Supply / Logistics Management System Assessment

Second Draft
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<thead>
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<th>ACRONYMS</th>
<th>Description</th>
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<tbody>
<tr>
<td>AAT</td>
<td>Award/advance Acceptance of Tender</td>
</tr>
<tr>
<td>ADR</td>
<td>Adverse Drug Reaction</td>
</tr>
<tr>
<td>ARI</td>
<td>Acute Respiratory Infection</td>
</tr>
<tr>
<td>BHU</td>
<td>Basic Health Unit</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CPOES</td>
<td>Computerized Physician Order Entry Software</td>
</tr>
<tr>
<td>DHIS</td>
<td>District Health Information System</td>
</tr>
<tr>
<td>DHO</td>
<td>District Health Officer</td>
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<tr>
<td>DHQ</td>
<td>District Health Quarter Hospital</td>
</tr>
<tr>
<td>DDHO</td>
<td>Deputy District Health Officer</td>
</tr>
<tr>
<td>DOH</td>
<td>Department of Health</td>
</tr>
<tr>
<td>DOS</td>
<td>Days of Stock-out</td>
</tr>
<tr>
<td>DRAP</td>
<td>Drug Regulatory Authority of Pakistan</td>
</tr>
<tr>
<td>DT</td>
<td>Dispersible Tablet</td>
</tr>
<tr>
<td>DTL</td>
<td>Drug Testing Laboratory</td>
</tr>
<tr>
<td>EDL</td>
<td>Essential Drug List</td>
</tr>
<tr>
<td>EMA</td>
<td>European Medicines Agency</td>
</tr>
<tr>
<td>EML</td>
<td>Essential Medicines List</td>
</tr>
<tr>
<td>EPI</td>
<td>Extended Program of Immunization</td>
</tr>
<tr>
<td>FATA</td>
<td>Federally Administered Tribal Areas</td>
</tr>
<tr>
<td>FP</td>
<td>Family Planning</td>
</tr>
<tr>
<td>FP&amp;PHS</td>
<td>Family Planning and Primary Healthcare Services</td>
</tr>
<tr>
<td>GAPPD</td>
<td>Global Action Plan for Pneumonia and Diarrhea</td>
</tr>
<tr>
<td>GMP</td>
<td>Good Manufacturing Practices</td>
</tr>
<tr>
<td>HANDS</td>
<td>Health and Nutrition Development Society</td>
</tr>
<tr>
<td>HF</td>
<td>Health Facility</td>
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<tr>
<td>HIMS</td>
<td>Health Information Management system</td>
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<tr>
<td>HISDU</td>
<td>Health Information and Service Delivery Unit</td>
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<tr>
<td>iCCM</td>
<td>Integrated Community Case Management</td>
</tr>
<tr>
<td>IHS</td>
<td>Integrated Health Services</td>
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IRMNCH&NP Integrated Reproductive Maternal Newborn Child Health and Nutrition Program
KP Khyber Pakhtunkhwa
LMIC Low and Middle Income Countries
LMIS Logistic Management Information system
LMU Logistics Management Unit
Lo-ORS Low Osmolarity Oral Rehydration Solution
LSAT Logistic System Assessment Tool
LP Local Purchased
LHW Lady Health Worker
MICS Multiple Indicator Cluster Survey
MOU Memorandum of Understanding
MEA Monitoring and Evaluation Assistant
MIS Management Information System
MNCH Maternal, Newborn and Child Health
MSH Management Sciences of Health
MO Medical Officer
NEML National Essential Medicines List
ORS Oral Rehydration Solution
P&SHD Primary and Secondary Healthcare Department
PITB Punjab Information Technology Board
PPPs Public Private Partners
PPHI Peoples Primary Health care Initiative
PPHSS Punjab Public Health Sector Strategy
RHC Rural Health Center
SCMS Supply Chain Management system
SDG Sustainable Development Goals
SHC&ME Specialized Healthcare and Medical Education Department
SOP Standard Operating Procedure
SRO Stringent Regulatory Ordinance
THQ Tehsil Head Quarter Hospital
US Under 5 years
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Name</th>
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<tbody>
<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>USFDA</td>
<td>United States Food and Drug Administration</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>WHOLIS</td>
<td>World Health Organization Library Information System</td>
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1 EXECUTIVE SUMMARY

1.1 Background
UNICEF and Bill and Melinda Gates Foundation established a partnership to contribute to increase the child survival in Pakistan. MG (Melinda Gates) Foundation achieved their goal by improving the process of diagnosis and treatment of pneumonia and diarrhea in children less than 5 years of age. The Project named as “Accelerating policy change, translation and implementation for pneumonia and diarrhea commodities in Pakistan”, is likely to be implemented in Pakistan with coordination with the Government of the country. It also involves the relevant stakeholders to ensure sustainable changes.

Pakistan has the third highest rate of maternal, fetal, and child mortality in the world\textsuperscript{1}. According to the research in 2010, the mortality rate of children under five (U5) is 89 deaths per 1,000 live births, with 1 in every 11 Pakistani child not surviving to their fifth birthday. Each year, approximately 91,000 children die of pneumonia and 53,300 children die of diarrhea. According to Demographic Health Survey of Pakistan 2012-13 shows a low proportion of children are receiving appropriate treatment. Only 38% of children suffering from diarrhea are properly treated with Oral Rehydration Solution (ORS) and 1.5% received Zinc. Nearly half of children suffering from pneumonia received suitable antibiotic. One out of nine children receives no treatment for diarrhea and 59% of them remain untreated for pneumonia.

1.2 Purpose
The pharmaceutical logistics assessment of Pakistan was carried out through UNICEF and Bill Melinda Gates Foundation. The purpose of the assessment was focused for Department for Health, Sindh and Punjab. A provincial level assessment has also been conducted for Khyber Pakhtunkhwa, Baluchistan and FATA.

The main purpose of the assessment was to provide the quantitative data on the supply of selected medicines and commodities at public health facilities and private pharmacies. The assessment was conducted to provide an in-depth information of the situation for further

\textsuperscript{1} Reproductive, maternal, newborn, and child health in Pakistan: challenges and opportunities: Health Transitions in Pakistan, The Lancet Volume 381, No. 9884, p2207-2218, 22 June 2013
analysis to pharmaceutical supply chain management system at all levels i.e National, Provincial, District, Sub-district levels. The health service delivery level includes central warehouse at district level, medicines store at health facility level and private pharmacies. Vertical programs (IRMNCH & NP, National Program, MNCH) were also assessed to provide the baseline information to track changes and improvement in pharmaceutical supply chain management system. Certain measures at local level production should be taken in order to attain sustainable conditions for new formulation of diarrhea and pneumonia in Pakistan. The study also provides the base line knowledge for the registration of new formulations (Amoxicillin DT and combo pack of ORS & Zinc supplementation) with Drug Regulatory Authority of Pakistan.

DOH and development partners required this information to explore national/provincial drug requirements and to measure the performance of logistics supply chain system. Moreover, they wanted some basic information regarding the duration of availability of essential medicines for diarrhea and pneumonia at health facilities and the reasons of stock outs.

1.3 Objectives
The supply chain management system assessment has following objectives

- To analyze the current supplies logistic system for pneumonia and diarrhea management through in-depth situation Analysis for public sector health facilities and vertical programs dealing in management of diarrhea and Pneumonia.
- To consult with Key opinion leaders’, decision makers and other stake holders to discuss the existing logistic systems for the procurement and distribution of pneumonia and diarrhea medicines within the country especially in - Sindh and Punjab provinces.
- To give practical and logical recommendations to the stakeholders on how updated logistic management information system (LMIS) can be introduced in supply chain management for forecasting, procurement, inventory management, warehousing and distribution and also on linking of revised DHIS tools with LMIS.

1.4 Methodology
The methodology of assessment is based on mixed analysis that is quantitative and qualitative. The quantitative analysis is established on the data derived from the Logistics
System Assessment Tool (LSAT) developed by USAID Deliver Project recommended by WHO for the assessment of logistics / supply chain management of medicines. However, the qualitative analysis was based on the information gathered through in-depth interviews on the desk review. Following are the categories of indicators:

i. Policy, legislation and regulation
ii. Product selection
iii. Organization and staffing
iv. Logistic management information system
v. Forecasting
vi. Obtaining supplies / procurement
vii. Inventory control procedures
viii. Warehousing and storage
ix. Transport and distribution
x. Organizational support for logistics
xi. Product use
xii. Patient exit interviews
xiii. Private sector availability of services and medicines

1.5 Key Findings

In accordance with the scope of work for this assessment, the pharmaceutical LSAT was used to obtain baseline data for the indicators. The data collected for selected indicators is presented in various tables while the key findings are as follows:

1. All the Provincial procurement cells have facilitated the districts by providing central rate contract with prequalified firms except in Balochistan. The health department of Balochistan has central procurement of medicines. WHO recommended method of forecasting was not implemented in provinces.

2. The teaching hospitals where computerized inventory management software were implemented. For example, HF under the supervision of SHC&ME has shown better result in inventory management results based on LSAT assessment i.e 92%, comparing this with DHQ hospitals of Sindh, which were not facilitated with such interventions, has shown 52% result only.

3. In Sindh in LHW-LMIS it has been observed, where the definitions SCMS has been modified like the definition of availability of stock was “% of LHW who did not have logistics item available”, definition of opening stock balance was “% of LHW who did
not have opening balance available for logistic item”. Even the DHIS does not give the
clear picture of the stock status of tracer elements. Furthermore, the LMIS from
health facilities was not web based. The LMIS program of LHWs does not report the
stock status of Amoxicillin suspension and Zinc supplement.

4. In the public health supply chain system, frequent stock outs were reported.
Medicines forecasting was based on Consumption methodology which does not fulfill
WHO recommendations. Khyber Pakhtunkhwa, however, has adopted mix method
approach of medicines forecasting that is consumption + morbidity based forecasting.
In Punjab, E-procurement cell has developed the medicines forecasting which is also
based on consumption method. By and large, in the vertical program the reasons for
stock out were common in all provinces.

5. Bulk orders were given to the prequalified manufacturers who were responsible to
supply the medicines to all the districts simultaneously. The supplies, however, were
not made within agreed time which was one of the contributing factors of stock out.

6. In Sindh, the medicines samples were not sent to the Drug Testing Lab for quality
assurance on frequent basis. They assumed that prequalified manufacturers do not
require laboratory analysis. Another reason was time required by the DTL for
submission of analytical reports.

7. WHO and NEML 2016 recommend solid oral dosage form of Zinc in the treatment of
diarrhea rather Zinc syrup. In government procurement Zinc Syrup is common as
compare to Zinc tablet that was only available at DHQ hospital Bahawalnagar Punjab.
Commercially, this syrup was only available in large pharmacies. Zinc syrup contains
sugar as sweetening agent which is not recommended by WHO in diarrhea because it
can cause osmotic diarrhea and hypernatraemia. The gap of availability of amoxicillin
suspension was observed during the assessment.

8. The drug registration process takes 3 to 4 years. Commercial market of Amoxicillin DT
and Zinc DT was not established yet. This situation, therefore, could not motivate
manufacturer to take interest and get their product registered with DRAP. The drug
law for Procedure for Registration of Drugs 2.(v) states “Provided that under special
circumstances to be recorded in writing, the Registration Board may register a drug
and require such investigations and clinical trials to be conducted after its
registration.” And 2. (ix) further states “Where it is necessary in the public interest so to
do, the Registration Board may register a drug on its own motion without having received any application for registration.”

1.6 Conclusion

1. The health system of Pakistan is devolved. The supply chain system of medicines is totally provincial subject. It was observed that overall the public health supply chain system in Pakistan was predominantly mixture of “push” and “pull” system. But in case of unavailability of demanded medicines it becomes “Push” system.

2. Successful development and implementation of inventory management software will facilitate the LMIS and the barriers in report submission could be resolved. It will lead to better healthcare service delivery and access to medicine. In Punjab, Prescription management information system, linked with LMIS is likely to produce more information for analysis including prescription behavior.

3. Many online links are required to develop an interlink of LMIS with DHIS. In DHIS reports quantities of tracer medicines were not shared. On the other hand, DOH does not have web based / computerized inventory management system. As a result, different master sheets with different SOPs may create difficulties in synchronizing the data, particularly in converting it to useful information.

4. The medicines forecasting and quantification should be based on the WHO recommendations to minimize the stock-outs. The gap of availability of tracer medicines should be covered.

5. The capacity of medicines stores at health facility level are enough for medicines supplies. The staff members who were handling the pharmaceuticals were not capable enough to understand and implement the WHO recommendations. Pharmacist were not frequently available for handling the medicines as per WHO recommendations.

6. The distribution of medicines from district warehouse to health facilities were not based on any forecasted criteria. Medicines were not distributed in the form of therapies / courses / kits rather unjustified proportions of medicines were distributed. Department of health do not have suitable vehicles for pharmaceutical transportation which creates hurdle in distribution plans.

7. The process of prequalification of manufacturers was not up to the mark. It does not help to accurately judge the production capacity of manufacturer due to which
medicines were not supplied within the duration of sixty day time period. The delayed supplies, thus, exerts an extra burden on medicines SCMS.

1.7 Recommendations

1.7.1 Immediate Recommendations

1. The health facilities should be provided a computerized / android LMIS, for inventory of tracer elements on immediate basis. The data should be compiled on daily basis. The inventory software should be capable to provide an automated stock out reports, expiry calendar, medicines forecasting, distribution and reorders.

2. Based on the morbidity data and stock out reports the medicines forecasting should use mix method to compare consumption method with morbidity method. Apart from that, the members of the procurement committee, physicians; with strong clinical knowledge and Hospital pharmacist should also be included for data collection and decisions.

3. Immediate steps should be taken for strengthening of DTL of Sindh; for quality assurance of medicines procured for public health facilities.

4. The basic technology and supported process for integration of LMIS with revised DHIS should be planned and designed. It should be aligned with continuous financial and technical support for implementation and maintenance. The plan should comprehend data mapping, system synchronization, software updates and customization. It should address other system disruption and stakeholder’s communication. The WHO definitions of “opening stock balance”, “stock out” and “stock on hand” should be used to create harmony and synchronization of LMIS with revised DHIS. The stock information of primary healthcare facilities required for Diarrhea and Pneumonia (Lo-ORS, Zinc Supplementation, and Amoxicillin suspension) could be linked with available LMIS.

5. As an interim measure, a master list of health facilities, commodities etc of partners, stakeholder and other who support the cause for diarrhea and pneumonia should be shared and synchronized till the interoperability layer can be added.

6. Based on WHO recommendations, Zinc DT should be used instead of Zinc syrup for the treatment of Diarrhea. WHO recommendations should be followed, in LHW kits,
Zinc syrup should be replaced with Zinc DT; along with easy handling of kit, and accuracy of dose will also be increased. It will help to reduce the transportation cost. The stock levels and consumptions of Zinc supplement and Amoxicillin suspension should be monitored by LHW program LMIS.

7. The distribution of medicine should be in the form of complete courses or Kits so that the STG should be followed. Medicines transportation system should be outsourced to companies like IRMNCH & NP in Punjab.

1.7.2 Medium term Recommendations
1. The integration process should be launched in the meeting with the stakeholders and should continue to have the follow up meetings on regular basis in order to share the updates. Memorandum of Understanding (MOU) should be developed for daily data-sharing interface between LMIS and revised DHIS. Stakeholders should be engaged with diverse expertise of clinical health practitioner, pharmacist, and statistician representing all the level of health system to develop a knowledge base and make it available on the dashboard.
2. During the consultation with the stakeholders, key performance indicators should be finalized and should be regularly monitored. This can be more helpful for further investigation and integration.
3. In integrated LMIS and DHIS, STG should be incorporated to develop an automated morbidity based method for medicines forecasting.
4. The process of registration of Amoxicillin DT and Co-packing of Lo-ORS and Zinc DT with DRAP should consider the privilege of law; as stated in 2.(v) and 2.(ix) and minutes of meeting of 248th Registration Board meeting case no. 5 i.e registration of 7.1% chlorhexidine digluconate gel registration. United States Pharmacopeia (Pakistan) should be involved in the process of registration.

1.7.3 Long term Recommendations
1. The software like “Prescription management Information System” has advantages over inventory management system but it should be modified, It should be upgraded to computerized physician order entry software (CPOES) approach. Such software can inform the physician while prescribing medicines about the safety of medicine during pregnancy or lactation, therapeutic dose, drug allergy, side effects,
drug-drug interaction, drug-food interaction etc. Adverse Drug Reactions Reports should also be included in it.

2. At DHQs and THQs, the availability of pharmacist showed better SCMS. Considering the number of outpatients or services delivered from RHC, Pharmacist should be provided and should be looked after the pharmaceutical activities in BHUs of catchment area of RHC.

3. The capacity of warehouses should be improved by purpose build warehouses or by providing racks suitable for large warehouse. Technical knowledge based on WHO recommendations of “Good Storage Practices” should be given to the warehouse staff for the handling of medicines.
2 INTRODUCTION

2.1 Background
UNICEF and Bill and Melinda Gates Foundation established a partnership, to contribute to increased child survival in Pakistan. This goal was achieved by improving the diagnosis and treatment of pneumonia and diarrhea in children less than 5 years of age. The Project “Accelerating policy change, translation and implementation for pneumonia and diarrhea commodities in Pakistan”, aimed to implement the policies to ensure sustainable changes. The M.G. Foundation worked with close coordination with the Government of Pakistan and the relevant stakeholders. It had an overarching goal to ensure that relevant national policies are revised, understood, and adhered to in order to ensure quality treatment and availability of the essential commodities for improving management of childhood diarrhea and pneumonia and increasing child survival by the end of 2019. The project also focused on incorporating pneumonia and diarrhea management commodities into essential medicine lists and advocates for increased resource allocation for commodities; It also catalyzed the initial stages of the commodities procurement process with the government authorities and pharmaceutical manufacturing stakeholders. Moreover, the Foundation concentrated on updating and strengthening supply chain and logistics management systems to track the respective commodities. This was done to further supplement the planned work of the project. The commodity available targets were developed to determine its success, and the results will be documented and disseminated as learning for complementary in-country initiatives and long-term sustainability.

The primary outcomes that are likely to be achieved through this project include the following:

**Outcome 1: Policy Change**

Existing national/provincial policies and guidelines are updated in line, with global recommendations (WHO/GAPPD) for management of diarrhea and pneumonia; among children under five in Pakistan by the end of 2019.

**Outcome 2: Policy Translation**
Translation of the revised and updated pneumonia and diarrhea treatment guidelines, into relevant action plans, by all provincial/areas health departments, in Pakistan by the end of 2019.

**Outcome 3: Policy Implementation**

Availability of essential commodities such as Amoxicillin DT, zinc DT, co-packed ORS and zinc suspension, oxygen, ARI timers, and pulse oximeters. It was required for the treatment of childhood pneumonia and diarrhea in Pakistan by the end of 2019.

**Outcome 4: Knowledge Management**

Translation of lessons learned from this investment, to other settings/broader geographical areas within Pakistan. This four year Project has completed its first six months inception phase (Jan-June2016). The implementing activities for this project are planned for the remaining period of 2016 and onward.

### 2.2 Country background

The Islamic Republic of Pakistan consists of Punjab, Sindh, Baluchistan, and Khyber Pakhtunkhwa, Azad Jammu and Kashmir (AJK), and the federal territories including FATA and province of Gilgit-Baltistan. The total land area of Pakistan is 796,095 km with an estimated population of 188.02 million. Approximately 64% of the population lives in rural areas (Economic survey of Pakistan, 2013-14, Pakistan Demographic and Health Survey 2012-13) The country is a lower-middle income country with a GDP of US $ 1,368 per capita (Pakistan Economic Survey 2013-14).

### 2.3 Purpose

Pakistan has the third largest rate of maternal, fetal, and child mortality in the world\(^2\). As of 2010, the mortality rate of children under five (U5) is 89 deaths per 1,000 live births. This explains that one of the 11 Pakistani child do not survive to their fifth birthday. Acute respiratory infections (ARIs), malaria, and dehydration caused by severe diarrhea are major causes of childhood mortality in Pakistan. Every year, approximately 91,000 children die from pneumonia and 53,300 children death is caused due to diarrhea. In total, diarrhea,

\(^2\) Reproductive, maternal, newborn, and child health in Pakistan: challenges and opportunities: Health Transitions in Pakistan, The Lancet Volume 381, No. 9884, p2207-2218, 22 June 2013
pneumonia, and malaria collectively become the major cause of death among children in Pakistan. According to Demographic Health Survey of Pakistan 2012-13, a lesser number of children are receiving appropriate treatment: only 38% of children suffering from diarrhea receive adequate treatment with Oral Rehydration Solution (ORS) and only 1.5% receive zinc; only half of children suffering from pneumonia receive an appropriate antibiotic. Statistically, one out of nine children suffering from diarrhea receives no treatment, and 59% receive no treatment for pneumonia. The prevention of these illnesses; nevertheless, is ideal, it is critical to treat them correctly and in time.

Hence, the situation requires a focused revision of the high-level policies; strengthening the training and knowledge of the health care providers, supporting production and procurement of relevant commodities, and improving the supply and logistics systems to track commodity stock and utilization.

2.4 Objectives

The objectives of the assignment are as follows:

- Review the existing supply management system at National, Provincial, district and sub-district levels.
- To analyze the current supplies logistic system for pneumonia and diarrhea management, through in-depth situation analysis for the public sector health facilities and the vertical programs dealing in management of diarrhea and Pneumonia.
- To consult with Key opinion leaders’, decision makers and other stakeholders to discuss the existing logistic systems for the procurement and distribution of pneumonia and diarrhea medicines within the country especially in - Sindh and Punjab provinces.
- To give practical and logical recommendations to the stakeholders on how to upgrade logistic management information system (LMIS); that can help...
forecasting, procurement, inventory management, warehousing and distribution and also on linking of revised DHIS tools with LMIS.

- To review the process of registration of pharmaceutical items by Drug Regulatory Authority of Pakistan. It also aims to submit recommendations to get this process expedited for registration of essential drugs for management of pneumonia and diarrhea.
- To document all above objectives in detail with in-depth situation analysis.

2.5 Scope of Evaluation
In-depth situation analysis of commodities and supplies of logistic system at national/province/ district and sub-district levels, related to pneumonia and diarrhea. This analysis of commodities/supplies will help to determine the situation of SCMS. It also defines the existing policies and their relevance with recommendation of GAPPD, gaps in supply management system which include; product selection, situation of staffing, LMIS, forecasting / quantification, procurement, inventory management, warehousing, distribution of medicines, organizational support for logistics, rational utilization of drugs and situation analysis of private sector in diarrhea and pneumonia management. Report prepared after the analysis will act as a “Baseline Assessment” and will identify the gaps, barriers and facilitators to policy translation and commodity access.

2.6 Study's Contribution to the Theory of Change for Pneumonia and Diarrhea Project
World health organization has defined logistics as an art of supply and maintenance. It involves a scientific discipline and utilization of the management principles. Logistics for peripheral health facility as provision of activities including planning, budgeting, receiving and inspection, storage, inventory control, supply, distribution. Besides it includes the transportation, maintenance and repair, communications, environmental management of health facilities, record and reporting, supervision and logistics training⁴.

__________________________

In LMIC, lower buying power of patients, hinders the access to essential medicines; leading them to opt alternate therapies especially in rural areas. It has also observed, that inappropriate prescription and dispensing of medicines; creates the gaps to access the essential medicines\(^5\). WHO, described, that one of the key component of the functioning health system; is provision of access to affordable, appropriate and high quality medicines. The access of essential medicines; is the outcome of integration of finance, planning, service delivery, and information management and governance system\(^6\).

The studies conducted in different areas in Pakistan have also referred the issues to the supply chain management of medicines in public sector. The access to medicines is a big challenge for poor in Pakistan. One of the issues regarding the access to essential medicines, as reported in different studies; is, that the government spends very little on health sector. It has also been reported, that such issues include lack of policies legislation and regulation, wastage of resources, mismanagement, lack of knowledge and capacities and infrastructures etc. The issues resulted in the increased expenditures of the poor in the developing country.

The in-depth situation analysis of the supply chain management of medicines, will help in analyzing the SMC system of public sectors through WHO’s recommended procedures and guidelines. The results of the analysis, will support the recommendations for policy or procedures change; to improve the access of essential Medicines to combat with diarrhea and pneumonia.


3 METHODOLOGY
The methodology of assessment is mixed analysis that is quantitative and qualitative analysis. The quantitative analysis is based upon the Logistics System Assessment Tool (LSAT) developed by USAID Deliver Project recommended by WHO\(^7\) for the assessment of logistics / supply chain management of medicines. As per the recommendation of LSAT for devolved health system for all provinces were assessed separately; with recommended modifications of health service delivery levels, as described in the tools. The qualitative analysis is in-depth interviews based upon the desk review. The details of the methodology is as follows

3.1 Phase I: Methodology for Desk review
The methodology adopted for the extraction of research papers is as follows

<table>
<thead>
<tr>
<th>Online Search</th>
<th>Search Terms</th>
<th>Research Inclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronic databases searched:</strong></td>
<td>Pharmaceutical Supply Chain Management, Drug Supply and Pakistan, Rationale Drug Use AND Pakistan; Drug Financing AND Pakistan; Drug Affordability AND Pakistan; Drug Access AND Pakistan; Drug Availability AND Pakistan; Drug Policy And Pakistan; Pharmaceutical Policy AND Pakistan. Searches conducted during last five years period.</td>
<td>Primary research studies, reviews, case reports.</td>
</tr>
<tr>
<td><strong>Websites searched:</strong></td>
<td></td>
<td>Grey Literature: Policy Acts, Policy Guidelines, Policy or strategic frameworks, national formulary.</td>
</tr>
<tr>
<td>Provincial Departments of Health, WHO Pakistan, WHO-EMRO and Pakistan Consumer Protection Network.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Using the PubMed search engine “Pharmaceutical Supply Chain Management” 144 results were found, six form Cinahal and Operational framework form WHOLIS. Abstracts and summary reports were reviewed. There were 86 studies, that were further shortlisted for

---

A free, full text researches and documents shared by government in their websites were studied and referred in the desk review. Complete desk review is shared in Annex 12.

### 3.2 Phase II: Methodology of Data Collection

The indicators for the assessment have been divided into following levels

- Assessment at National Level
- Assessment at Provincial level
- Assessment at District and Sub-District Level

Following are the categories of the indicators based upon the LSAT Tool. The Sub-indicators, were further modified for devolved health system as recommended by LSAT. A complete set of indicators are attached in Annex 13.

#### Table 2 categories of indicators

<table>
<thead>
<tr>
<th>Section #</th>
<th>Categories of Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Policy, Legislation and Regulation</td>
</tr>
<tr>
<td>2.</td>
<td>product Selection</td>
</tr>
<tr>
<td>3.</td>
<td>Organization and Staffing</td>
</tr>
<tr>
<td>4.</td>
<td>Logistic Management Information System</td>
</tr>
<tr>
<td>5.</td>
<td>Forecasting</td>
</tr>
<tr>
<td>6.</td>
<td>obtaining Supplies / procurement</td>
</tr>
<tr>
<td>7.</td>
<td>Inventory Control Procedures</td>
</tr>
<tr>
<td>8.</td>
<td>Warehousing and Storage</td>
</tr>
<tr>
<td>9.</td>
<td>Transport and Distribution</td>
</tr>
<tr>
<td>10.</td>
<td>Organizational Support for Logistics</td>
</tr>
<tr>
<td>11.</td>
<td>Product Use</td>
</tr>
<tr>
<td>12.</td>
<td>Patient Exit Interviews</td>
</tr>
<tr>
<td>13.</td>
<td>Private sector Availability of services and medicines</td>
</tr>
</tbody>
</table>

With reference to the above mentioned indicators, the data has been collected from key informants of all provinces, while for assessment of district and sub-district level; key
informants were selected from the below mentioned districts, based on their role and responsibility in public sector.

3.2.1 Key Informants:
The selection of key informant was based on the role of the informant in public health department. Special care was taken in selecting the most suitable person to respond to the questionnaire.

The provincial level assessment has been conducted for Sindh, Punjab, Baluchistan, KP and FATA. While the districts and sub districts level assessment has been conducted for Sindh and Punjab only.

Table 3 List of key informants at National Level

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Key Informants</th>
<th>National Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DRAP</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>EM WHO</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>MNHS R&amp;C</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>Federal DG Health</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 4 List of key informants at provincial level

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Key Informants</th>
<th>Punjab</th>
<th>Sindh</th>
<th>KP</th>
<th>Baluchistan</th>
<th>AJK</th>
<th>FATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DG Health</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>Director MSD</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Director IRMNCH &amp; NP</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>Chief Pharmacist (Purchase cell)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>Store keepers</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>PPHI / HANDs / IHS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>Specialized Hospital / DHQs</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5 List of key informants at District and Sub-district levels

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Key Informants</th>
<th>District Level</th>
<th>Sub-District Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CEO / EDO (H)</td>
<td>Central Warehouse</td>
</tr>
<tr>
<td>1</td>
<td>CEO / DHO</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>MS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HF in-charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pharmacist</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Store keepers</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>LHW &amp; CMW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patient exit interview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Private sector doctor and pharmacy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2.2 Criteria for Selection of Districts

On the basis of the data provided by the Bureau of Statics of Pakistan Multiple Indicator Cluster Survey (MICS) Sindh, 2014. and the Multiple Indicator Cluster Survey Punjab, 2014. The disease episodes following district has been selected for the assessment. For Sindh, the criteria for the selection of districts was as follows:

- One district from each division has been selected for comprehensive review of supply chain management system of the province.
- Districts shown high percentage of disease episodes of diarrhea & ARI, for example, symptoms in MICS 2014.

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• Districts administered through Health Department of Sindh, Public or private partnership, in order to get the comparative situation of supply chain management cycle.
• Good performing districts and bad performing districts; based on the treatment of Diarrhea and ARI, for example, symptoms taken from public sector.

### Table 6: Criteria for selection of districts

<table>
<thead>
<tr>
<th>Province</th>
<th>Divisions</th>
<th>Districts</th>
<th>Percentage of episodes of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Diarrhea</td>
</tr>
<tr>
<td>Sindh</td>
<td>Larkana</td>
<td>Kashmore</td>
<td>32.4</td>
</tr>
<tr>
<td></td>
<td>Sukkur</td>
<td>Sukkur</td>
<td>33.8</td>
</tr>
<tr>
<td></td>
<td>Hyderabad</td>
<td>Tando Muhammad Khan</td>
<td>31.2</td>
</tr>
<tr>
<td></td>
<td>Mirpur Khas</td>
<td>Tharparkar</td>
<td>23.4</td>
</tr>
<tr>
<td></td>
<td>Karachi</td>
<td>Karachi Malir</td>
<td>28.8</td>
</tr>
<tr>
<td></td>
<td>Shaheed Benazirabad</td>
<td>Shaheed Benazirabad</td>
<td>26.9</td>
</tr>
<tr>
<td>Punjab</td>
<td>Bahawalpur</td>
<td>Bhawalnagar</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>DG Khan</td>
<td>Muzaffargarh</td>
<td>18.8</td>
</tr>
<tr>
<td></td>
<td>Sahiwal</td>
<td>Pakpattan</td>
<td>19.4</td>
</tr>
<tr>
<td></td>
<td>DG Khan</td>
<td>Rajanpur</td>
<td>22.8</td>
</tr>
</tbody>
</table>

### 3.2.3 Public Health Facilities

A District Headquarter hospital, a Tehsil Headquarter Hospital, RHC and two BHUs have been visited to assess the medicines supply chain management system. The selection of BHUs was based on the distance from the central medicines distribution point, to assess the bottlenecks of medicines distribution and lead time.

### 3.2.4 Warehouses

Provincial Central warehouse, District Central warehouse, District warehouse of vertical program, health facilities medicine store of above mentioned districts have also been visited for the assessments of the storage conditions of medicines.
3.2.5 Patient Exit Interviews
Caretakers of the children with diarrhea were interviewed to evaluate the provision of medicines and dispensing practices of the hospitals.

3.2.6 Private Hospitals and Pharmacies:
Five private practitioners and pharmacies were selected based upon the information provided by the respondents of households.

3.2.7 Health Facilities & Warehouse visited
Apart from the provincial offices, sample size for the collection of the data was 64 including warehouses and health facilities out of which 38 from Sindh and 26 from Punjab.

3.3 Phase III: Methodology for Analysis
The data of the quantitative indicators has been analyzed using LSAT analytical score.

The LSAT recommended scores as mentioned in Annex 13.

3.4 Ethical Standards
All ethical standards of UNICEF were followed.
4 RESULTS AND ANALYSIS

The main focus of the assessment findings were Policy, legislation and regulation, Product selection, Organization and Staffing, Logistics management information System, Forecasting, Procurement, Inventory management, Warehousing. Moreover, the assessment of storage, Transportation & Distribution, Organizational support for logistics and Rational utilization of medicines, registration of new formulations of amoxicillin dispersible tablet with Drug Regulator Authority of Pakistan. The major findings of the assessment were as follows.

1) National Essential Medicines List: Pakistan has National Essential list based on which provincial EML were prepared. Provinces has procurement rules of medicines which restrict the DOH to procure the medicines only from the Provincial Essential Medicines List, or, if required, from NEML. The strict rules for medicines selection from NEML, have strengthened the product selection of SCMS.

2) Logistic Management Information System: The status of LMIS was more or less similar in Sindh and Punjab. The situation of vertical program was also same in both provinces.

3) Forecasting: The quality of forecasting is based on the availability of data. The impact of LMIS on forecasting gave the same results.

4) Procurement: At the districts of Sindh and Punjab, procurement process was similar LSAT scoring that is 53% . While the score of Specialized Healthcare and Medical Education (SH&ME), was 70%, which was the highest percentage in the public sector.

5) Inventory control: The inventory control procedures of SH&ME hospitals i.e DHQs of Punjab has shown better results of assessment that is 92%. It was mainly due to the development and implementation of Medicines Inventory Management software. The situation of the districts in Punjab was also better; due to the introduction of e-procurement system.

6) IRMNCH & NP has totally changed the routine method of medicines distribution. They had outsource the transportation process of medicines to courier company.
Comparison of Logistics Systems among Districts in Sindh

Graph 1: Comparison of Logistics System of Department of health among Districts of Sindh

Comparison of Logistics Systems among Districts of Punjab

Graph 2: Comparison of Logistics System of P&SHD among districts of Punjab
Comparison of Logistics System of DHQ Hospitals of Punjab and Sindh

Comparison of Logistics Systems of NP FP&PHS Sindh and IRMNCH & NP Punjab

Graph 3 Comparison of logistics system of DHQ hospitals of Sindh and Punjab

Graph 4 Comparison of logistics system between NP FP&PHS and IRMNCH&NP
4.1 Drug Registration Process for local production

Diarrhea and Pneumonia are major causes of mortality among children under five in Pakistan. The availability of first line therapy, is one of the major challenges to the management of such diseases. Pharmaceutical industries are one of the growing industries of Pakistan.

The medicine essential for the management of these diseases are

i. Low osmolarity ORS already registered and frequent in production.
ii. Zinc Dispersible Tablet already registered but not frequent in commercial market
iii. Amoxicillin Dispersible tablet not registered in Pakistan
iv. Co-packing of Low osmolarity ORS and Zinc Tablet not registered in Pakistan.

The production of Lo-ORS and Zinc DT is easily available, while the drugs like, amoxicillin DT and Co-packing, required registration with Drug Regulatory Authority of Pakistan (DRAP) for local production. Any manufacturing industry having capacity to manufacture “tablet” and “powder” can apply for the registration of co-pack.
Drug Act 1976, regulates the import, manufacture, storage distribution and sale of the drugs. These drugs are registered under section 7 of drug act 1976. Registration board is the authority of registration of drug.

It was observed that period of 3-4 years is required by the DRAP for the completion of registration. Already many applications, committee meetings, industrial inspections are still pending and the number is increasing day by day. For the registration of these medicines, the shortest possible time and the privilege of rules of drug registration should be considered. These rules are described in clause 2. (v) and 2. (ix).

A recent example of 7.1% chlorhexidine digluconate gel registration with DRAP in which product has been registered on the public interest (Annex 14)

The process of registration is based on the morbidity needs and manufacturing capacity of manufacturer. The process of the registration of the Drugs is briefly described here; while detail is mention in (annex 15).

**Clause 2. (V)**

The Registration Board shall, before registering a new drug for which the research work has been conducted in other countries and its efficacy, safety and quality has been established therein, require the investigation on such pharmaceutical, pharmacological and other aspects, to be conducted and clinical trials to be made as are necessary to establish its quality and, where applicable, the biological, availability, and its safety and efficacy to be established under the local conditions: Provided that under special circumstances to be recorded in writing, the Registration Board may register a drug and require such investigations and clinical trials to be conducted after its registration.

**Clause 2. (IX)**

Where it is necessary in the public interest, so to do, the Registration Board may register a drug on its own motion without having received any application for registration.
4.1.1.1 Steps for registration of new formulation

1. The process of registration, for the new formulation, particularly Amoxicillin DT and ORS & Zinc supplementation, Co-pack the following steps: Collection of reference material, preparing the desk review of impact analysis of Amoxicillin DT and ORS and Zinc co-packaging in other countries.

2. It also involves the consultation with Pharmaceutical Bureau, Pharmaceutical Manufacturing Association, Research & development of DRAP and other stakeholders, for preparation of comparative study of different formulation of the subjected medicines in Pakistan. The stakeholders include UNICEF, WHO, R& D of DRAP, Health Department of all Provinces, Pharmaceutical Bureau, Pharmaceutical Manufacturing Association of Pakistan, Pakistan Pharmacist Association, United State Pharmacopeia Pakistan and Nutrition International.

3. With consultation of PMA selection of pharmaceutical industries that is already registered for manufacturing of Zinc DT and ORS for Co-packaging, Amoxicillin in different formulations for bilateral discussion with DRAP and other stakeholders.

4. Preparation of bilateral meeting documents including invitation letters agenda, and studies, that has to be shared and with participant etc.

5. Coordinate lobbying / Advocacy Bilateral meeting

6. Submission of final report of lobbying / Advocacy bilateral meeting (including minutes, conclusion and recommendations)

4.1.1.2 Potential Manufacturer for Registration

In discussion with Pakistan Pharmaceutical Manufacturers Association (PPMA), a manufacturer “Wilshire” has been introduced, who is interested in registration of Co-package of ORS and Zinc DT and Amoxicillin DT. Company profile is shared in annex 16. Wilshire was already registered for Zinc DT with DRAP and soon they will receive the registration of ORS. They have potential for registration of co-package. They are also interested in Amoxicillin DT.

4.2 Findings

4.2.1 Section I: Policy, Legislation and Regulation

Pakistan has National Drug Policy, but does not clarify the duty taxes on import of donated items. The SRO notification of Government of Pakistan through DRAP,
MNHS R&C, explains the exemption of the duty and taxes on import of drugs for donation in Gazette of Pakistan.

The law and regulation of Pakistan promotes the local manufacturing of medicines, rather than, the import of finished drug from other countries; but in public interest, the import is allowed. The drug policy encourages the access of medicines at health service delivery sites. It also promotes or encourages the access of patient for utilizing the services by improving the availability of medicines at HF. In Punjab, on the other hand, public awareness has also been created through TV and print media. Provincial details are as follows

4.2.2 Section II: Product Selection

The product selection of medicines for procurement and availability at the service delivery site were based on the National Essential Medicines. All the products except Zinc solid oral dosage form selected for the procurement were from National Essential Medicines List, which was available on official website of DRAP. NEML, has been used for the development of provincial essential medicines list, and the list of medicines for central rate contract. The criteria for the selection of any product for essential medicines list, was WHO recommendations and disease burden. It has been observed that Zinc syrup was procured rather Zinc solid oral dosage form. The essential packages for health services were available for Punjab, Sindh and Khyber Pakhtunkhwa. The services included in EPHS were: Immunization, Antenatal, Natal and postnatal Care, Inter-natal care, Prevention of STI and RTI, FP service, Major Micronutrient deficiencies, mental health, screening, outreach services for all levels of health facilities. The survey conducted, was primarily for assessment of diarrhea and pneumonia medicines which include ORS, Zinc supplementation, and Amoxicillin suspension which were part of essential medicines list for all the provinces.

Diarrhea and pneumonia are vaccine preventable diseases. Rota virus was the major contributor of deaths of children suffered from diarrhea in Pakistan. In Punjab vaccine for ROTA virus and pneumonia were included in routine EPI while in Sindh pneumonia vaccine is included in routine EPI.
4.2.3 Section III: Organization and Staffing

Logistics Management Unit (LMU):

According to WHO, LMU, is a management structure that can be used to organize, monitor and support all the activities within the logistics system. Through the lens of continuous improvement; LMU identifies the Supply Chain problems, develop solutions and implement those interventions. LMU is an important link between the different organizations, levels, and actors within the supply chain.

LMU were available in all provinces. It was responsible for managing and using the logistics management information system, forecasting, procurement, inventory management and distribution. The selection of product was in consultation with the Districts. It was also responsible for the supervision and development of logistics staff.

- Although, at the provincial level, the activities were facilitated by specific units, for the procurement of the medicines; like: Procurement cell / Procurement Committee in all provinces and Medicines Coordination Cell like the one in KP. The key logistics tasks were assigned to either of it. The activities used to coordinate key logistics tasks among those responsible for logistics were official letters, meeting and joint work plans etc

- Such staff member (who are employed for other departments and had other departmental responsibilities as well) had to perform logistics tasks. It was observed, that the system lack the dedicated HR, to carry out key logistics task with powers and authority and make prompt decisions. . The logistics activities could be best performed by a qualified person with pharmaceutical as well as SCM knowledge. The DHQs hospitals, were facilitated with the sufficient number of Pharmacists, It was, therefore, observed that the logistics system was better at DHQs as compare to the hospitals like RHCs, where the pharmacist was not available. The vertical programs have dedicated logisticians but SCM tasks were not achieved. It was observed that Standard Operating Procedures were also not available. Even, with key personals, SOPs were not distributed to all service delivery levels. The logistics system has one year plan in all provinces. The smooth functioning of the supply chain system was
affected by transporters strikes, resulting in the delays of supplies from manufacturers and eventually, it leads to the delay in the budget release.

The details of the indicators of organization and staffing are mentioned in the below table.

**Sindh:**

LMU was available at provincial level but it was not integrated as in Punjab. It was fully responsible for managing and using LMIS, procurement, inventory management, product selection, supervision and logistics staff development. The product selection and forecasting were mainly done at district level under the supervision of DHOs. A single line budget was available with DHO and some HF who could exercise DDO authority. They are capable of managing their logistics budget from it. Health facilities with DDO power also have single line budget.

- SOP or guidelines for medicines forecasting and quantifications were not provided at the district levels.
- The Central Level Position, dedicated for logistics is mainly in the district. The logistics officers can exercise the same authority as any other functional unit heads can.
- The activities used to coordinate key logistics tasks, beside those responsibilities, logistics were to deliver an official letters, regulate meeting and make joint work plans.
- The logistics responsibilities were managed by DHO, Store Keeper at the district level while at DHQ Hospital there are Hospital Pharmacist and Store Keepers.
- The Public Private Partners (PPHI, IHS and HANDS) of the Sindh, has LMUs, which were indirectly supporting the government health facilities within their scope of work as described in their contracts. In Sindh, almost all the BHUs are handed by PPP except in the District Shaheed Benazirabad and Karachi. They facilitated the government for the product selection, forecasting, procurement, distribution inventory management, storage, staffing for logistics, financing for logistics and supervision. The government of Sindh, procures medicines for THQ / RHCs (not handed over to IHS). As PPP, is facilitating the government so their strengths and capacities were reflected as government services. Their SCM activities were under
the supervision of the dedicated logistics staff, showing best performance in their work. Although, they are facilitating the government, in terms of services and access to medicines. All indicators, were applied on these organizations as well, in order to explore the strengths of the system and to compare it with the government supply chain system. Such comparisons will help the government to adopt the strengths of service delivery standards; so that, at the time of exit of PPP service delivery, the standards will remain the same, especially in terms of SCMS.

- **Punjab:**

  LMU comprises “e-Procurement and Inventory Management Unit” which was an integrated system of medicines procurement. It has established central level position of logistics management in which districts procurement, drug testing labs and prequalified manufactures were involved. It also facilitates the medicines forecasting or preparation of rational demand based on the availability of the budget and the manufacturers capacity. The responsibilities of logistics, other than procurement, such as, inventory management, staffing and the product selection were served by the district team, under the supervision of CEO.

- **SOP of medicines forecasting and quantification (based on WHO guidelines)** has been provided to all districts through PSPU with the support of TRF plus in the form of forecasting and quantification tool. While after the establishment of Primary and Secondary healthcare Department, the system has been modified and incorporated in the e-procurement.

- The activities used to coordinate key logistics tasks, besides those responsible for logistics were official letters, meeting including online meetings and joint work plans.

- **Baluchistan:**

  MSD and PPHI collectively takes the responsibility of LMU. The role of MSD is the procurement of medicines while rest of all the responsibilities like distribution, inventory management etc has been done by PPHI.

- The MSD, act as central level position for the procurement of medicines, while handling and inventory management was done by the store keepers.
• **Khyber Pakhtunkhwa:**
  In Khyber Pakhtunkhwa, at provincial level, LUM was Procurement cell and Medicines Coordination cell (MCC). The districts were facilitated with logistics staff.

• The MCC, provide the central rate contract list of prequalified manufactures, while the product selection and forecasting is done at districts level. Handling, inventory management and warehousing is mainly done by logistics officers and storekeepers at district level.

• The logistics officers have the same level of authorities for decision making as the other functional unit heads.

• **FATA:**
  The procurement is managed by procurement committee / cell. Forecasting of medicines is consumption based, which does not fulfill the WHO recommendations. The central level position of logistics is managed at agencies. The activities used to coordinate key logistics tasks among those responsible for logistics were official letters and meeting. The key logistics positions were DHO and Store Keeper, Agency, and the Store keepers.

• **FP&PHS / IRMCNH & NP**
  • The vertical programs have already selected products, so there is no role of LMU in selection of products. The activities used to coordinate key logistics tasks among those responsible for logistics were official letters, meeting and work plans. The logistics staff include Logistics Coordinator at provincial level, the Store Keeper at District level,

• In Punjab IRMNCH & NP has recently modified the SCM system and quantities of medicines for LHWs have increased. In future, Forecasting will be based on the updates of the modified quantities. The distribution of medicines has planned through courier/ parcel system.
4.2.4 Section IV: Logistics management Information System (LMIS)

The logistics Management Information System in Public health facilities was manual and computerized. The computerized system does not show the complete flow of medicines; from the receiving till the consumption. In different provinces different efforts were made to get maximum information of the logistics management.

In all provinces DHIS gave the information of stock out status of tracer elements at health facilities. DHIS provides the status of stock out only in yes and no format. This is not sufficient as it should also provide information of stock levels. Due to an incomplete information stock status (functional stock out) were not reported. Vaccine LMIS (vLMIS) was available but data was not updated regularly from all districts.

In Sindh manual LMIS was implemented which gave the information of stock procured, issued etc. The sharing of manual stock reports; from HF to the District level was not regular. The health facilities should also be monitored to get actual situation of stocks.

In Punjab, Specialized Healthcare and Medical Education Department has developed a web based computerized software for medicines inventory management at teaching hospitals, DHQs etc. this software gave real time stock status. The software shares information of status of stock outs, near expiry medicines, stock in hand, stock issuance etc with all logins.

Health Information and Service Delivery Unit has launched Primary and Secondary Healthcare department. At the time of assessment, it was observed that online information including HR, logistics information of vaccines, contraceptive, TB, Information of DHIS etc. were shared at one dashboard. It was reported, that their next phase they will be interlinking information from all segments, and making it more useful and result oriented. HISDU has also prepared a “Prescription Management Information System” which will track the medicines record from the receiving till the issuance to the patient. It will also link with inventory management system.

Simultaneously, the stock status was also monitored by Monitoring and Evaluation Assistants (MEAs) and they prepare monthly report of the stock status of very
essential / tracer elements. The Health department, rely more on the reports of MEAs because it was consider as an external evaluation / physical count of stock status. This report indicates overall performance of health facility.

Vertical programs i.e FP&PHS and IRMNCH & NP has its own MIS covering specific indicators and they depend more on their MIS rather DHIS. The LHW program reporting mechanism is manual and computerized both.

Ideally, the information provided by the LMIS; should be compiled and perform an automated functions of logistics activities. As observed that the LMIS / DHIS / MIS focused the stock out status and report. There must be more automated systems to support the forecasting, resupply, transportation, monitoring of medicines dispensed to the patients as per WHO standards.
4.2.5 Section V: Forecasting

It has been observed that methodology adopted for the medicines forecasting and quantification was consumption based, in which, there was no adjustments of days of stock out. Stock for lead time, and time required for the laboratory analysis were not included. Buffer stock was considered; but the methodology for calculation of buffer stock was not correct. Review period for the forecasting was one year; which caters the seasonal variations. It was also observed, that the irrational use of medicines was due to the unavailability (stock out) of first line therapy. Which not only creates financial burden, but also was not appreciated and recommended by WHO. The activity of medicines forecasting requires financial support; it also depends on how much data is required to be collected and analyzed. It is one of the hidden costs of the supply chain management system. It was also discovered, that medicines forecasting need proper budget allocation. This situation was observed in all districts of Sindh, Punjab, Baluchistan, KP and FATA.

In Punjab, the Primary and secondary Healthcare Department has developed e-Procurement system, which is organized through software developed by Punjab Information Technology Board. It is a system through which the medicines were forecasted, based on the consumption based methodology provided by Policy and Strategic Planning Unit (PSPU). The system has improved the availability of medicines in tertiary care hospitals / teaching hospitals. The need to compare the consumption based methodology with morbidity based forecasting is still required to promote the rational utilization of medicines.

In Khyber Pakhtunkhwa, particularly in Health department, the medicines forecasting became a part of their agenda. They had developed the computerized tool for medicines forecasting and quantification. This tool developed for KP health department was able to conduct forecasting of all health facilities, with both techniques i.e morbidity and consumption method based on WHO recommendations. It was observed that the data provided by the DHIS for morbidity based forecasting and quantification had limitations; which created hurdles for the morbidity based medicines forecasting and quantification methodology.
In Sindh, the Public private partners (PPHI, IHS, and HANDS), considered the importance of morbidity based forecasting and quantification. As per the recommendation of WHO, if there were no stock out, consumption based methodology can also be applied. The comparison of morbidity, consumption based method of forecasting and quantification; promotes the rational utilization of medicines. It was observed that PPP compared the consumption based and morbidity based forecasted data. Such techniques should be shared with the government staff for the capacity building.

4.2.6 Section VI: Obtaining Supplies/Procurement

Procurement is the process of purchasing supplies; directly from national or multinational, private or public supplier.

Procurement of medicines in public sector followed the government procurement rules. For larger quantities, the process of bids was followed. The bidding process is based on the estimated quantities from the districts. While with the estimating budget, special care is required for procurement of the medicine and equipment. This includes the actual expenditure incurred from Jan to May 2017, and the estimated needs for the remaining days of May & June, 2017. This will cater to the immediately need of payments, required for the medicine, procured at provincial level in “centralized procurement” mode. Following the government rules, the technical specification and financial specifications were acknowledged. The lowest bidders were contracted for the supply of medicines. It is stated, that the quality of the products should be according to the standards of drug act.

In Sindh: According to the “Bid Documents for Procurement of drugs by procuring agencies of Sindh,” in General Condition, it is stated that the chemical and physical examination of medicines shall be carried out through the provincial drug testing laboratories.

It has been observed and reported by health department, Sindh; that the provincial drug testing laboratory is not properly functioning, Hence, according to the government procurement rules “the batch release certificate” for test analysis report
of quality control / quality assurance department, the manufacturer, have to been relied upon.

Similarly, based on this situation, most of the public health facilities did not send their samples for quality assurance. The health facilities reported, that they have procured the medicines from prequalified firms or manufacturers, so the document was not required. And if they are required to send the document for DTL, then there will be more delay in availability of the medicines.

**In Punjab:** All the samples of medicines were sent to Drug Testing laboratories. In Punjab, particularly, there were five drug testing laboratories established at divisional level by the department of health; which covers the analytical requirements. The payments of the medicines were only made, when districts or hospitals receive the satisfactory reports from these laboratories.

In Punjab, it was witnessed, that despite putting a lot of efforts; in this case, the selection of the brand leaders, development of the new strategies for procurement, efficient follow up for pipe line status of orders, increase in budget to meet the gaps, timely submission of reports from DTL, timely payments to the manufacturer; an unacceptable delay in supplies was observed due to which health facilities were in very bad shape. So much that even the CEOs’ of the companies were expecting that if the manufacturers do not supply the medicine in time, there were high chances, that the budget for procurement of the medicines will lapse. The prequalified manufacturer has less manufacturing capacities. During the visits of private pharmacies, in private sector, it was observed that there was no delay in the supplies of same manufacturer (GSK for Amoxicillin suspension). It shows that these brand leaders have more interest in their regular market.

Such attitudes of the manufacturers were also reported from Sindh province.

**Balochistan:** central procurement system was introduced to ensure the procurement of quality products.

**Note:** It has also been noted that the IHS has been contracted as PPP for RHCs but their budget has not been released due to which the supply of medicines was
affected. IHS has made an initial supply from their own budget. This needs to be replenished with the committed budget, for smooth operations of health facilities.

4.2.7 Section VII: Inventory Control

The Inventory control or inventory management is heart of pharmaceutical management system. It has been observed that the inventory management was considered as the most simplest method, based on the receipt, store and issuance of medicines and record. These are the limited list of items. The inventory control or management was not effective; mainly, due to the lack of pharmaceutical management knowledge or lack of qualified person i.e. pharmacist. One of the outputs of proper inventory management system is to create a reasonable balance between holding cost on one hand and purchasing and shortage cost on the other. It could be achieved by applying the techniques, like; establishing minimum and maximum stock levels, establishing the reorder levels and determining how much to reorder. Organizing the data in effective manner supports the LMIS.

In Sindh, the inventory management system, used in public health facilities has shown many deficiencies in which push system of supplies was mostly observed. The medicines were distributed, based on the availability and request from HFs, rather than need. Most of the record keeping was manual and even the manual record were not fully updated. The concept and importance of bin cards were not fully understood. In some health facilities, either these bin cards were missing and in some, if available, were not updated. BHU jaffer e Teyar of District Karachi Malir, stock register was not updated for Amoxicillin suspension. Moreover, the requisition for medicines was submitted with wrong information of physical quantities. In medicines requisition stock in hand, was reported as zero while physically bottles of Amoxicillin suspension were present in the health facility.

In Punjab, minimum stock levels of tracer medicines has been established for the monitoring of MEAs which was 45 days stock availability in the health facility. The calculation for the average monthly consumption, was not dealing with all the WHO recommendation; but it helped in improving the availability of the stock in health facilities. The inventory control is required to balance the minimum and maximum
stock levels. It was also reported that the excess stock of Amoxicillin suspension was distributed from Muzaffargarh. The e-procurement system, total maximum limit for the district was defined; because if the procurement exceeded the forecasted quantities, it was not possible to manage it with available budgets. In National program, and IRMNCH & NP, the minimum and maximum levels were demarcated. The Specialized healthcare & Medical Education department has established its own medicines inventory management software, which gives the real time data of the health facilities under its supervision.

The PPP: the holding cost was managed by increasing the number of supply; which not only saved the holding and procurement cost but also the distribution or transportation cost. It provided sufficient space to organize the stocks in small store of public health facilities, especially in BHUS.

**STOCK AVAILABILITY STATUS AT THE HEALTH FACILITIES DURING ASSESSMENT:**

Any health facility that faced even a single day of stock out during one year period was considered as stock out. Even, at the time of assessment the stocks were available but during one year period health facility faced the condition of stock out was reported under the stock out. It has been observed that the stocks of ORS were comparatively better then Amoxicillin and Zinc Supplementation. Mostly the stock outs were observed with LHW program.

Based on the observations during assessment following percentage of stock availability has been recorded. The total number of sample size was 50 out of which 38 service delivery levels were observed in Sindh and 26 were visited in Punjab. During the discussion with provincial managers of Sindh it was informed that procurement of all medicines were under process and within one month period the stocks will be available at the district levels.

Details are mentioned in below graphs.
Graph 6 Stock out status of ORS in selected districts of Sindh

Graph 7 Stock out status of Zinc Syrup in selected districts of Sindh
Graph 8 Stock out status of Amoxicillin suspension in selected district of Sindh

Graph 9 Stock out status of ORS in selected districts of Punjab
Graph 10 Stock out status of Zinc supplementation in selected districts of Punjab

Graph 11 Stock out status of Amoxicillin Suspension in Punjab
4.2.8 Section VIII: Warehousing and Storage

The storage condition of the medicines has great impact on the service delivery. Among the storage conditions, the size of the store or warehouse has great importance. The availability of temperature controlling equipment like fridge and AC for maintaining room temperature, directly affects the efficacy of the products. The availability of racks, pallets, thermometers, fire extinguishers are essential for the storage of medicines.

The storage conditions of public health facilities need improvement. It includes the improved knowledge of the staff and the storage condition etc. Although, the Punjab health departments have improved the storage conditions and equipment like AC, fridge etc has been provided. Such facilities was only provided at district level while the BHUs or RHC store also have need of these equipment. Vaccine was stored in recommended conditions. Chillers were provided at district level and ILR were provided at health facility level. Vaccine carrier boxes and ice packs were also provided to ensure the cool chain.

The government of Sindh, has planned to establish one warehouse in each division, to improve the storage capacity of the medicines.

The storage conditions of medicines in Baluchistan and FATA were not suitable, due to lack of temperature regulatory equipment.

4.2.8.1 Infrastructure of warehouses

The medicinal warehouses have been assessed to provide the baseline information of the storage conditions. Purpose build stores were rare, mostly, rooms were allotted as storage sites. In capacity of store rooms, for the health facilities were not enough to store the medicines as per recommended procedures. The structure of medicines store of district Kashmore Sindh and Rajanpur were not suitable to store the medicines. EDOH, LHW program of Kashmore have arranged a temporary store while Rajanpur is still using the same store. The details are as follow
4.2.8.2 Good Storage Practices

The Good storage practices, mainly depend upon the available resources and knowledge. The availability of a pharmacist for medicines management is a legal requirement. In Punjab, the Pharmacist are available in DHQ and THQ hospitals, where an additional charge has been given to “District Quality Control officer” who is a pharmacist by profession. The post of pharmacist on central warehouse was not filled. In Sindh, this responsibility is given to DDO or any doctor who is MBBS by profession. The details of good storage practices are as follows,

### Status of Storage Infrastructure in selected districts of Sindh and Punjab

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designated warehouse</td>
<td>87 (Sindh)</td>
</tr>
<tr>
<td>Condition of building</td>
<td>92 (Sindh)</td>
</tr>
<tr>
<td>Adequate capacity</td>
<td>50 (Punjab)</td>
</tr>
<tr>
<td>Suitable Floor</td>
<td>84 (Sindh)</td>
</tr>
</tbody>
</table>

### Stock Handling in selected Districts of Sindh and Punjab

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organized stock</td>
<td>61 (Sindh)</td>
</tr>
<tr>
<td>Direct contact of medicines</td>
<td>71 (Sindh)</td>
</tr>
<tr>
<td>stocks placed outside the store</td>
<td>3 (Punjab)</td>
</tr>
<tr>
<td>exposed to sunlight</td>
<td>11 (Punjab)</td>
</tr>
<tr>
<td>Store room was clean &amp; tidy</td>
<td>55 (Punjab)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organized stock</td>
<td>92 (Punjab)</td>
</tr>
<tr>
<td>Direct contact of medicines</td>
<td>54 (Punjab)</td>
</tr>
<tr>
<td>stocks placed outside the store</td>
<td>8 (Punjab)</td>
</tr>
<tr>
<td>exposed to sunlight</td>
<td>8 (Punjab)</td>
</tr>
<tr>
<td>Store room was clean &amp; tidy</td>
<td>58 (Punjab)</td>
</tr>
</tbody>
</table>
4.2.9 Section IX : Transportation / Distribution

In Punjab and Sindh, it has been observed, that in the public health department, Supply chain mechanism and transportation of medicines was a challenge. Although, the health department, either arrange vehicle from LHW programs or provide rental vehicles for the transportation of medicines; but such situation could not be handled when there is an emergency stock delivery. The overall expense for the distribution of medicines increased considerably. The techniques to calculate the quantities, that are required to be distributed, were not understood by the store keepers. The quantities of medicines should be calculated on basis of morbidity; to provide complete therapy of a disease. It was observed that the health facilities have ORS in the stock, but Zinc Syrup was not present and if it was available, the quantities were in very low. It indicates that morbidity or STG were not taken in considerations before the distribution of medicines. The distribution of vaccine was recommended vehicle and vaccine carrier boxes.

In Sindh, PPP has arranged the private suppliers. They were responsible to deliver the medicines at district levels. At the district level, the organization managed medicines supplies from the district warehouse to the health facilities. The frequency of medicines supplies was based on the consumption and availability of space for storage, at each level. In the districts, the lead time of supply in PPHI was 2 to 3 days. PPHI, HANDS and I H S has its own vehicles
(not specifically designed for medicines transportation) and medicines were distributed in the vehicle; especially, in the districts there were no specific routes for the distribution of medicines.

In Punjab, IRMNCH & NP has solved this issue by contracting a courier service for the supply of medicines. It was reported by the LHWs, that in the past they had to face the issues of medicines delivery. Delay was a common practice. The transportation of medicines through courier has reduced the time of delivery; thus, the medicines will reach its destination in time.

4.2.10 Section X: Organizational support for Logistics system
The organizational support for the logistics activity is an important component for smooth operations of supply chain management system. It was observed, that the communication system among the public health facilities at the district levels was either weak or ambiguous. There were no routine meetings of the logistics staff. Mostly, the communication is through the submission of reports and/or feedbacks. There was no capacity building of staff to develop the skills for better and more effective supervisory visit. The supervisors have an empathic behavior toward the department negligence. During health department’s supervisors (DHO, coordinators etc) visits, the coaching of health facility staff should be arranged. Such frequent coaching should be obligatory because it may help the on-job staff to develop the skills required for their employment.

In Punjab, monitoring of the stock out status was reported by two systems; one was DHIS and second was MEAs. Health department has more trust on MEAs data. The process of medicines forecasting was introduced in e-procurement software which was accessible at regional level. During the medicines procurement meetings at secretary health office, the demands of districts and health facilities were refined, rationalized and submit to the manufacturers. The argument of health facilities staff, that they receive less quantity of medicines was still not denied.

In Sindh, The Public health facilities lacked a well-defined system of medicines forecasting. It lead to irrational demand of medicines, and a common argument made by health facility
staff was, that they do not receive the quantity of medicines according to their requisitions. Such issues were raised by the health facility staff during the supervisor’s visits.

Conversely, the health facilities under the supervision of PPP, did receive the medicines according to their submitted demand. In the public and private partners, the health facilities did regular visits of higher levels, in which Hand on trainings / on job coaching has been done.
4.2.11 Section XI: Product use
All the efforts were made to improve the system, which ultimately, leads to the improvement of the availability of right drug, at right time in right dosage and frequency. Irrational prescribing practices of the physicians may influence the whole efforts that were put in to improve the SCMS.

The WHO always recommends and promotes the rational utilization of the drugs. In SCM, efforts made to promote the rational utilization of drugs are very important. There is a requirement to ensure the availability of STG at the service delivery site, to promote the understanding of STG, and increase the rational use of drugs. During the assessments, it has been observed that one of the major reasons of irrational use of medicines was, the unavailability of first line therapy. Physician has to move on to the second line therapy. It may increase the antibiotics resistance and the cost of therapy.
4.2.12 Patient Exit interviews

During the assessment, it has been observed that the patients have the understanding of preparation of ORS and on further inquiring an impetration was given that they know the preparation of ORS before coming to hospital. The Patient knows that they have to prepare the medicines in boiled and cooled water while a small number of patients skipped the word cool. The dose and duration was also understood by the patients, although, some patient have the confusion of daily interval of the administration of medicines.

<table>
<thead>
<tr>
<th>District</th>
<th>Number of patient interviewed</th>
<th>% of patient understand the preparation of medicines</th>
<th>% of patient with Correct understanding of correct dose and</th>
<th>% of patient with Correct understanding of duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kashmore</td>
<td>11</td>
<td>91</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>Sukkur</td>
<td>10</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Tando Muhammad Khan</td>
<td>8</td>
<td>88</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Karachi Malir</td>
<td>7</td>
<td>86</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>Saheed Benazirabad</td>
<td>11</td>
<td>91</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>Muzaffargarh</td>
<td>8</td>
<td>88</td>
<td>88</td>
<td>88</td>
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<tr>
<td>Rajanpur</td>
<td>8</td>
<td>88</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Pakpattan</td>
<td>10</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

4.2.13 Private clinics and pharmacies

Prescribing practices (as asked from the physicians) was poly pharmacy. Physicians need complete understanding of the use of Zinc. There is no proper method defined for the disposal of clinic / hospital waste. It has been observed that the Zinc dispersible tablet was available in the market (Pakpattan and Karachi). There was no shortage of medicines in the market especially in Punjab but there was a delay from the customer in supply which indicates that the open market was the first priority area of the manufacturers.
## 5 Work Plan

Human resource requirement for work plan: Three consultants (one national level, two provincial levels). Consultant for capacity building (trainings)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Responsibility</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Oct</td>
<td>Nov</td>
</tr>
<tr>
<td>1 Drug registration</td>
<td>Consultant Islamabad</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Collection of reference material and stability test and prepare desk review</td>
<td>Consultant Islamabad</td>
<td></td>
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</tr>
<tr>
<td>1.2 Meeting with United States Pharmacopeia for stability studies</td>
<td>Consultant Islamabad</td>
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<tr>
<td>1.3 Consultative meeting with stakeholders for preparation of comparative study of different formulation</td>
<td>Consultant Islamabad</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4 Consultation with PPMA for identification of potential manufacturers</td>
<td>Consultant Islamabad</td>
<td></td>
<td></td>
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<tr>
<td>1.5 Bilateral meeting with DRAP</td>
<td>Consultant Islamabad</td>
<td></td>
<td></td>
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<tr>
<td>1.6 Submission of report of bilateral meeting</td>
<td>Consultant Islamabad</td>
<td></td>
<td></td>
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<tr>
<td>1.7 Submission of application for registration of drug</td>
<td>Provincial consultants / PPMA</td>
<td></td>
<td></td>
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<tr>
<td>1.8 Prepare documents for justification of need of concern drug</td>
<td>Consultant Islamabad / Provincial consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Meeting with DRAP</td>
<td>Consultant Isb / Provincial consultant / PPMA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Procurement process (demand generation from Public Health facilities)</td>
<td>Health department (Sindh and Punjab) / provincial consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.11 Manufacturing and supply of product.</td>
<td>PPMA / provincial consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.12 Monitoring of distribution of medicines</td>
<td>Provincial consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Responsibility</td>
<td></td>
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<tr>
<td>2</td>
<td>Integration of LMIS with Revised DHIS</td>
<td></td>
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<tr>
<td>2.1</td>
<td>Ongoing support and maintenance of process consultant Islamabad / provincial consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Identification and engagement of Stakeholders consultant Islamabad / provincial consultant</td>
<td></td>
<td></td>
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<tr>
<td>2.3</td>
<td>Advocacy meeting for integration consultant Islamabad / provincial consultant</td>
<td></td>
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<tr>
<td>2.4</td>
<td>Signing of MOU with among stakeholders consultant Islamabad</td>
<td></td>
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<tr>
<td>2.5</td>
<td>Coordination meetings with stakeholders to choose indicators for Integration provincial consultant</td>
<td></td>
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<tr>
<td>2.6</td>
<td>Standardization of data to reduce the mapping provincial consultant / stakeholders</td>
<td></td>
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<tr>
<td>2.7</td>
<td>establish the compatibility with past data provincial consultant / health department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.8</td>
<td>Preparation of master sheets (health facility sheet and indicator sheet) provincial consultant / health department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.9</td>
<td>DHIS2 Import features and LMIS export features provincial consultant / stakeholders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.10</td>
<td>Development and implementation of Application program Interface provincial consultant / health department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.11</td>
<td>Advance Integration of LMIS with DHIS2 to facilitate the forecasting, order preparation etc provincial consultant / IT (software development company)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12</td>
<td>Monitoring of effectiveness of the integration provincial consultant / health department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Responsibility</td>
<td></td>
<td></td>
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<tr>
<td>----------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>strengthening of Supply Chain Management System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Development of strategic plan for SCMS</td>
<td>provincial consultant / health department</td>
<td></td>
</tr>
<tr>
<td>3.2</td>
<td>Development of SOP (all steps of SCMS)</td>
<td>provincial consultant / health department</td>
<td></td>
</tr>
<tr>
<td>3.3</td>
<td>Capacity building of Government staff on SOPs of SCMS, Good Storage practices, forecasting, procurement, distribution, Good dispensing practices, Rational utilization of medicines, pharmaceutical waste management</td>
<td>consultant Islamabad / Provincial consultant / health department</td>
<td></td>
</tr>
<tr>
<td>3.4</td>
<td>Development (if govt. do not have it) and implementation of inventory management software at health facility levels</td>
<td>consultant Islamabad / Provincial consultant / health department / IT company</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td>development and implementation of strategic plan for forecasting</td>
<td>provincial consultant / health department</td>
<td></td>
</tr>
<tr>
<td>3.6</td>
<td>collection of data of medicines consumption from health facilities</td>
<td>provincial consultant / health department</td>
<td></td>
</tr>
<tr>
<td>3.7</td>
<td>forecasting and quantification of medicines for Diarrhea and Pneumonia</td>
<td>provincial consultant / health department</td>
<td></td>
</tr>
<tr>
<td>3.8</td>
<td>Procurement of new formulations of diarrhea and pneumonia</td>
<td>provincial consultant / health department</td>
<td></td>
</tr>
<tr>
<td>3.9</td>
<td>Monitoring of need base distribution of diarrhea and pneumonia</td>
<td>provincial consultant / health</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Responsibility</td>
<td>2017</td>
<td>2018</td>
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<td>---------------------------</td>
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</tr>
<tr>
<td>medicines.</td>
<td>department</td>
<td></td>
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<tr>
<td>Monitoring of SCMS</td>
<td>provincial consultant</td>
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<td></td>
<td>/health department</td>
<td></td>
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<td>3.1</td>
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