficiencies and develop technology that can assist in better distribution of the DOH's public health commodities.

Internal Challenges

Internally, the assessment team observed several challenges the LMD is tackling. Established communication channels and roles between LMD and the programs are vague. While the LMD stated that a liaison-type position is dedicated to each health program, the programs did not seem to recognize that the LMD already has this role. Because of this lack of communication, delivery status and stock status are not being communicated well to programs. Additionally, when there are delivery issues, the programs do not have clear points of contact with whom to discuss these issues. In some cases, the programs have been directed to go to the 3PL to sort out delivery issues.

In terms of managing the 3PL provider, while there is data available from the current 3PL providers, the LMD does not seem to be reviewing and processing the information effectively. There is a need within the LMD to define roles and increase capacity to monitor and evaluate the 3PL provider. To manage and monitor the 3PL provider, a key position or group must be created that can maintain the data and process it into indicators to ensure the performance of the 3PL provider is consistently reviewed.

Another internal challenge the LMD faces revolves around their main task—warehousing. As described above, their multiple warehouse locations make it difficult to adequately staff all facilities. With product stored in various locations, it is also difficult to perform the picking and packing process for efficient distribution. All warehouses visited were overcrowded. Consequently, excess product is currently sitting at the 3PL warehouses and the LMD has little-to-no visibility into that stock. They also have no immediate plans for distributing that product.

Last, it was observed that the LMD has no automated warehouse management system. While it is possible to use a paper-based system to manage product, it is noticeably difficult for the LMD to manage their level of inventory appropriately with their current system of paper-based bin cards. By only using bin cards, which include information on product in a specific location, they are missing access to data on their inventory levels, as a whole; stock cards would at least provide this.

3PL

Current State

At the time of the assessment, Ximex Delivery Express (Ximex) had been identified as the winner of the current 2014 contract; but, because of some contracting issues, the award has not completed. In the interim, another 3PL provider—Air21—was asked to take over and do some of the storage and distribution for the DOH. After the contract issues are resolved, Ximex will continue as the DOH 3PL provider. They have had the contract for the past two years.

Ximex, established in 1988, is primarily a domestic cargo forwarding and trucking company. It has three regional hubs in Luzon, Visayas, and Mindanao; and 24 branches located nationwide. The Tanyag warehouse has about 8,500 square meters (m^2) of rented space, of which 5,000 m^2 is covered. The Bagumbayan warehouse has 800 m^2 of covered cold space, which the DOH primarily uses. The company-owned warehouse in Laguna has a covered area 1,000 m^2 and they have another 5, 000 m^2 of covered space in Balut, Tondo. Appropriate and functioning racking and warehouse equipment was observed, as well as good warehouse storage and safety practices. They are currently applying for IS0 9001. They passed the first stage of the audit and were recommended for the second stage audit.

Ximex has a homegrown WMS—eWarehouse; but, they notified the team during the assessment that they will soon transfer to the commercial off-the-shelf application—Infor WMS (formerly called the EXCEED WMS system). They also have a track and trace system—eCargo—that can track shipments. They are currently developing eCargo 2 at the request of another client, GLOBE telecom, who want more visibility into milestones during the delivery process. They are also developing an application that will include a photo capability to show who accepted the delivery.

The process below shows how the DOH (LMD) initiates a delivery with Ximex for its intended destination. It should be noted that the LMD, in general, confirmed this process; the delivery notification and reporting are not always completed in a timely, reliable, or useful way, according to the LMD and programs.

1. DOH calls Ximex and requests a pickup (usually one day in advance).
2. Ximex dispatches the appropriate size truck.
3. Ximex reviews product to be shipped with the DOH.
4. DOH fills out the B/L and the IRP.
5. Ximex checks the product to ensure it matches the B/L and IRP.
6. Ximex takes the product back to the warehouse and enters the B/L and IRP into the eCargo track and trace.
7. Ximex then consolidates and creates the house way bill and the shippers instruction commodity content (SICC) and ships it to their regional warehouse.
8. After the delivery is complete, the deliverer sends a text to confirm the delivery to the eCargo system.
9. The original proof of delivery (POD) is sent back to Ximex; it is then sent to the DOH along with the invoice.
10. Ximex sends daily reports to warehouse staff at LMD via email; they are pulled from eCargo and lists, by tracking number, what deliveries have been made.
11. If issues arise, a corrective preventative action report (CPAR), records and corrects any incidents.

Challenges

Overall, the 3PL provider, Ximex, appears to have well-functioning warehouse and transportation operations, serving many commercial clients, in addition to the DOH. A few challenges were identified at Ximex; some were internally driven and some were driven by the LMD and DOH.

Internal

Ximex is actively trying to switch from their homegrown WMS to a commercial off-the-shelf system. Transitions from one WMS to another can be quite lengthy and could cause a disturbance in the level of service for all their customers, including the DOH.

Another challenge the team observed was that it was clear from conversations with the LMD they do are not using the data Ximex is sending very often. Several reasons could explain this; but, notably, it does seem that Ximex is sending a lot of data that is not presented in a manner or form that the LMD can quickly and easily digest. Ximex should be able to send information to its customers that is clear, well presented, specific, and related to the requirements. In this case,

daily/weekly reports on shipments sent out and shipments delivered would be expected, in addition to seeing stock reports for any DOH-owned product.

In addition, it appears that Ximex is agreeing to deliverables and expectations they know they cannot achieve. Currently, Ximex is offering the DOH free storage for longer periods. They have also, contractually, agreed to have barcoding as part of the service they provide to the DOH. However, during the conversation with Ximex, and during the walk-through of their warehouse, it was clear Ximex does not have barcoding capabilities.

External

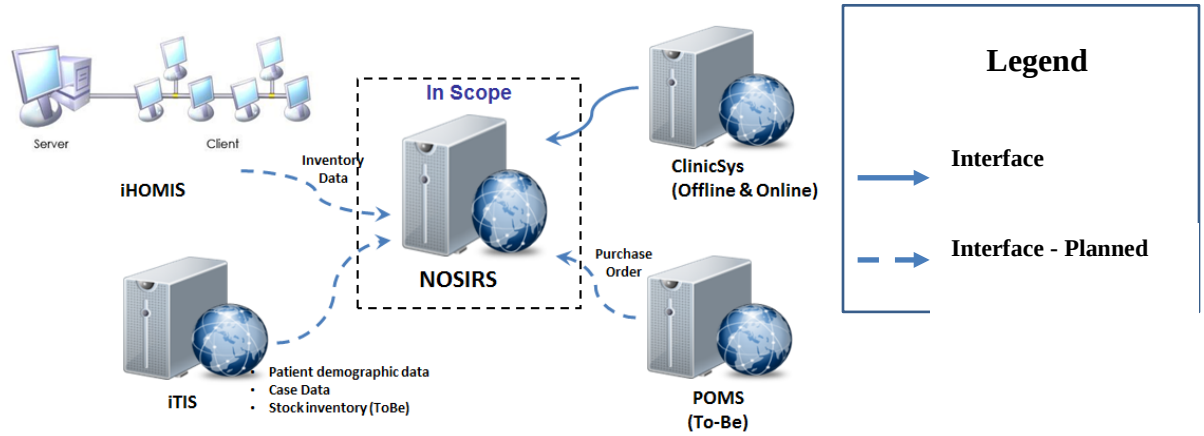
Ximex faces several external challenges that hinder their ability to perform. Currently, when the LMD prepares a shipment for Ximex to pick up, they call Ximex the day it is ready and the LMD expects a pickup the next day. While the LMD expects pickup the next day, there is no contractual language that states how long Ximex has to arrive before they are considered late. The next day expectation places an unrealistic expectation on Ximex, and the lack of clarity and agreement on the time limit to pickup shipments ready for distribution leaves both parties dissatisfied.

Another external challenge Ximex faces is the increased number of pickup locations the LMD currently has and continues to add. Currently, the LMD maintains four warehouses; they will have another two outsourced warehouses that stock all the product Ximex must pickup for distribution. With Ximex picking up product from six warehouses, communications and efficiency may be an issue.

DOH MIS Review

During the initial assessment of the Philippines DOH, the team reviewed both paper-based and automated LMIS. The team was asked to focus on the NOSIRS, because the DOH has officially endorsed it and it is being deployed in the whole country, although is still under development. Overall, the team identified five separate applications that were being used: NOSIRS, iHOMIS, iTIS, CLINICSYS, and Procurement Operations Management System (POMS) (see figure 5).

Figure 5. Philippines DOH As-Is Application Topology



iHOMS: An integrated information system used by government hospitals to manage aspects of hospital operations, like administrative, financial, medical, and service processing.

iTIS: A web-based system and a tool for data collection, processing, reporting, and use of the information needed to improve TB control effectiveness.

ClinicSys: This system was developed as a tool to efficiently and effectively monitor patient cases in the rural health units or health centers.

POMS: The Procurement Operations Management System is currently under development.

Note: Because these other systems were not considered to be supply chain applications, the focus of the team and this report is only on the NOSIRS application.

Strategic Level

The management processes of the LMIS ensures the overall management and governance of the electronically delivered LMIS.

Management processes

Strategy and planning

The *strategy and planning* management process delivers a structured approach to support business objectives and achieve program goals. Specifically, the strategy and planning management process would enable an organization to establish a long-term outlook in the development of its mission,

vision, and goals, as it relates to the LMIS environment—i.e., people, processes, and technologies. Key activities that the strategy and planning management process focuses on are—

- identifying program mission, vision, goals, and objectives
- identifying relevant legal, regulatory, and contractual requirements
- identifying management and functional requirements specific to LMIS clients (e.g., regional, provincial, and facility levels)
- identifying management and functional requirements specific to internal business (e.g., forecasting, procurement, warehousing, etc.)
- developing a strategic plan, operating model, and implementation plan to meet goals and objectives
- socializing and obtaining authorization for a strategic plan, operating model, and implementation plan
- reviewing and updating an implementation plan based on compliance/performance reviews and reports; or, as needed, due to changes in requirements.

STRATEGY AND PLANNING

OBSERVATIONS – LEVEL 2

1. DOH KMT currently has developed a strategic plan that defines the mission, vision, goals, and objectives.
2. Identified functional road map is available to strategically guide the LMIS process is not available.
3. Formal framework or process is not available to capture functional requirements as they relate to the LMIS clients.
4. Formal planning that relates to the LMIS is not available.
5. Structured approach (i.e., quantifiable metrics) are not available to identify and approve the organizational structure; such as staffing strategy, based on the growing needs of the KMT, and the support for the NOSIRS application.
6. A communication plan is not defined (e.g., communicating updates and changes to the field; communicating functional changes and updates to the NOSIRS application) to disseminate information in a timely manner.

Policy portfolio management

The policy portfolio management process delivers policies, standards, procedures, and guidelines needed to facilitate management and functional compliance and awareness. The process also provides the necessary structure and enforcement mechanism to ensure transparency and accountability in the LMIS.

The primary activities of this process include—

- identifying requirements for management and functional policies, standards, procedures, and guidelines

- defining and developing management and functional policies and standards
- developing management and functional procedures and guidelines to support the management and functional policies and standards
- obtaining authorization for management and functional policies, standards, procedures, and guideline; and communicate to all responsible parties
- reviewing and authorizing exceptions to policies and standards
- periodically reviewing/updating management and functional portfolio of policies, standards, procedures, and guidelines.

MANAGEMENT PROCESS: POLICY PORTFOLIO MANAGEMENT

OBSERVATIONS – LEVEL 1

1. Currently, defined inventory management policies are not available.
2. Distribution procedures and policies are not available.
3. Defined IT development policies, standards, and project management are not available.

Risk management

Because the introduction of any change to the operating environment may produce additional risks, an effective risk management framework ensures that a risk-based approach is embedded in the solutions used. It requires recognition by an organization that it operates in a complex and interconnected environment, using both—state-of-the-art and legacy—information systems that the stakeholders (e.g., regional, provincial user base, etc.) depend on to accomplish critical missions and to conduct important commerce.

Primary activities of risk management include—

- defining an overarching risk management methodology that consistently determines risks to the LMIS, process and technology assets, and the organization,
- conducting periodic risk assessments, based on capability maturity versus target states
- presenting risk assessment reports to management and receiving guidance on enterprise risk acceptance criteria
- evaluating risks and selecting controls for the treatment of risk
- presenting risk treatment options to management and obtaining acceptance of residual risk and authorization to implement approved treatments
- Periodically reviewing risk assessments and appropriately updating the functional components.

MANAGEMENT PROCESS: RISK MANAGEMENT

OBSERVATIONS – LEVEL 1

1. Strong dependency on NOSIRS, which has limited capacity to inform logistics decision making.
2. Defined IT risk management procedures and policies (i.e., resources, disaster recovery, availability) are not available.

Awareness training

Considered the first line of defense against possible attacks, awareness and training reduces the likelihood of unintentional security incidents, and also increases compliance with policies and guidance. All staff of the Knowledge Management team (KMT), contractors, and 3PL should receive regular awareness training, as appropriate for their job function.

A formal, documented awareness and training policy should exist and be enforced. The policy should address the purpose, scope, roles, responsibilities, management commitment, coordination among government entities, and compliance; in conjunction with formal, documented procedures to facilitate the implementation of the awareness and training policy and associated awareness and training controls.

Primary activities of awareness and training process include—

- identifying awareness and training requirements for the functional components of the LMIS: i.e., procurement process, application and data, infrastructure, operations, and security
- developing management and functional awareness and training to ensure all responsible parties are knowledgeable about their roles and responsibilities for compliance with policies
- coordinating the delivery of awareness campaigns across the organization through training programs and communications/outreach initiatives
- maintaining training records to measure the effectiveness of training
- reviewing and updating awareness training periodically, as needed.

MANAGEMENT PROCESS: AWARENESS TRAINING

OBSERVATIONS – LEVEL 2

1. Currently, they have train-the-trainer programs for NOSIRS.
2. Defined deployment training strategy, procedures, or processes are not available.
3. Sensitization in awareness or orientation strategy for leadership at the central, regional, and provincial levels are not available.

Performance management

Implementation of performance measures that indicate the effectiveness of management and functional controls applied to the LMIS allows the program performance to be measured against established metrics and goals. Such measures are used to facilitate decisionmaking, improve performance, and increase accountability. Effective performance management requires thorough collection, analysis, and reporting of relevant performance-related data—providing a way to tie the implementation, efficiency, and effectiveness of the LMIS management and functional controls to DOH's success in achieving its mission.

Key activities of performance management process are—

- developing and implementing a measurements and metrics program for management and technical summary reporting
- conducting periodic tests for the effectiveness of the management processes and functional components to determine if goals are being met and level of compliance.

  Examples include—
  - compliance evaluations
  - performance evaluations
  - technical testing: e.g., bandwidth performance/capacity, latency, vulnerability scans, and penetration tests
  - conduct periodic internal information security assessments and audits
  - prepare corrective and preventive action plans to address deficiencies
  - present reports, findings, and action plans during periodic management reviews
  - implement approved action plans and measure changes for effectiveness.

MANAGEMENT PROCESS: PERFORMANCE MANAGEMENT
OBSERVATIONS – LEVEL 1
1. A defined performance goals and objectives are not available. 2. A Performance Monitoring Plan (PMP) is not available.

Functional components

The functional components examine the NOSIRS capabilities needed to support the LMIS and the system.

LMIS functions

The LMIS is the system of records and reports that supply chain workers use to collect, organize, and present logistics/supply data gathered across all levels of the system. Managers then analyze the gathered LMIS data to make decisions, improve functions, and coordinate future logistics actions in ways that will ultimately improve beneficiary service.

Maintaining accurate data and records is crucial for good supply chain management. The managers at any level of the system should be able to quickly and easily report the available stock for any item.

MANAGEMENT PROCESS: LMIS FUNCTIONS

OBSERVATIONS – LEVEL 1

1. There are either no or limited documented minimum high-level requirements for NOSIRS as a logistics management information system:
    a. Requisition is not available.
    b. Limited receiving.
    c. No storage.
    d. No order processing.
    e. No transport/distribution management.
    f. No dispensing.
    g. No forecasting, supply planning, and pipeline monitoring.
2. No defined operating procedures for logistics system.
3. No ability to handle returned products.
4. Consumption data are not captured.
5. Adjustments are improperly categorized and captured.
6. Inability to use collected data for resupply, redistribution, forecasting, or management decisions (supervisions).
7. Inability to report stock status (months of stock [MOS]).
8. Does not generate essential logistics reports.
    a. Currently able to generate 5 reports (Available Stocks per Facility, Zero Stock per Facility, Summary - Available Stocks per Commodity, Near Expiry Commodity, Stock Card)
    b. The following minimum reports are missing:
        i. Consumption
        ii. Stock status (Ministry of Health)
        iii. Stocked according to plan (i.e., per facility, per level, per product, etc.)
        iv. Overstock/understock rate
        v. Stockout rate
        vi. Reporting rate
        vii. Adjustments summaries
        viii. Discrepancies: ordered versus supplied
        ix. Distribution discrepancies
        x. Emergency order
    c. NOSIRS is limited to issuing and receiving leading to stock-on-hand data
9. Logistics reports are not transmitted to programs.
10. Does not have a designated LMIS leader/champion to provide oversight.

Application and Data

This section identifies what drives the application functionality and capability and data component. Areas to be addressed are requirements, application architecture, performance, and interfaces.

MANAGEMENT PROCESS: APPLICATION AND DATA

OBSERVATIONS – LEVEL 1

1. Currently, NOSIRS is a silo-ed application. Does not interface with other applications (iTIS, etc.), which results in no sharing of data.
2. The system has limited reporting capabilities.
3. NOSIRS currently has only one direct interface to the ClinicSYS application, which is a one-way feed of information to NOSIRS.
4. NOSIRS does not have dedicated servers for each of the components (e.g., the web, application, and database servers are shared).
5. Structured testing methodology is not being utilized (e.g., no regression testing of application prior to production release).
6. Currently, NOSIRS does not provide adequate end-user response time when operating within the system.

Infrastructure

The infrastructure design and planning provides a framework and approach for the strategic and technical design and planning of the DOH infrastructures. It includes the necessary combination of business (and overall information technology [IT]) strategy, with technical design and architecture.

Key outputs from design and planning are—

- information, communication, and technology (ICT) strategies, policies, and plans
- the ICT overall architecture and management architecture.

MANAGEMENT PROCESS: APPLICATION AND DATA

OBSERVATIONS – LEVEL 1

1. Limited Internet access at the regional, provincial, and facility levels.
2. Limited computers.
3. Unstable and inconsistent power.
4. Servers are being shared across multiple applications and databases, resulting in potential performance degradation.

Operations

The operations component defines and establishes the requirements for the support that the NOSIRS application environment necessitates, after it is in operational mode.

Key activities comprising operational components are—

- establishing a methodology and structure to manage and support the NOSIRS production environment with the appropriate level of skilled people, tools, and procedures
- establishing a strong governance program to manage the NOSIRS application (e.g., define and develop service-level agreements)

- balancing the business requirements between all stakeholder groups (e.g., central, regional, provincial, etc.) and ensure the NOSIRS application is operating effectively and efficiently
- ensuring a periodic comparison of business needs with the new functionality available
- establishing a comprehensive, scalable support team to provide the day-to-day support needs of the diverse NOSIRS application and business requirements (i.e., employ a staffing strategy that supports the progressive growth in the use of the NOSIRS application)
- establishing a work environment that fosters the sharing of knowledge and resources across all applications and leverages understanding of technical, functional, and integration knowledge
- establishing and maintaining end-user system knowledge by providing ongoing training and help desk support.

For application and infrastructure load spikes, and to forecast network utilization, consistently monitoring network usage via automated tools ensures the impact to the NOSIRS application is promptly addressed.

MANAGEMENT PROCESS: OPERATIONS

OBSERVATIONS – LEVEL 2

1. NOSIRS support is available, but limited resources available to assist in resolving issues in a timely manner.
2. Currently, the NOSIRS team consists of 10 total resources for development, testing, training, and help desk support.
3. A formal mechanism or process to proactively monitor and track IT related issues is not available.
4. A structured process or procedures for providing help desk support is not available.
5. A structured process or procedures for software change and release management is not available.

Security

The assessment of the security component comprises five key functional areas, including identity and access management, physical security, communications and operations management, incident management, and business continuity management. The Philippines DOH was only evaluated on four of the core areas because of time constraints.

The Identity and Access Management (IA&M) component establishes and defines the access control requirements, which should be implemented through a policy. Additionally, the IA&M component comprises the following activities:

- Define and communicate to staff the responsibilities for password selection and use.
- Control and monitor access to networks and network services.
- Control and monitor operating systems and administrative rights.
- Applied session time-outs and invalid attempt limits to sensitive systems.
- Encrypt passwords in storage and in transit.

- Ensure that all individuals accessing the system have unique user IDs.
- Ensure that a user or a computer on the network has the capability to identify via logs.
- Apply the principle of least privilege to sensitive systems (e.g., black box) and data access.
- Restrict direct access to the most sensitive systems using limited network segmentation.

The physical security component has two distinct activities: (1) prevention of unauthorized access or damage to the physical location of the server room and; (2) equipment security to prevent loss, theft, or compromise of assets and the disruption of business. These activities can be further divided to specific measures, as below, that an organization should employ to ensure the physical access to the NOSIRS application is granted only to authorized individuals and there is robust protection in place to keep NOSIRS equipment safe-guarded against vulnerabilities and threats.

- Control perimeter security for offices/data processing centers by key lock systems, small fixed-post guard operations, intrusion detection, and closed circuit television (CCTV).
- Limit access/package delivery by entry controls, manned reception/loading areas, and a credential/sign-in system.
- Design and equip facilities to afford protection against external/environmental threats: e.g., fires, explosions, floods, high winds, industrial accidents, etc.
- Maintain and physically protect assets/equipment and data against damage, theft, or compromise.
- Employ physical measures to protect assets/equipment and data from loss due to failures in the supporting infrastructure.
- Ensure cabling is secure: e.g., exposed cables.
- Maintain all the equipment: e.g., maintenance of infrastructure, servers, air conditioning, and power supply.

The information security incident management component reports, handles, and reviews incidents and maintains forensic evidence.

Key activities that incident management component focuses on are to—

- Define and communicate incident/vulnerability detection, prevention, and reporting procedures.
- Define and communicate response obligations/restrictions to staff.
- Base incident identification on industry-defined threat and vulnerability taxonomies.
- Coordinate incident response and management across the enterprise.
- Obtain and document operational authority to shut down: via service-level agreements (SLAs)
- Deploy tools to detect and initiate responses to intrusive internal scans or malicious events.
- Formally define event response processes, reports, root cause analyses, and lessons learned.
- Ensure response staff are aware of current and evolving legal requirements.
- Response team has a contact list of key internal and external stakeholders: e.g., vendor support hotlines, etc.

The business continuity component identifies potential impacts that threaten an organization and provides a framework for building resilience and the capability for an effective response that safeguards the interests and the reputation of an organization.

- Document and exercise business continuity procedures, IT disaster recovery procedures and plans, and standard operating producers (SOPs).
- Document and update periodically, to ensure it is current, a call tree—contact list with current contact information—of all key internal and external stakeholders that must be contacted during a continuity operation.
- Document and make available a comprehensive emergency management plan.
- Ensure that a mandatory business continuity (BC) management, information technology/disaster recovery and emergency management training is available for all staff, based on roles and responsibilities.
- Ensure adequate resources are available not only to develop and maintain BC plans, but are available and operational during recovery, as well.

MANAGEMENT PROCESS: SECURITY

OBSERVATIONS – LEVEL 1

1. NOSIRS production website it not using HTTPS.
2. Data encryption is not being used.
3. Minimum security mechanisms have been defined or implemented for NOSIRS (i.e., user login/password)
4. User access is granted via paper form request. User ID's are automatically system generated.

Application Level

The NOSIRS application was developed using an open source programming language—PHP—which was designed for web development, but is also used as a general programming language.

The infrastructure used to operate the NOSIRS application is based on the following:

- Intel Xenon
- 38 GB RAM
- 1 TB of HD storage
- Windows Server 2008 R2 Enterprise Edition.

Design Qualities

Maintainability is the ability of the system to undergo changes with a degree of ease. These changes could impact components, services, features, and interfaces when adding or changing the functionality, fixing errors, and meeting new business requirements.

APPLICATION LEVEL: MAINTAINABILITY

OBSERVATIONS – LEVEL 3

1. Development uses PHP, an open source development language, which allows for easy functional updates and potential migration to another platform.
2. Database is also an open source database management system (DBMS) with enterprise level capabilities and, if needed, easily transitioned to a commercial-based DBMS.

Reusability defines the capability for components and subsystems to be suitable for use in other applications and in other scenarios. Reusability minimizes the duplication of components and also the implementation time.

APPLICATION LEVEL: REUSABILITY

OBSERVATIONS – LEVEL 3

1. Programming language being used is a standard across the evaluated applications that allows for code portability

Run-Time Qualities

Interoperability is the ability of a system or different systems to operate successfully by communicating and exchanging information with other external systems written and run by external parties. An interoperable system makes it easier to exchange and reuse information internally, as well as externally.

APPLICATION LEVEL: INTEROPERABILITY

OBSERVATIONS – LEVEL 2

1. Currently, NOSIRS does not have any interfaces.
2. Can interface with other applications using standard data interfacing protocols.

Scalability is ability of a system to either handle increases in load without impacting the performance of the system, or the ability to be easily expanded.

APPLICATION LEVEL: STABILITY

OBSERVATIONS – LEVEL 3

1. Can easily add on additional functionality, but may require additional time and effort for added functionality.
2. Currently, the application is running very slowly, which could result from external factors, but could be addressed through proper testing.

User Qualities

Usability defines how well the application meets the requirements of the user and consumer by being intuitive, providing good access for users, and resulting in a good overall user experience.

APPLICATION LEVEL: USABILITY

OBSERVATIONS – LEVEL 1

1. Currently, the application only provides two functions—receiving and issuing stock/commodities.
2. Application is not intuitive to use.
3. Application has shown poor performance in refreshing the screen and accessing data.
4. Application menus are not consistent with the functions labeled in the menu.

Recommendations

The following section provides short-term and strategic recommendations. In addition to listing the next steps, the short-term recommendations also identify the assistance that should be provided to the Philippines DOH to follow the recommendations. The success of implementing the short-term recommendations, however, depends on changes related to the overall design of the supply chain, which is the focus of the strategic recommendations.

Short-Term Recommendations

DOH Distribution

Based on the information gathered through interviews with the LMD, programs, and the 3PL, in addition to a review of the contract with Ximex, the assessment team's recommendations are to do the following:

1. **Develop a monitoring/evaluation management plan for the LMD to monitor the distribution of all products, including the 3PL performance; the LMD will be responsible for carrying it out.**

   The monitoring/evaluation plan should include, in addition to the indicators (1) targets that both the DOH and 3PL provider agreed on; (2) tracer products from each program that will be used for overall monitoring;[1] and (3) a schedule for when routine data will be provided by the 3PL and how often LMD will do physical stock checks at warehouses. Because the 3PL is being assessed, staff within the LMD must carry out the routine monitoring.

   Illustrative indicators are provided in table 4. Before finalizing any indicators for the evaluation of the 3PL performance; however, it will be important to review, revise, and add any additional indicators to ensure that they monitor and measure the key concerns of the DOH and align with the performance goals of the DOH. (This assumes that the DOH has their own distribution-related performance goals that they are tracking; the 3PL goals can be linked and aligned to them.)

[1] Tracking indicators and doing stock checks for all products will be very time consuming and will overburden the assessment, which is why tracer products are recommended.

Table 4. Recommended Indicators for Monitoring of 3PL, Data Source, and Targets

Indicator	Data Source	Targets (recommended)
Warehousing/Storage		
Inventory accuracy rate	Stock on hand & physical stock checks	100%
Order processing time	IRP issue date & track and trace ship-out date	Based on region
Use of FEFO	Stock on hand & pick list	100%
On-time reporting	Date of submission of required warehousing reports	100%
Storage conditions	Visual check of space, storage practices, and temperature monitoring	95%
Value & qty. of product damaged (storage)	Stock on hand—losses & adjustments	zero
Transportation/Distribution		
On-time delivery	IRP issue date & POD date (signed invoice)	100%
Delivery accuracy	IRP & facility acceptance rate	100%
On-time reporting	Date of submission of required delivery reports	100%
Value & qty. of product damaged (distribution)	IRP & facility reported damages via POD	zero

.

2. **Review the data and sources currently available and identify required data points and sources**. The responsibility for monitoring the performance of the 3PL must fall with the LMD, rather than the 3PL provider. To measure the performance indicators, the LMD must have access to data from the 3PL provider. The 3PL provider should, therefore, be responsible for providing the LMD with key data points, such as stock on hand, date received, date issued, expiry date, dispatch reports, and delivery reports. The team recommends a thorough review of the data currently available to assess if any gaps in required information remain. If gaps and certain key pieces of information are not available, the LMD must work with the 3PL to determine how to resolve the issue.
3. **Strengthen the capacity at the LMD to conduct monitoring and to appropriately analyze the data.** The current capacity within the LMD to carry out the evaluation or routine monitoring is extremely limited. Appropriate staff should be hired for the specific role and trained to carry out the work.
4. **Establish feedback mechanisms.** The LMD must be able to communicate with the programs and Ximex, either through a monthly technical working group or routine reporting to the programs.

Recommended immediate next steps: *The team recommends providing additional assistance to the LMD, because of the current issues with capacity—to determine the best set of indicators, set initial targets based on a review data and sources currently available, and establish the monitoring plan.*

DOH MIS

The following section focuses on recommended steps forward for potentially implementing an eLMIS application that will support the supply chain (see table 5). Before implementing any of the

following recommendations, to own the development of the following logistics-related activities and processes, a core group of three to five logistics subject matter experts (SMEs) within the DOH will need to be established.

Table 5. Recommended Steps Forward for Implementing an eLMIS Application

	Summary of Recommendation	Impact
1.	Redesign/update the overall LMIS, identify the minimum recommended high-level requirements and logistics reports; and capture the necessary data elements for reporting purposes.	**High**
2.	Develop a strategic roadmap (functional and technical) that includes all the necessary steps.	**High**
3.	Setup and resource an IT Program Office.	**High**
4.	Expand NOSIRS ▪ Organize management and oversight bodies (project management, CCB, change management, risk management, etc.).	**Medium**

1. **Redesign/update the overall LMIS, identify the minimum recommended high-level requirements and logistics reports, and capture the necessary data elements for reporting purposes—HIGH.**

After a core group has been established, a formal review of the current business processes and existing tools—i.e., SMRS and Contraceptive Distribution and LMIS (CDLMIS)—should be done. During the business process review, business requirements and essential data elements should be identified and captured as formal business requirements. Similarly, the review of existing tools, such as SMRS and CDLMIS, should reveal any gaps in collecting essential logistics data and their ability to feed into NOSIRS. After the business process and data elements have been identified and agreed-upon, a road map should be developed to ensure proper planning, training, and roll out of the identified functionality and reporting.

2. **Develop a functional and technical strategic roadmap that includes all the necessary steps—HIGH.**

In conjunction with the MIS recommendation #1, after the high-level functional requirements have been identified, a strategic roadmap should be developed, in alignment with the organizational goals and objectives. After the roadmap has been approved, the IT development team will be able to work against static requirements and plan accordingly for design, development, testing, training, and deployment. As a result, this will assist in the overall end-user acceptance of the application.

3. **Setup and resource an IT program office—HIGH.**

The intent of the IT program office is defined as—

Program management is tied to distinct deliverables and targets **and** to the overall effect on organization, organizational strategy, and fulfillment of corporate strategy.[2]

[2]Project Management Institute –PMBOK

As an initial step to setting up a program office, governance will need to be slowly incorporated into the organization. The development and implementation of processes and procedures to control operations and changes to performance objectives are required. At a minimum, the following policies/procedures should be defined and implemented:

- communications plan
- software change management plan
- release management plan
- deployment plan.

As policies/procedures are being defined and implemented, the IT organizational structure should begin to be identified. Currently, there is only one person, the program manager, leading the KMIS team; additional resources should be hired to support her in the following areas:

- Design and planning: This team will assist the program manager in executing governance activities; this team should include—
  - Business analysts from each major area of the organization: this group will also comprise the requirements analysis/design team. This team would serve as a dual-purpose team that works with the logistics management team (ideally, the LMU or logistics functions SME) to obtain and understand the functional requirements of the logistics management system that is to be implemented into NOSIRS; they will also assist and act as the lead for system testing of the NOSIRS application, after any development has been completed.
- Deployment management: This team should develop and implement a framework for the successful management of the test and roll out (deploy) of projects within the overall program. This particular group should have many project management skill sets, including release management. This team should include the following:
  - Testing lead and team: This team currently exists but should comprise separate individuals from the development team. This team will be responsible for the complete end-to-end (system) testing of any new developments, modules, and functionality to the NOSIRS application. The requirements analysts can either act as the test leads for the testers, because of their deep knowledge and understanding of the functional requirements. The test team should include people that understand the importance of testing and the various iterations of testing, such as regression testing, performance testing, etc.
  - Change Control Board (CCB). This committee makes decisions regarding whether or not proposed changes to the application should be implemented into NOSIRS. This will assist in the control and regulation of what functionality is to be implemented, thus providing timely application release schedules, project schedules, and project budget.
- Technical support/help desk: This currently exists, but this team should be separated from the developers and analysts. The team acts as a dedicated 2nd-tier support to the applications that have been deployed. The responsibilities of this group are to provide immediate resolutions for the issues that are presented to the end-users. If the help desk

cannot provide a resolution, then they are to work with the development team in finding a resolution as quickly as possible, and then present the solution to the end-user.

- Training lead and team: This team will be responsible for the training and communications of any new functionality to the NOSIRS application.

Strategic Recommendations

Throughout the course of both the 3PL distribution assessment and the MIS review, it became clear to the team that several opportunities to strengthen the overall supply chain were available. While these strategic recommendations do not directly address the issues of 3PL distribution and MIS, the team believes they are necessary to ensure that any supply chain interventions are effective and sustainable. These recommendations impact all supply chain–related activities and can be the basis for a well-organized, high-performing supply chain organization.

1. **Establish and develop a logistics management unit (LMU) that is responsible for all supply chain functions.**

   The key to building sustainable logistics systems is recognizing and investing in the human resources and the necessary management structures required to effectively and efficiently manage these systems. A single LMU is a management structure responsible for organizing, monitoring, and supporting all supply chain activities within the logistics system—e.g., strategic planning, performance management, MIS, forecasting, supply planning, warehousing and inventory control, and distribution/transportation—and it should be established within the DOH. Through a pattern of continuous improvement, the LMU identifies supply chain problems, develops interventions to address those problems, and implements those interventions. The LMU, typically based at the central level, should have both an operational and a strategic purpose. They are a vehicle to institutionalizing good supply chain management practices; they are involved in all logistics functions, linking upstream and downstream logistics activities. The LMU should be established and empowered through a DOH mandate and be appropriately placed within the DOH organization at a high enough level to have enough authority and impact. As part of the development of the unit, roles and responsibilities should be clearly defined, in addition to ensuring that the necessary staffing and resource requirements are met.

   An alternative to creating a stand-alone LMU, in the current context of the Philippines's DOH, would be to redefine and make official the mandate of the existing LMD. The LMD mandate should include the oversight, management, and implementation of specific logistics responsibilities—those of a typical LMU—agreed-to by the DOH as a whole. For example, for distribution, the LMD would need to be responsible for or input into determining vendor delivery schedules, distribution schedules for all programs, and warehousing and inventory management responsibilities for all programs. In addition, they would have to play a key role in streamlining and integrating the LMIS used by the LMD and programs.

2. **Redesign the public health logistics system.**

   To ensure a well-functioning integrated supply chain, the current system should be redesigned. This would entail establishing new minimum and maximum stock levels; and ordering and resupply procedures at all levels of the system—i.e., central, provincial, and municipality. In addition, proper tools for data collection, reporting for ordering and resupply, and feedback at the appropriate level should be redesigned to meet the new system's requirements. Furthermore, as part of the restructuring, all logistics management SOP manuals and supportive supervision

processes and materials would need to be reviewed and updated. Finally, a training curriculum that would include both a trainer-of-trainers (TOT) curriculum and roll out plan would need to be developed; and the appropriate staff, at all levels of the system, would need to be trained in health commodity management.

3. **Increase the use of data for decisionmaking at all levels and build national capacity.**

   Increasing the use of data for decisionmaking, at all levels; and building national capacity can be accomplished by developing a regular user-friendly interface between the LMIS, forecasting updates, and supply plans updates, as well as expanding automation at all levels of the supply chain, where appropriate. In addition, the use of pipeline monitoring data and updated supply plans within relevant logistics programs and logistics entities should be instituted and become routine practice. Finally, relevant staff should be trained to conduct forecasting and supply planning exercises, according to standard best practices—e.g., using programs, such as Quantimed and PipeLine.

Appendix A: Assessment Schedule

DATE/DAY	MEETING/ACTIVITY
December 2 Tuesday	Meeting with HPDP2-*Orville Solon, Allan Millar, Ed San Juan, Alex Rosete, Daryll Naval, Kristine Funtanilla*
	Site visit to Quirino Warehouse (LMD)
December 3 Wednesday	Meeting with DOH Women and Men's Health Division, Child Health Division- *Dr. Sally Paje (Family Planning), Dr. Anthony Calibo, (Newborn Care) Ms. Lita Orbilla (Micronutrients)*
	Meeting with DOH Logistics Management Division and DOH Information Management Service-*Alan Pasumbal (Head, Logistics Management Divison), Dave Masiado, OIC, and Ferdie Dela Cruz, Warehouse Manager, and Ms. Cherry Esteban (IMS)*
December 4 Thursday	Meeting with TB Program Manager- *Dr. Celine Garfin.*
	Meeting with National Center for Pharmaceutical Access (NCPAM)- *Ms. Sarah Millena (designated representative of Dr. Melissa Guerrero OIC Director)*
	Meeting with LuzonHealth, VisayasHealth, MindanaoHealth- *Ms. Noemi Bautista (LH) Dr. Gerry Cruz (VH);*
December 5 Friday	Meeting with **Ximex** *(Noel Pilapil, Account Manager for DOH)*
	Meeting with **AIR21** at Taguig Warehouse *(Tony Belo, Account Manager for DOH)*
	Meeting with UNFPA
December 8 Monday	***Meetings cancelled due to Typhoon Ruby***
December 9 Tuesday	Meeting with LMD- *(Dave Masiado, OIC, and Ferdie Dela Cruz, Warehouse Manager)*
	Meeting with DOH Assistant Health Secretary for Logistics- *Blessilda Guttirez,*
December 10 Wednesday	Meeting with Bulcan Province Health Office
	Meeting with Municipal Health Office/Rural Health Unit team in Pandi, Bulucan Meeting with Municipal Health Office/Rural Health Unit team in Angat, Bulucan
December 11 Thursday	Meeting with SIAPS and Impact-- *Ms. Zaza Munez and Princess Catheirne Mangao, (SIAPS)*
December 12 Friday	Debriefing with USAID
	Debriefing with DOH

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

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