

DISTRICT PRIORITY MEDICINES FORMULARY



FIVE YEARS COSTED FORECAST
(2020 to 2025)

DISTRICT MOHMAND

Department of Health
Government of Khyber Pakhtunkhwa

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This is a living document and will be updated on regular basis as and when required

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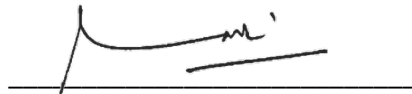
ACKNOWLEDGMENTS

With the technical support of United States Agency for International Development (USAID), Global Health Supply Chain Program, Procurement and Supply Management (GHSC-PSM) project, the Department of Health, Government of Khyber Pakhtunkhwa has developed a district-focused forecast for the District Priority Medicines list for the selected five districts of Khyber Pakhtunkhwa.

As per the mandate of the GHSC-PSM project continues to lend its technical expertise to support forecasting and supply planning of health commodities to the Government of Khyber Pakhtunkhwa. This forecast is a result of a close coordination between the Department of Health (DoH) and GHSC-PSM project, hence proving to be a stepping stone towards the capacity building of the human resource of DoH-KP. In addition, it is aimed at the successful transition of all forecasting and supply planning activities to provincial and district governments which can lead towards the achievement of global supply planning benchmarks.

We would like to express our deepest appreciation to all the relevant public-sector stakeholders, development partners, experts and medical professionals for reviewing, contributing, guiding and supporting the forecast of the District Priority Medicines for the selected districts of Khyber Pakhtunkhwa.

We also wish to appreciate Dr. Muhammad Tariq, Country Director, USAID GHSC-PSM project, Pakistan for his leadership role and his dedicated team for their devoted efforts and support provided in the formulation of this report.



Dr. Niaz Muhammad
Director General Health Services
Government of Khyber Pakhtunkhwa

ACRONYMS

ANCS	Antenatal corticosteroids
ARI	Acute respiratory infection
BHS	Basic Health Services
CHX	Chlorhexidine
DHIS	District Health Information System
DoH	Department of Health
DPM	District Priority Medicines
ECP	Emergency contraceptive pill
EML	Essential Medicines List
EPI	Expanded Program on Immunization
FIGO	Federation of Gynecology and Obstetrics
GDP	Gross domestic product
GHSC-	Global Health Supply Chain Program – Procurement and Supply
PSM	Management
GOP	Government of Pakistan
HDI	Human Development Index
ICM	International Confederation of Midwives
IDs	Infectious diseases
IM	Intramuscular
IV	Intravenous
KPK	Khyber Pakhtunkhwa
MMR	Maternal mortality rate
MNCH	Maternal, neonatal, and child health
MWRA	Married women of reproductive age
NCD	Non-Communicable Diseases
NGO	Non-governmental organization
ORS	Oral rehydration salts
PBS	Pakistan Bureau of Statistics
PDHS	Pakistan Demographic and Health Survey
PE/E	Preeclampsia and eclampsia
PHC	Primary health care center
PPH	Postpartum hemorrhage
PWD	Population Welfare Department
STGs	Standard Treatment Guidelines
TWG	Technical Working Group
UN	United Nations
UNDP	United Nations Development Program
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
VEML	Very Essential Medicines List
WHO	World Health Organization
WRA	Women of Reproductive Age

EXECUTIVE SUMMARY

Health care statistics and trends in Pakistan shows that the country continued to face extraordinary burden of both the communicable and non-communicable diseases and the concerned government authorities come up with almost little success in devising a strategy to safeguard population from the infectious diseases and their epidemics. Statistics reveal that the incidences of communicable diseases like tuberculosis, malaria, dengue fever, typhoid, viral hepatitis and a number of other infections caused by bacteria, viruses, fungi and parasites remained on the rise during last few years while a rising trend of non-communicable diseases particularly heart diseases, stroke, diabetes, hypertension and cancer was also recorded. Beyond lack of adequate basic health related services, unavailability of life saving products is also a predominant factor for morbidity and mortality due to infectious and non-infectious diseases. Absence of a structured mechanism for forecasting commodity needs leads to shortages and unavailability of priority products to the last mile.

Chemonics International Inc., through its Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project, has been engaged extensively with the provincial government of Khyber Pakhtunkhwa (KP) in finalizing and notification of a standardized procurement list of medicines for primary and secondary health care facilities. Based on this district priority medicines list, the first ever long term (five-year) scientific forecast for the districts of Charsadda, Lakki Marwat, Swat, Peshawar and Mohmand has been undertaken. This articulation was done after a series of consultations with relevant government functionaries and stakeholders. The forecast has different variations as different products require indigenous modelling given the scarcity of the data, considering demographics, DHIS reports and district specific logistics data.

Results from the latest Demographic and Health Survey of 2017-18 showed that Pakistan is still a long way from meeting the Sustainable Development Goals (SDGs), goal 2 and 3, which relate to reducing the burden in child and maternal deaths, respectively. In this survey, the infant mortality rate (per 1,000 live births) in Pakistan was estimated at 62 and the percentage of births attended by skilled health personnel was 69.3 percent.¹ Immunization rates remain low, especially among rural populations.

To accelerate progress towards meeting the SDG goals, the DoH and partners have developed a number of strategic interventions, especially at the primary health care level. These interventions aim at increasing basic antenatal, newborn, and child care for the most vulnerable populations, with the goal of saving lives by 2025. The key to these interventions is to provide medicines and health commodities. In 2018, GHSC-PSM project conducted first ever indigenous forecasting exercise for the very essential Maternal Neonatal and Child Health (MNCH) commodities for the Departments of Health-Khyber Pakhtunkhwa, Punjab and Balochistan with funding estimates. These forecasting helped the concerned governments to improve the financing of the MNCH products with optimum availability of products at each service delivery point.

In 2009, the Government of Pakistan without any scientific modelling had 4-5 m dollars forecast of family planning (FP) products for the entire country. Similar forecasting helped the government to improve the financing of these FP products but had several limitations. The new forecasting approach is based on scientific modelling and takes into account services, demographics, as well morbidity data sets, which leads to a more robust and accurate forecast.

This new forecast exercise aims to guide the decision makers in setting up a national system for regular updates to the forecasts and introduce supply planning processes for District Priority Medicines. Furthermore, this activity will ensure adequate financing and optimize a data-driven procurement system, minimize stock outs

¹ PDHS - 2017-18 Key indicator Report Aug 2018

and/or losses through expiry or by over stocking. With this forecasting, we anticipate that the Government of Khyber Pakhtunkhwa will exponentially increase its financing for these priority products.

Using the priority diseases data acquired from the annual reports of District Health Information System (DHIS) of DoH, Mohmand, the Chemonics International carried out a services-based forecast. This report includes the findings from the forecast, as well as the funding requirement analysis that can be used for advocacy with key stakeholders to increase the level of funding and eventual availability of commodities for Basic Health Services (BHS) including infectious diseases (IDs) in KP. The district priority commodities needed for a comprehensive Basic Health Services program were quantified by categories / commodity groups. These groups were parenteral, antibiotics, anesthetics, antidotes, antituberculosis, antidiabetic, hypertensive, dermatological commodities etc.

The funding requirements for the prioritized District Priority Medicines were estimated based on distribution data, DHIS reports, MCC list reviews and consultative meeting with provincial technical groups. The project designed a framework for indigenous modeling forecast of priority products and recommend a financing of approximately PKR 80 million for the District Priority Medicines, over the 2020-25 forecast period.

Moving forward, it is recommended that the results of this forecast and annual funding requirements should be used by the DoH and partners to source their funding. Concurrently, a supply plan that takes into account existing stock levels, as well as commodities that may already be on order needs to be developed to inform the procurement of these commodities. Lastly, a forum for all stakeholders needs to be created to meet regularly and chart a way forward toward creating Basic Health Services commodity security.

INTRODUCTION

In September 2019, the Department of Health, Khyber Pakhtunkhwa (KP) notified a standardized procurement list of medicines for Primary and Secondary Health Care Facilities. This list contains 123 molecule containing products related to Basic Health Services and Infectious diseases. The accessibility and availability of these priority medicines at district level, across the primary and secondary health care facilities, will be pivotal to the provision of basic health services including prevention and management of infectious diseases.

The DoH KP requested the GHSC-PSM project, Pakistan, implemented by Chemonics International Inc., to address supply chain management issues related to provision of basic health services including control and management of infectious diseases, helping the Government of KP and other key provincial and district stakeholders to improve the security of district priority medicines in the province, strengthen the distribution and management information systems in place, and build local capacity to strengthen the health systems. As part of this effort, GHSC-PSM project has been working with relevant DoH, KP to improve forecasting and supply planning of district priority medicines.

Furthering the effort, the GHSC-PSM is providing technical assistance to the health department, KP in developing a five-year district level costed forecast of approved medicine lists for the districts of Charsadda, Lakki Marwat, Swat, Peshawar and Mohmand. This multi-year scientific quantification and financing needs of each district is expected to improve public sector financing. The scientific forecasting and costing of district priority medicines was carried out in close coordination with DoH KP and the health authorities of prioritized districts. The forecast modeling exercise for the priority medicines focused on developing institutional and district level FASP capacity; strengthening provincial and district supply chains; and improving data quality and availability. One of the supply chain areas for these priority medicines that was identified as particularly weak was forecasting and supply planning. For several of these medicines, the data required to estimate need accurately are unavailable and forecasts are based on unsubstantiated assumptions and often on data from past procurements and distribution and/or issuance information.

BACKGROUND

Khyber Pakhtunkhwa is located in the northwestern region of Pakistan. KP is Pakistan's smallest province by area with a land mass of 101,741 km², with an estimated population of 30,523,371 as of 2017. Among those, an estimated 83.1% live in rural areas. The population growth rate is 2.89% per annum (PBS) while it accounts for 10% of Pakistan's GDP.

According to 2017 Population Census of Pakistan, KP has the third highest share of 17.69 percent in population pie and its share has increased as compared to 1998. The share of urban population in KP in 2017 remained almost unchanged as compared to 1998 i.e. 83.2%. (PBS)

According to PDHS 2017-18, in the 5-year period preceding the survey, neonatal mortality was 42 deaths per 1,000 live births, infant mortality was 62 deaths per 1,000 live births, and under-5 mortality was 74 deaths per 1,000 live births. These rates imply that nearly one in 16 children die before reaching their first birthday and one in 14 die before reaching their fifth birthday.

PDHS 2017-18 reflects that Pakistan has shown improvement on infant and child mortality rates. Under-5 mortality has declined from 112 deaths per 1,000 live births in 1990-91 to 74 deaths in 2017-18 -- a 34% decrease over the last 3 decades. Infant mortality declined from 86 to 62 deaths per 1,000 live births. The neonatal mortality that stagnated at roughly 55 deaths per 1,000 live births for a decade has declined to 42 deaths per 1,000 live births in the most recent 5-year period.

Childhood mortality rates are higher in rural areas than in urban areas by 10 deaths per 1,000 live births. Neonatal, infant, and under-5 mortality rates are 45, 68, and 83 deaths per 1,000 live births, respectively, in rural areas, as compared with 37, 50, and 56 deaths per 1,000 live births in urban areas. (PDHS 2017-18) Deaths of newborns are mainly due to prematurity, asphyxia, and infections. Most of these deaths could have been prevented if newborns had adequate access to resuscitation devices, appropriate umbilical cord care, and timely treatment for sepsis. Substantial presence of acute respiratory infections and diarrhea also contribute to the elevated mortality rates for children.

The current estimated maternal mortality ratio (MMR) is 178 per 100,000 live births (WHO 2015), one of the highest rates in the world. One of the many factors that contribute to maternal mortality is the inadequate use of health services. 2017-18 Demographic Survey data show that in Pakistan, 66% of the births in the 5 years preceding the survey were delivered in a health facility. Forty-four percent of deliveries took place in private facilities, and only 22% took place in government facilities. There has been great improvement over time in the percentage of deliveries at health facilities; institutional deliveries increased from 13% to 66% between 1990-91 and 2017-18. In the last 5 years, the proportion has increased by 18 percentage points from 48% to 66%. Most of the women die at the time of the birth because of postpartum hemorrhage, eclampsia and other indirect obstetric causes.

As the challenges cited above have demonstrated, strengthening the planning, procurement, and information management of MNCH life-saving commodities is critical to the survival and quality of care for millions of women and children in Pakistan. The country has made commendable progress in the prevention and control of pneumonia and diarrhea-related complications despite many challenges and now must strive to build on that progress and reinvigorate efforts to address other causes of maternal and child mortality. To this end, it is essential that life-saving commodities be available when and where they are needed.

Pakistan is faced with a huge quadruple disease burden.³⁴ Infectious diseases are rampant and diseases such as

tuberculosis and malaria, among others, are a major public health challenge for all stakeholders, including policymakers and healthcare providers.³⁵ Noncommunicable diseases are increasing rapidly due to unhealthy lifestyle, rapid urbanization, and breakup of the traditional joint-family system that puts additional pressure on individuals. Diabetes, hypertension, coronary artery disease, and malignancies are on the rise.³⁶ Mental health is compromised and mental diseases are on the rise.³⁷ With the rapid advances in transportation, road traffic accidents are contributing substantially to overall disease burden.³⁸ Pakistan is currently facing the double burden of communicable (38%) and non-communicable diseases (49%) according to WHO NCD Country Profiles 2014. About 50% of all deaths are attributed to NCD's. The WHO country profile (2014) shows that in Pakistan 25.3% individuals had high BP, 19% had CVD diseases, 3% had diabetes, 6% had chronic respiratory diseases, 8% had cancers, 23% were tobacco smokers and 0.1% were alcohol consumers.

Forecasting and supply planning (FASP) is the foundation for all other functions further down the supply chain as over estimation or underestimation of commodities can have serious implications on health delivery systems. It is a highly scientific and complex process, wherein numerous factors must be considered including demographics, morbidity rates, service data sets, and logistics data and requires a specialized skill set. Currently, FASP for a complete range of District Priority Medicines (DPMs) as per approved medicines list for health department is being undertaken with technical assistance from the GHSC-PSM project on the basis of logistics, demographic and morbidity indicators and enhancement in service delivery. Availability of qualified and experienced human resources, structures, and tools remains a challenge for improved accuracy and timeliness of forecasting and supply planning for all medicines and supplies. Due to gaps identified in FASP projections, serious anomalies persist in district demand. Health department realize the need for having a structured mechanism for accurate FASP with dedicated trained staff as part of the Integrated Supply Chain Management and Coordination Cell at DoH.

Three data sets: logistics, services, and morbidity will be considered for forecasting and quantification of priority commodities depending upon availability of data and its quality. Knowledge and information of health departments' programmatic strategies will be important for accurate forecast and quantification of district priority commodities. This needs to be ensured through document review and consultations with key stakeholders and / or focal points within the department. A forecasting exercise for DPMs List will be done for five years and reviewed annually for adjustments, as per recommended model (Figure 1).

Current landscape:

Forecasting and supply planning (FASP) is the foundation for all other functions further down the supply chain as over estimation or underestimation of commodities can have serious implications on health delivery systems. It is a highly scientific and complex process, wherein numerous factors must be considered including demographics, morbidity rates, service data sets, and logistics data and requires a specialized skill set. Currently, FASP for a complete range of DPMs as per the approved Medicines List for district level service delivery is being undertaken with technical assistance from the GHSC-PSM project on the basis of logistics, demographic and morbidity indicators and enhancement in service delivery. Availability of qualified and experienced human resources, structures, and tools remains a challenge for improved accuracy and timeliness of forecasting and supply planning for all medicines and supplies. Due to gaps identified in FASP projections, serious anomalies persist in district demand. Health department realize the need for having a structured mechanism for accurate FASP with dedicated trained staff as part of the Integrated Supply Chain Management and Coordination Cell at DoH.

FASP Roadmap

The objective of this roadmap is to establish a fully functional and structured FASP mechanism at district level that systematically determines district specific priority medicines requirements, estimates their financial costs, and coordinates fulfillment of projected needs to support the continuous availability of commodities.

Priority areas for improvement

- Reliable and quality data sets (demographic, disease prevalence/morbidity, and logistics) for accurate forecasting
- Dedicated resources (financial & trained HR) for FASP

- Institutionalization of FASP through capacity building of the district departments on accurate and timely forecasting and quantification of DPMs and identification of champions to form technical working groups under the ISCM&CC. As FP supply chain has higher maturity than district priority medicines with respect to procurement planning and monitoring functions, it is expected that, modelling FASP for DPMs supply chain will help in attaining departmental capacity within 2-3 years.
- Three data sets: logistics, services, and morbidity will be considered for forecasting and quantification of district commodities depending upon availability of data and its quality. Knowledge and information of health departments' programmatic strategies will be important for accurate forecast and quantification of district commodities. This needs to be ensured through document review and consultations with key stakeholders and / or focal points within the district health department.
- A forecasting exercise for DPMs will be done for five years and reviewed annually for adjustments, as per recommended model (Figures 1).

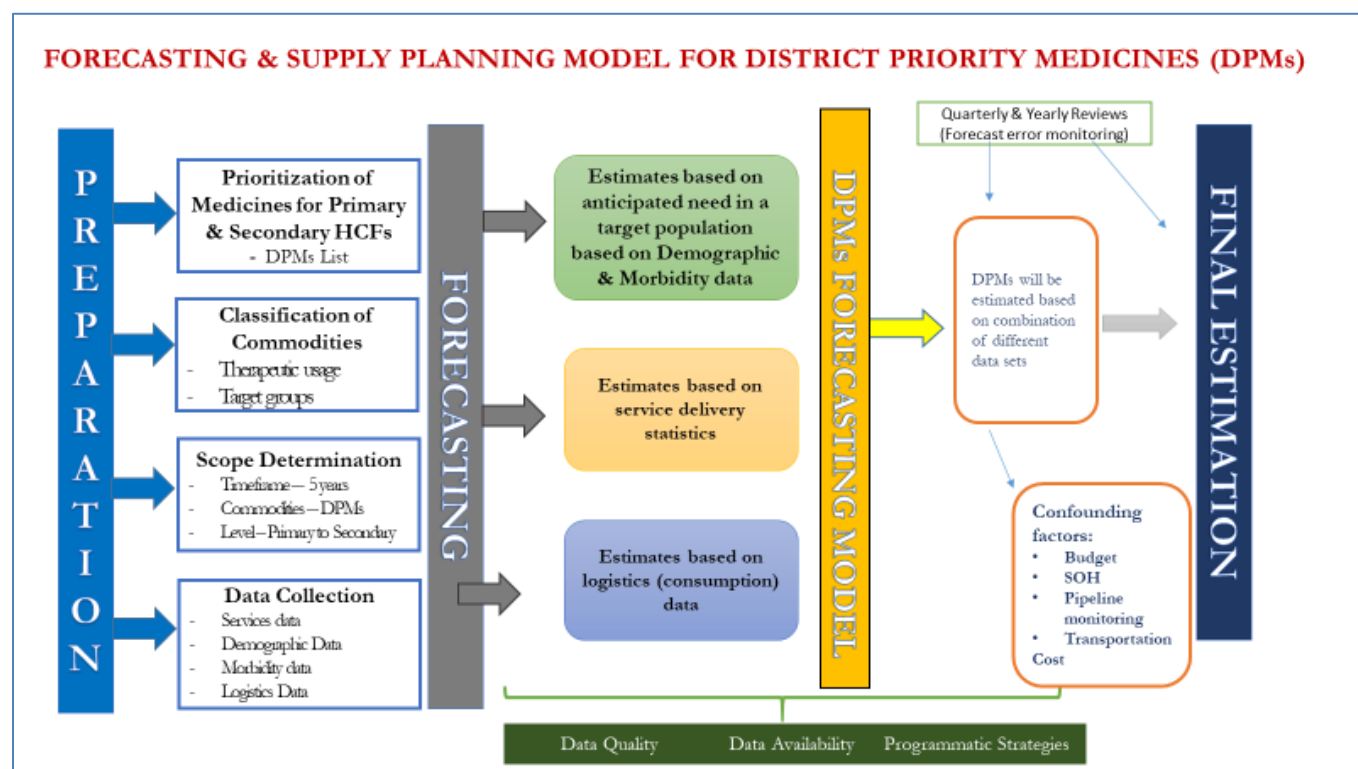


Figure 1: FASP Model for District Priority Medicines

Implementation plan:

The district health and population welfare departments of the Provincial Governments will carry out following activities to achieve articulated objectives.

- **Formation of Forecasting & Quantification Technical Working Group (TWG) at District Level**
Both health and population welfare departments will establish and notify a forecasting and quantification TWG at the district level. The TWG will systematically determine district commodities requirements, estimate their financial costs, and coordinate fulfillment of projected needs to support the continuous availability of commodities. The TWG will also analyze quantification figures related to priority commodities security issues and improve district capacity to perform this task independently. Improved inter-departmental coordination will facilitate consensus building on scope and assumptions for forecasting and quantification. It will also minimize duplication of efforts and wastage of resources.
- **Create Professionalized and Trained Human Resources at the District Level**
At the provincial level, the capacity of the Procurement and FASP unit of the ISCM&CC will be trained in forecasting and quantification of DPMs. Pre-and in-service training courses will be organized / arranged that will contribute and ultimately lead to building of institutional capacity on forecasting and quantification at the district level, within the provincial government.
- **Automation of Forecasting and Quantification Function into Integrated Web-based MIS**
To reduce the likelihood of computational inaccuracies, forecasting and supply planning functions will be automated incrementally and made part of the integrated supply chain management information system. The province will design an EML forecasting and supply planning module in the web-based integrated MIS and will train users on the module. Thus, forecasting and supply planning will be graduated from manual to automated computation. The automation will help in timely and accurate forecasting and supply planning, which will, in turn, assist in procurement and commodity security.

RATIONALE FOR UNDERTAKING THIS EXERCISE

In Khyber Pakhtunkhwa, Department of Health procures medicines and other commodities through Medicines Coordination Cell (MCC), a provincial level procurement body, for primary and secondary healthcare facilities using rate contract mechanism. Districts have the provision to procure medicines as per approved MCC list through local purchase from approved firms.

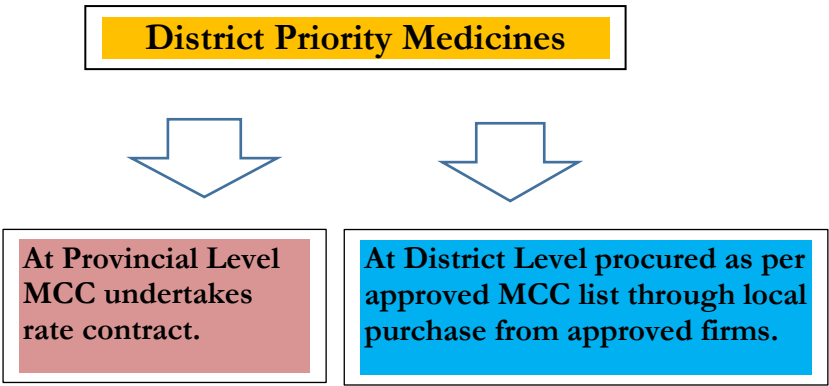


Figure 2: Khyber Pakhtunkhwa district commodities procurement

Although districts are generating demand / indent / requisition for district commodities but the data is not utilized for forecasting purposes. This is mainly due to two reasons; 1) non-existence of formal forecasting and quantification mechanism and 2) quota/target-based procurement. Most of the healthcare centres in KP lack sufficient stocks of priority medicines owing to the untimely release and inadequate allocation of funds. Around 760 Basic Health Units (BHUs) and 96 Rural Health Centers (RHCs) across the province offer healthcare services to the people. However, stocks of priority medicine continue to lag at 60 per cent.²

The provincial government had sought to improve service delivery in primary health care facilities, allocating additional resources and developing a robust independent monitoring system to take immediate remedial actions. To ensure adequate stocks of medicines in primary health care facilities, the health department took a number of steps such as negotiating a central contracting rate for medicines periodically, a move which proved to be cost effective. Moreover, the health department hired logistics officers in each district to manage affairs at the district level and to ensure that the procurement process is completed in time. However, even if the government allocates sufficient budget, the untimely release of these funds could still hamper the utilization of the budget to purchase medicines for facilities. If the district government releases the medicine budget timely as a single tranche to district health department, districts can then place orders on time and ensure the timely utilization of the medicine budget. Meanwhile, health experts have stated that since all 1,600 health facilities across the province had sufficient doctors, nurses, paramedics and technicians, medicines in sufficient quantity should be supplied to these centres on a priority basis.

The Department of Health, Government of Khyber Pakhtunkhwa has documented the limited capacity within its structure to conduct the forecast for health commodities. This lack of capacity has compelled the provincial and district health department to rely on the use of past distribution data and estimates of patient flows at facilities to calculate the need for commodities at primary and secondary health care facilities. The respective officials develop medicine requirements that are not scientifically appropriate to meet the current needs, thus making it difficult to maintain appropriate inventory to meet the needs of patients and clients in the district. This current practice sometimes yields stock imbalances, stock- outs of some important

² <https://tribune.com.pk/email/1430834/k-p-health-centres-lack-sufficient-medicine-stocks>

medicines, and a preponderance of emergency orders, which in the end have been threatening the integrity of the health service delivery. However, with the technical Assistance of GHSC-PSM project, the district department of health has established mechanism to undertake the forecasting exercise of DPMs. This approach helps to improve the forecasting and supply planning functions.

The need for a comprehensive, harmonized and coordinated forecasting exercise (first of its kind) in the DoH is heightened by a number of factors including:

- The lack of a formalized district coordinated system mechanism for forecasting and supply planning of district priority commodities.
- The need to identify the current funding gap for the needed commodities to ensure efficient allocation of financial resources by the DoH, Government of Khyber Pakhtunkhwa.

This activity is aimed at developing a long term (five-year) district forecasting collaboration with the district health authority, which will better inform procurement decisions for the priority commodities. The exercise will also help DoH to populate a framework for computing the requirements for the DPMs during the plan period and be able to take future procurement actions. Basically, the goal of this forecasting exercise is to optimize a data-driven procurement system and minimize losses through expiry by over stocking. The report will essentially guide the decision makers in setting up a district system for regular updates of the forecasts and introduce supply planning process for district commodities.

GOALS AND OBJECTIVES

Goal

Determine the district needs for prioritized District Medicines.

Objectives

1. Prepare the district forecast for the district priority medicines for the period 2020-25.
2. Discuss data sources and data gaps to support regular forecasting and supply planning, and ways to address those gaps.
3. Develop recommendations for institutionalization of a formal forecasting and pipeline monitoring system within Department of Health, Khyber Pakhtunkhwa which is capable of conducting updates on the forecast and supply plan.

METHODOLOGY

The GHSC-PSM project worked in close coordination with the Department of Health, Khyber Pakhtunkhwa to develop the forecast. Initially, the scope, purpose and period of the forecast was defined. Afterwards, GHSC-PSM project collected and reviewed existing documents to define assumptions and make adjustments based on recent logistics data. GHSC-PSM project then developed the algorithms of the forecasting process for each commodity. Furthermore, they were reviewed by key stakeholders. The steps of the process are detailed below.

Scope:

The forecast was meant to cover the notified priority commodities for primary and secondary health care facilities (**Annex 1**) prioritized by the Department of Health, Khyber Pakhtunkhwa and the estimated requirements of these commodities for health services provided at public health facilities in the district. The estimates included requirements for district and sub-district levels of health care system. The agreed upon timeframe is 2020-21—2024-25. However, through discussions with the department and programs and upon review of existing data, forecasting was done for priority commodities.

Forecasting Options

Estimates of commodity needs for multi-year planning are based on the notified priority diseases data and linked to defined Provincial Health strategies and plans. Three methods of estimating commodity needs are commonly used:

- Estimates based on anticipated need in a target population based on demographic and morbidity data (more appropriate at the national and provincial levels);
- Estimates based on previous consumption of a commodity (more appropriate at the provincial and district level);
- Estimates based on the service delivery statistics (more appropriate at the service delivery level).

Whichever method is used, the accuracy of the estimate depends on the availability and quality of data used, as well as the forecasting team's knowledge of the specific conditions of the program. Due to the absence of reliable logistics and morbidity data for the commodities mentioned in Annex 1, services method is used for this forecasting.

Four basic sets of data are required for forecasting the commodity requirements:

1. Medicine lists with packaging and price data
2. Standard treatment or average regimen for different medicines.
3. Priority diseases data from DHIS Reports
4. District Priority Medicines Formulary List.

The basic formula used in the Services method is:

Total quantity of a medicine required for a given health problem / priority disease	=	Number of expected treatment episodes of the health problem / priority disease per year	X	Quantity of the medicine specified for a standard course of treatment
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In order to calculate the total quantity of a medicine required to treat expected number of cases of a

priority disease in a given year, the first element in the formula requires calculation of expected cases based on the average taken of last three years reported or treated cases. In this forecast average is taken of yearly number of disease episodes treated during the years 2017-19. The other element is the quantity of a medicine required to treat a single disease episode as per standard treatment guidelines (SDGs) or average treatment regimen. The outcome of multiplying the total number of disease episodes with quantity of medicine required to treat an episode, will be equal to estimated total quantity of medicine required during a given year to manage a particular clinical condition / disease in the district, whose forecast is being undertaken.

Data Collection and Document Review

As part of the forecasting exercise, we considered factors such as the estimated current need and provincial program strategies. This forecast is based on various assumptions regarding district commodity needs. The process included a review of provincial policy and technical documents; we familiarized ourselves with the DHIS data, recommended treatment guidelines and previous activities that could impact the forecasting. In addition, we reviewed policy documents to assess information provided on other major policy decisions that may affect the health department. Several of these documents are listed in bibliography and some are listed below, as well:

- DHIS Annual Reports – 2017-19
- Pakistan Demographic and Health Survey (2012-13)
- Pakistan Demographic and Health Survey (2017-18)
- Minimum Health Service Delivery Package for Primary & Secondary Health Facilities
- MCC List 2019-20.

Data Analysis

We used basic Excel to forecast the requirements for the district priority commodities. The average expected disease episodes or events for respective commodities was determined which will help to analyze, plan, and advocate for improved programming. Excel facilitates the process of determining the quantities of medicines that are required for any health program. For each medicine, we used SDGs and average treatment regimens to determine the estimated quantities required for one year. We then entered information on all medicines and added the total requirement and costs by the categories. The specific forecasting methodology, key assumptions, and forecasting results for each commodity category are included in the corresponding subsections presented in the quantification results.

Essential Medicines List and District Priority Formulary of Medicines

Essential medicines are those that are deemed to satisfy the health care needs of the majority of the population and that should be available in the appropriate dosage forms and strengths at all times. The rationale for selecting a limited number of essential medicines is that it may lead to better supply, more rational use, and lower costs. Because selection of medicines has a considerable impact on quality of care and cost of treatment, it is one of the most cost-effective areas for intervention.

A list of essential medicines may be selected for use in one or more level of health facilities or for the public sector as a whole. In the latter case, the list usually indicates the level of the health care system where each medicine may be used. It can also be considered a supply list. A formulary system is part of the medicine selection process. The system includes a formulary list, which is ideally based on an essential medicines list.

A formulary list (Annex-1) is a list of pharmaceutical products approved for use in a specific health care setting. It may be a national formulary list, a provincial list, a hospital list, or a list indicating products for use and availability at primary and secondary level care health facilities of a district. In the public sector, the formulary list is synonymous with essential medicines list.

Steps Used in Forecasting

The following steps were used to forecast the need for each commodity:

1. Estimation of average expected episodes / events of a priority disease in a given year.
2. Quantity of medicine required to treat an episode of a disease.
3. Expected projected changes in consumption (potential losses or scale-up in use)

Consultative Meeting with Stakeholders

After completing the draft forecast, we will conduct consultative technical sessions with the district health representatives. The objectives of the consultative meeting will be to:

- Present and jointly review draft forecast.
- Review and validate the available data and methodologies.
- Discuss data sources and data gaps to support regular forecasting and supply planning, and ways to address gaps.
- Reach consensus and agree upon assumptions, data, methodologies, and current forecasting findings.

RESULTS

Forecasted Need for Anaesthetics

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains two general anaesthetics and three local anaesthetics drugs under the anesthetic's category, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Isoflurane	inhalation		Anaesthetics General
2	Propofol	Injection	10 mg / ml in 20 ml	Anaesthetics General
3	Bupivacaine (hydrochloride)	Injection	0.50%	Anaesthetics Local
4	Lignocaine (hydrochloride)	injection	2% in 10ml	Anaesthetics Local
		topical gel	2% w/w	Anaesthetics Local

General anaesthetics are generally meant for secondary level health care facilities including DHQ and THQ hospitals and certain Rural Health Centres, where surgical services are offered. Local anesthetics are provided and used at all primary and secondary level health care facilities.

The following input data is used to estimate the yearly requirements of anesthetics for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anaesthetic Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of anaesthetic medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case /episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of anaesthetic medicines is as follows:

$$\text{Total Requirement of Anaesthetic Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of medicines per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of anaesthetics is calculated and

reflected in the table below:

Table 1. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Isoflurane	injection	25	28	30	34	37
2	Propofol	injection	126	138	152	168	184
3	Bupivacaine (hydrochloride)	injection	378	415	457	503	553
4	Lignocaine (hydrochloride)	injection	403	443	487	536	590
		topical gel	302	332	366	402	442

The associated summary outputs for anaesthetics are shown in Table 1. By applying the different attributes and assumptions the year-wise forecasted numbers for the period 2020-25 are estimated against each medicine that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Muscle Relaxants

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains three drugs under the muscle relaxants category, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Atracurium (besylate)	injection	30 mg/ml in 3ml; 5ml	Muscle Relaxants
2	Glycopyrrolate	injection	0.2mg /ml in 1ml (for anesthesia only)	Muscle Relaxants
3	Neostigmine (metilsulphate)	injection	2.5 mg in 1ml	Muscle Relaxants

Muscle relaxants are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of muscle relaxants for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Muscle Relaxant Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of muscle relaxant medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of muscle relaxant medicines is as follows:

$$\text{Total Requirement of Muscle Relaxant Medicines} = \frac{\text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH}}{\text{Average dose of drug per case / episode}} \times$$

Using the above methodology and formula, the estimated yearly requirements of muscle relaxant medicines is calculated and reflected in the table below:

Table 2. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Atracurium (besylate)	injection	755	831	914	1,005	1,106
2	Glycopyrrolate	injection	2,517	2,769	3,046	3,351	3,686
3	Neostigmine (metilsulphate)	injection	1,259	1,385	1,523	1,675	1,843

The associated summary outputs for muscle relaxants are shown in Table 2. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Analgesics / Non-Steroidal Anti-Inflammatory Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains three drugs under the analgesics / non-steroidal anti-inflammatory medicines category, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Tramadol	Injection	50 mg / ml	Analgesics Opioid & Centrally Acting
2	Acetylsalicylic acid	dispersible tablets	300 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		dispersible tablets	75mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
3	Diclofenac (sodium)	tablets	50 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		ampoule	75 mg in 3ml	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
4	Paracetamol	tablets	500 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		syrup	120 mg / 5ml	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		suppository	100 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		Infusion	10mg/ml	Analgesics / Non-Steroidal Anti-Inflammatory Medicines

Analgesics / non-steroidal anti-inflammatory medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of analgesics / non-steroidal anti-inflammatory medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Analgesics / Non-Steroidal Anti-Inflammatory Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of analgesics / non-steroidal anti-inflammatory medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of analgesics / non-steroidal anti-inflammatory medicines is as follows:

$$\text{Total Requirement of Analgesics / Non-Steroidal Anti-Inflammatory Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of analgesics / non-steroidal anti-inflammatory medicines is calculated and reflected in the table below:

Table 3. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Tramadol	Injection 50 mg / ml	367	404	444	489	537
2	Acetylsalicylic acid	dispersible tablets 300mg	27,267	29,994	32,993	36,292	39,922
		dispersible tablets 75 mg	49,081	53,989	59,388	65,326	71,859
3	Diclofenac (sodium)	Tablets	7,552	8,307	9,138	10,052	11,057
		Ampoule	1,007	1,108	1,218	1,340	1,474
4	Paracetamol	Tablets	15,793	17,372	19,109	21,020	23,122
		Syrup	11,541	12,695	13,964	15,361	16,897
		suppository	1,822	2,004	2,205	2,425	2,668
		Infusion	364	401	441	485	534

The associated summary outputs for analgesics / non-steroidal anti-inflammatory medicines are shown in Table 3. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need of Antiallergics and Medicines Used in Anaphylaxis

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains four drugs under the category of Antiallergics and Medicines used in Anaphylaxis, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Chlorpheniramine (hydrogen maleate)	injection	22.7mg	Antiallergics and Medicines Used in Anaphylaxis
2	Dexamethasone (disodium phosphate)	injection	4 mg / ml	Antiallergics and Medicines Used in Anaphylaxis
3	Epinephrine (adrenaline)	ampoule	1 mg /ml	Antiallergics and Medicines Used in Anaphylaxis
4	Hydrocortisone (sodium succinate)	injection	100 mg	Antiallergics and Medicines Used in Anaphylaxis
		injection	250 mg	Antiallergics and Medicines Used in Anaphylaxis

Antiallergics and Medicines used in Anaphylaxis are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Antiallergics and Medicines used in Anaphylaxis for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Antiallergics and Medicines used in Anaphylaxis

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Antiallergics and Medicines used in Anaphylaxis is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Antiallergics and Medicines used in Anaphylaxis is as follows:

$$\text{Total Requirement of Antiallergics and Medicines used in Anaphylaxis} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Antiallergics and Medicines

used in Anaphylaxis is calculated and reflected in the table 4 below:

Table 4. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Chlorpheniramine (hydrogen maleate)	injection	2,349	2,584	2,843	3,127	3,440
2	Dexamethasone (disodium phosphate)	injection	1,410	1,551	1,706	1,876	2,064
3	Epinephrine (adrenaline)	ampoule	470	517	569	625	688
4	Hydrocortisone (sodium succinate)	Injection 100 mg	705	775	853	938	1,032
		Injection 250 mg	235	258	284	313	344

The associated summary outputs for Antiallergics and Medicines used in Anaphylaxis are shown in Table 4. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Antidotes and Other Substances Used in Poisoning

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains three drugs under the category of Antidotes and Other Substances used in Poisoning, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Atropine (sulphate)	ampoule	1 mg in 1ml	Antidotes and Other Substances Used in Poisoning
2	Charcoal activated	powder		Antidotes and Other Substances Used in Poisoning
3	Naloxone (hydrochloride)	ampoule	400 mcg in 1ml	Antidotes and Other Substances Used in Poisoning

Antidotes and Other Substances used in Poisoning are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Antidotes and Other Substances used in Poisoning for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Antidotes and Other Substances used in Poisoning

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Antidotes and Other Substances used in Poisoning is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Antidotes and Other Substances used in Poisoning is as follows:

$$\text{Total Requirement of Antidotes and Other Substances used in Poisoning} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Antidotes and Other Substances Used in Poisoning is calculated and reflected in the table below:

Table 5. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Atropine (sulphate)	Ampoule	110	121	133	146	161
2	Charcoal activated	powder	11	12	13	15	16
3	Naloxone (hydrochloride)	ampoule	15	17	19	20	23

The associated summary outputs for Antidotes and Other Substances used in Poisoning are shown in Table 5. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anticonvulsant / Antiepileptic Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains one drug under the category of Anticonvulsant / Antiepileptic Medicines, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Carbamazepine	tablets	200 mg	Anticonvulsant / Antiepileptic Medicines
		syrup	100mg / 5ml	Anticonvulsant / Antiepileptic Medicines
2	Magnesium Sulphate (<i>For eclampsia only</i>)	injection	500mg / ml	Anticonvulsant / Antiepileptic Medicines

Anticonvulsant / Antiepileptic Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anticonvulsant / Antiepileptic Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anticonvulsant / Antiepileptic Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anticonvulsant / Antiepileptic Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anticonvulsant / Antiepileptic Medicines is as follows:

$$\text{Total Requirement of Anticonvulsant / Antiepileptic Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anticonvulsant / Antiepileptic Medicines is calculated and reflected in the table 6 below:

Table 6. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Carbamazepine	Tablets	12,928	14,221	15,643	17,207	18,928
		syrup	1,293	1,422	1,564	1,721	1,893
2	Magnesium Sulphate (For eclampsia only)	injection	632	695	765	841	925

The associated summary outputs for Anticonvulsant / Antiepileptic Medicines are shown in Table 6. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Antibiotics/Antimicrobials

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains eight drugs under the category of Antibiotics/Antimicrobials, which have been further classified into - Key Access and Watch Group Antibiotics, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Amoxicillin + Clavulanic acid	Tablets	625 mg	Antibiotics/Antimicrobials - Key Access Antibiotics
		Syrup	125 mg amoxicillin + 312.5 mg clavulanic acid / 5 ml	Antibiotics/Antimicrobials - Key Access Antibiotics
		Tablets	1 Gm	Antibiotics/Antimicrobials - Key Access Antibiotics
2	Doxycycline	Capsule	100 mg	Antibiotics/Antimicrobials - Key Access Antibiotics
3	Metronidazole	Tablets	400 mg	Antibiotics/Antimicrobials - Key Access Antibiotics
		Injection	500 mg in 100-ml	Antibiotics/Antimicrobials - Key Access Antibiotics
		Syrup	200 mg / 5ml (<i>benzoate</i>)	Antibiotics/Antimicrobials - Key Access Antibiotics
4	Azithromycin	Capsule	250 mg	Antibiotics/Antimicrobials - Watch Group Antibiotics
		Suspension	125mg / 5ml in 22.5ml	Antibiotics/Antimicrobials - Watch Group Antibiotics
5	Cefixime (trihydrate)	Capsule	400 mg	Antibiotics/Antimicrobials - Watch Group Antibiotics
		suspension	200mg / 5ml	Antibiotics/Antimicrobials - Watch Group Antibiotics
6	Ceftriaxone (sodium)	powder for injection	500 mg, 1gm	Antibiotics/Antimicrobials - Watch Group Antibiotics
7	Cefoperazone + Salbactam	injection	1gm	Antibiotics/Antimicrobials - Watch Group Antibiotics
8	Ciprofloxacin	tablet	500mg	Antibiotics/Antimicrobials - Watch Group Antibiotics
		syrup	100mg/5ml	Antibiotics/Antimicrobials - Watch Group Antibiotics
		infusion	200mg/100ml	Antibiotics/Antimicrobials - Watch Group Antibiotics

Antibiotics/Antimicrobials are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Antibiotics/Antimicrobials for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of

medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Antibiotics/Antimicrobials Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Antibiotics/Antimicrobials Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Antibiotics/Antimicrobials Medicines is as follows:

$$\begin{array}{lcl} \text{Total Requirement of} & & \\ \text{Antibiotics/Antimicrobials} & = & \text{Yearly average number of cases / episodes of} \\ \text{Medicines} & & \text{priority disease reported by primary \& secondary healthcare facilities of DoH} \end{array} \quad \times \quad \begin{array}{l} \text{Average dose of} \\ \text{drug per case /} \\ \text{episode} \end{array}$$

Using the above methodology and formula, the estimated yearly requirements of Antibiotics/Antimicrobials is calculated and reflected in the table below:

Table 7. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Amoxicillin + Clavulanic acid	Tablets	9,665	10,632	11,695	12,864	14,151
		Syrup	483	532	585	643	708
		Tablets	4,833	5,316	5,847	6,432	7,075
2	Doxycycline	Capsule	5,799	6,379	7,017	7,719	8,491
3	Metronidazole	Tablets	21,747	23,921	26,314	28,945	31,839
		Injection	14,498	15,948	17,542	19,297	21,226
		Syrup	9,665	10,632	11,695	12,864	14,151
4	Azithromycin	Capsule	14,498	15,948	17,542	19,297	21,226
		Suspension	686	755	830	913	1,005

5	Cefixime (trihydrate)	Capsule	21,747	23,921	26,314	28,945	31,839
		suspension	967	1,063	1,169	1,286	1,415
6	Ceftriaxone (sodium)	powder for injection	14,498	15,948	17,542	19,297	21,226
7	Cefoperazone + Salbactam	injection	2,900	3,190	3,508	3,859	4,245
8	Ciprofloxacin	tablet	24,163	26,579	29,237	32,161	35,377
		syrup	435	478	526	579	637
		infusion	1,329	1,462	1,608	1,769	1,946

The associated summary outputs for Antibiotics/Antimicrobials are shown in Table 7. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anthelmintic Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains one drug under the category of Anthelmintic Medicines, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Mebendazole	syrup	100mg / 5ml	Anthelmintic Medicines
		tablets	500 mg (<i>with caution only for adults</i>)	Anthelmintic Medicines

Anthelmintic Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anthelmintic Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anthelmintic Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anthelmintic Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anthelmintic Medicines is as follows:

$$\text{Total Requirement of Anthelmintic Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anthelmintic Medicines is calculated and reflected in the table below:

Table 8. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Mebendazole	syrup	805	885	974	1,071	1,178
		tablets	2,415	2,656	2,922	3,214	3,535

The associated summary outputs for Anthelmintic Medicines are shown in Table 8. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anti-Fungal Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains three drugs under the category of Anti-Fungal Medicines, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Clotrimazole	vaginal cream	10% w/v	Anti-Fungal
		vaginal tablet	500 mg	Anti-Fungal
2	Fluconazole	capsule	150mg	Anti-Fungal
3	Nystatin	drops	100,000 IU/ml	Anti-Fungal

Anti-Fungal Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anti-Fungal Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anti-Fungal Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anti-Fungal Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anti-Fungal Medicines is as follows:

$$\text{Total Requirement of Anti-Fungal Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anti-Fungal Medicines is calculated and reflected in the table below:

Table 9. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Clotrimazole	vaginal cream	239	263	290	319	351
		vaginal tablet	479	527	580	637	701
2	Fluconazole	capsule	3,592	3,951	4,346	4,781	5,259
3	Nystatin	drops	958	1,054	1,159	1,275	1,402

The associated summary outputs for Anti-Fungal Medicines are shown in Table 9. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anti-Tuberculosis Medicines - First line medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains eight drugs under the category of Anti-Tuberculosis Medicines - First line medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Ethambutol	tablets	100 mg	Anti-Tuberculosis Medicines - First line medicines
		tablets	400 mg	Anti-Tuberculosis Medicines - First line medicines
2	Isoniazid	tablets	100 mg	Anti-Tuberculosis Medicines - First line medicines
		tablets	300mg	Anti-Tuberculosis Medicines - First line medicines
3	Streptomycin	injection	1 gm	Anti-Tuberculosis Medicines - First line medicines
4	Rifampicin + isoniazid (RH)	tablets	150mg + 75mg	Anti-Tuberculosis Medicines - First line medicines
		tablets dispersible	75mg + 50mg	Anti-Tuberculosis Medicines - First line medicines
5	Rifampicin + isoniazid + pyrazinamide + ethambutol (RHZE)	tablets	150mg + 75mg + 400mg + 275 mg	Anti-Tuberculosis Medicines - First line medicines
6	Rifampicin + isoniazid + ethambutol (RHE)	tablets	150 mg + 75 mg + 275 mg	Anti-Tuberculosis Medicines - First line medicines
7	Isoniazid + ethambutol	tablets	150 mg + 400 mg Strip/blister	Anti-Tuberculosis Medicines - First line medicines

Anti-Tuberculosis Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anti-Tuberculosis Medicines - First line medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anti-Tuberculosis Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anti-Tuberculosis Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases /

episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anti-Tuberculosis Medicines is as follows:

$$\text{Total Requirement of Anti-Tuberculosis Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anti-Tuberculosis Medicines - First line medicines is calculated and reflected in the table below:

Table 10. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Ethambutol	tablets	23,021	25,323	27,855	30,641	33,705
		tablets	15,347	16,882	18,570	20,427	22,470
2	Isoniazid	tablets	15,347	16,882	18,570	20,427	22,470
		tablets	5,755	6,331	6,964	7,660	8,426
3	Streptomycin	injection	13,429	14,772	16,249	17,874	19,661
4	Rifampicin + isoniazid (RH)	tablets	34,531	37,984	41,783	45,961	50,557
		tablets dispersible	34,531	37,984	41,783	45,961	50,557
5	Rifampicin + isoniazid + pyrazinamide + ethambutol (RHZE)	tablets	46,042	50,646	55,710	61,281	67,410
6	Rifampicin + isoniazid + ethambutol (RHE)	tablets	49,878	54,866	60,353	66,388	73,027
7	Isoniazid + ethambutol	tablets	5,755	6,331	6,964	7,660	8,426

The associated summary outputs for Anti-Tuberculosis Medicines are shown in Table 10. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anti-Leishmaniasis Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains one drug under the category of Anti-Leishmaniasis Medicines, as shown in table below;

#	Generic Drug Name	Form	Strength	Category
1	Meglumine antimonite, and sodium stibogluconate	injection	333 mg	Anti-Leishmaniasis Medicines

Anti-Leishmaniasis Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anti-Leishmaniasis Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anti-Leishmaniasis Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anti-Leishmaniasis Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anti-Leishmaniasis Medicines is as follows:

$$\text{Total Requirement of Anti-Leishmaniasis Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anti-Leishmaniasis Medicines is calculated and reflected in the table below:

Table 11. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Meglumine antimonite, and sodium stibogluconate	injection	790	869	956	1,051	1,157

The associated summary outputs for Anti-Leishmaniasis Medicines are shown in Table 11. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anti-Diabetic Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains four drugs under the category of Anti-Diabetic Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Glimepiride	tablets	3mg	Anti-Diabetic Medicines
2	Sitagliptin + metformin	tablets	50 / 500mg	Anti-Diabetic Medicines
3	Insulin Regular	injection	100 IU / ml	Anti-Diabetic Medicines
4	Insulin Comp.	injection	30 + 70 % w/v	Anti-Diabetic Medicines
5	Metformin (hydrochloride)	tablets	500 mg	Anti-Diabetic Medicines

Anti-Diabetic Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anti-Diabetic Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anti-Diabetic Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anti-Diabetic Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anti-Diabetic Medicines is as follows:

$$\text{Total Requirement of Anti-Diabetic Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anti-Diabetic Medicines is calculated and reflected in the table below:

Table 12. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Glimepiride	Tablets	26,254	28,879	31,767	34,944	38,438
2	Sitagliptin + metformin	Tablets	28,537	31,390	34,529	37,982	41,781
3	Insulin Regular	Injection 100 IU / ml	1,141	1,256	1,381	1,519	1,671
4	Insulin Comp.	Injection 30 + 70 % w/v	152	167	184	203	223
5	Metformin (hydrochloride)	Tablets	29,678	32,646	35,911	39,502	43,452

The associated summary outputs for Anti-Diabetic Medicines are shown in Table 12. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anti-Malarial Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains five drugs under the category of Anti-Malarial Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Artesunate (management of severe malaria)	ampoule	60 mg/ml in 1-ml	Anti-Malarial Medicines
2	Chloroquine (phosphate or sulphate)	Syrup; tablet	50mg/5ml:150mg	Anti-Malarial Medicines
3	Artesunate and lumefantrine	tablet	80mg + 480mg	Anti-Malarial Medicines
4	Primaquine (diphosphate) (<i>For Vivax</i>)	tablets	7.5 mg	Anti-Malarial Medicines
		tablets	15 mg	Anti-Malarial Medicines
5	Quinine	tablet	300 mg	Anti-Malarial Medicines

Anti-Malarial Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anti-Malarial Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anti-Malarial Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anti-Malarial Medicines is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anti-Malarial Medicines is as follows:

$$\text{Total Requirement of Anti-Malarial Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anti-Malarial Medicines is

calculated and reflected in the table below:

Table 13. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Artesunate (management of severe malaria)	ampoule	2,701	2,971	3,268	3,595	3,954
2	Chloroquine (phosphate or sulphate)	Syrup: tablet 50mg/5ml: 150mg	13,505	14,855	16,341	17,975	19,772
3	Artemether + Lumefantrine	tablet	8,103	8,913	9,805	10,785	11,863
4	Primaquine (diphosphate) (For Vivax)	Tablet 7.5 mg	16,206	17,826	19,609	21,570	23,727
		Tablet 15 mg	12,154	13,370	14,707	16,177	17,795
5	Quinine	Tablet 300 mg	20,257	22,283	24,511	26,962	29,659

The associated summary outputs for Anti-Malarial Medicines are shown in Table 13. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Medicines Acting on Gastrointestinal Tract

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains nine drugs under the category of Medicines Acting on Gastrointestinal Tract, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Aluminium hydroxide + magnesium trisilicate	tablets	250mg +500mg	Medicines Acting on Gastrointestinal Tract
2	Dimenhydrinate	injection	40mg	Medicines Acting on Gastrointestinal Tract
		suspension	12.5mg/4ml: 60ml	Medicines Acting on Gastrointestinal Tract
3	Drotaverine	tablets	40 mg	Medicines Acting on Gastrointestinal Tract
4	Metoclopramide	injection	10mg	Medicines Acting on Gastrointestinal Tract
5	Omeprazole	tablets	20mg	Medicines Acting on Gastrointestinal Tract
		injection	40mg	Medicines Acting on Gastrointestinal Tract
6	ORS (low osmolality) Recommended with Zinc Sulphate 20 mg dispersible tablet in case of acute diarrhea	sachet	each sachet contains glucose anhydrous 13.5gm B.P. trisodium citrate dihydrate 2.9 gm B.P potassium chloride 1.5gm B.P., sodium chloride 2.6 gm B.P.	Medicines Acting on Gastrointestinal Tract
7	Ranitidine	injection	25 mg / ml in 2ml	Medicines Acting on Gastrointestinal Tract
8	Glycerine	suppository		Medicines Acting on Gastrointestinal Tract
9	Enema	Small and larger		Medicines Acting on Gastrointestinal Tract

Medicines Acting on Gastrointestinal Tract are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Medicines Acting on Gastrointestinal Tract for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Medicines Acting on Gastrointestinal Tract

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Medicines Acting on Gastrointestinal Tract, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Medicines Acting on Gastrointestinal Tract is as follows:

$$\begin{array}{lcl} \text{Total Requirement of} & & \\ \text{Medicines Acting on} & = & \text{Yearly average number of cases / episodes of} \\ \text{Gastrointestinal Tract} & & \text{priority disease reported by primary \& secondary healthcare facilities of DoH} \end{array} \quad \times \quad \begin{array}{l} \text{Average dose of} \\ \text{drug per case /} \\ \text{episode} \end{array}$$

Using the above methodology and formula, the estimated yearly requirements of Medicines Acting on Gastrointestinal Tract is calculated and reflected in the table below:

Table 14. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Aluminium hydroxide + magnesium trisilicate	tablets	2,191	2,410	2,651	2,916	3,208
2	Dimenhydrinate	injection	876	964	1,061	1,167	1,283
		suspension	2,629	2,892	3,182	3,500	3,850
3	Drotaverine	tablets	23,665	26,031	28,634	31,498	34,648
4	Metoclopramide	injection	5,259	5,785	6,363	7,000	7,699
5	Omeprazole	tablets	52,588	57,847	63,632	69,995	76,995
		injection	438	482	530	583	642
6	ORS (low osmolarity)	sachet	8,765	9,641	10,605	11,666	12,832
7	Ranitidine	injection	876	964	1,061	1,167	1,283
8	Glycerine	suppository	1,753	1,928	2,121	2,333	2,566
9	Enema	Small and larger	438	482	530	583	642

The associated summary outputs for Medicines Acting on Gastrointestinal Tract are shown in Table 14. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Antiviral Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains single drug under the category of Antiviral Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Acyclovir	tablets	400mg	Antiviral Medicines
		injection	250mg	Antiviral Medicines

Antiviral Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Antiviral Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Antiviral Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Antiviral Medicines, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Antiviral Medicines is as follows:

$$\text{Total Requirement of Antiviral Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Antiviral Medicines is calculated and reflected in table below:

Table 15. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Acyclovir	tablets	476	523	576	633	697
		injection	190	209	230	253	279

The associated summary outputs for Antiviral Medicines are shown in Table 15. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Cardiovascular Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains eleven drugs under the category of Cardiovascular Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Amlodipine (besylate)	tablets	5 mg	Cardiovascular Medicines
2	Bisoprolol	tablets	5 mg	Cardiovascular Medicines
3	Dobutamine (hydrochloride)	injection	200mg	Cardiovascular Medicines
4	Glyceryl trinitrate hydralazine (hydrochloride)	sublingual	500 mcg	Cardiovascular Medicines
5	Isosorbide dinitrate	tablets	10mg	Cardiovascular Medicines
6	Valsartan + Hydrochlorthiazide	tablets	80mg + 12.5 mg	Cardiovascular Medicines
7	Propranolol	tablets	10mg	Cardiovascular Medicines
8	Amiodarone	injection	200 mg	Cardiovascular Medicines
9	Streptokinase	powder for injection	1.5 million IU	Cardiovascular Medicines
10	Rosuvastatin	tablets	10mg, 20mg,	Cardiovascular Medicines
11	Methyldopa	tablets	5 mg	Cardiovascular Medicines

Cardiovascular Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Cardiovascular Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Cardiovascular Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Cardiovascular Medicines, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment

regimen for a case /episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Cardiovascular Medicines is as follows:

$$\text{Total Requirement of Cardiovascular Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Cardiovascular Medicines is calculated and reflected in table below:

Table 16. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Amlodipine (besylate)	tablets	54,534	59,988	65,986	72,585	79,843
2	Bisoprolol	tablets	65,441	71,985	79,184	87,102	95,812
3	Dobutamine (hydrochloride)	injection	121	133	147	161	177
4	Glyceryl trinitrate hydralazine (hydrochloride)	sublingual	1,212	1,333	1,466	1,613	1,774
5	Isosorbide dinitrate	Injection /tablets	32,720	35,993	39,592	43,551	47,906
6	Valsartan + Hydrochlorthiazide	tablets	10,907	11,998	13,197	14,517	15,969
7	Propranolol	tablets	110,583	121,641	133,806	147,186	161,905
8	Amiodarone	injection	606	667	733	806	887
9	Streptokinase	powder for injection	182	200	220	242	266
10	Rosuvastatin	tablets	76,348	83,983	92,381	101,619	111,781
11	Methyldopa	tablets	87,255	95,980	105,578	116,136	127,750

The associated summary outputs for Cardiovascular Medicines are shown in Table 16. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Diuretic Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains two drugs under the category of Diuretic Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Furosemide	injection	10 mg	Diuretic Medicines
2	Furosemide + spironolactone	tablet	40mg+100mg	Diuretic Medicines

Diuretic Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Diuretic Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Diuretic Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Diuretic Medicines, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Diuretic Medicines is as follows:

$$\text{Total Requirement of Diuretic Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Diuretic Medicines is calculated and reflected in table below:

Table 17. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Furosemide	injection	39,922	43,914	48,306	53,136	58,450
2	Furosemide + spironolactone	tablet	59,883	65,871	72,459	79,704	87,675

The associated summary outputs for Diuretic Medicines are shown in Table 17. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Medicines Affecting Coagulation

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains three drugs under the category of Medicines affecting Coagulation, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Heparin	injection	5000i.u	Medicines affecting Coagulation
2	Enoxaparin (low molecular weight heparin)	injection	40 mg	Medicines affecting Coagulation
		injection	60mg	Medicines affecting Coagulation
3	Tranexamic acid	injection	100 mg/ml in 5-ml	Medicines affecting Coagulation
		capsule	250 mg	Medicines affecting Coagulation

Medicines affecting Coagulation are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Medicines affecting Coagulation for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Medicines Affecting Coagulation

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Medicines affecting Coagulation, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Medicines affecting Coagulation is as follows:

$$\text{Total Requirement of Medicines Affecting Coagulation} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Medicines affecting Coagulation is calculated and reflected in table below:

Table 18. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Heparin	injection	82	91	100	110	121
2	Enoxaparin (low molecular weight heparin)	injection	93	102	112	123	136
		injection	147	162	178	196	215
3	Tranexamic acid	injection	41	45	50	55	60
		capsule	618	679	747	822	904

The associated summary outputs for Medicines affecting Coagulation are shown in Table 18. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Oxytocic & Antioxytocic Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains one single drug under the category of Oxytocic & Antioxytocic Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Oxytocin	injection	10 IU in 1-ml	Oxytocic & Antioxytocic Medicines

Oxytocic & Antioxytocic Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Oxytocic & Antioxytocic Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Oxytocic & Antioxytocic Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Oxytocic & Antioxytocic Medicines, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Oxytocic & Antioxytocic Medicines is as follows:

$$\text{Total Requirement of Oxytocic \& Antioxytocic Medicines} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Oxytocic & Antioxytocic Medicines is calculated and reflected in table below:

Table 19. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Oxytocin	injection	911	1,002	1,102	1,212	1,334

The associated summary outputs for Oxytocic & Antioxytocic Medicines are shown in Table 19. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Medicines Acting on Respiratory Tract

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains four drugs under the category of Medicines Acting on Respiratory Tract, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Acefyline	syrup		Medicines Acting on Respiratory Tract
2	Beclomethasone	inhaler	50 mcg/actu; 800mcg/2ml	Medicines Acting on Respiratory Tract
3	Salbutamol (sulphate) / albuterol	inhaler	100 micrograms	Medicines Acting on Respiratory Tract
		solution for nebulizer	5 mg /ml	Medicines Acting on Respiratory Tract
4	Prednisolone	tablet	5mg	Medicines Acting on Respiratory Tract

Medicines Acting on Respiratory Tract are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Medicines Acting on Respiratory Tract for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Medicines Acting on Respiratory Tract

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Medicines Acting on Respiratory Tract, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Medicines Acting on Respiratory Tract is as follows:

$$\text{Total Requirement of Medicines Acting on Respiratory Tract} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Medicines Acting on Respiratory Tract is calculated and reflected in the table below:

Table 20. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Acefyline	syrup	1,456	1,602	1,762	1,938	2,132
2	Beclomethasone	inhaler	291	320	352	388	426
3	Salbutamol (sulphate) / albuterol	inhaler	291	320	352	388	426
		solution for nebulizer	728	801	881	969	1,066
4	Prednisolone	tablet	8,737	9,611	10,572	11,629	12,792

The associated summary outputs for Medicines Acting on Respiratory Tract are shown in Table 20. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Ophthalmic Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains six drugs under the category of Ophthalmic Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Chloramphenicol	eye drops	1%	Ophthalmic Medicines
2	Pilocarpine (hydrochloride or nitrate)	eye drops	2%	Ophthalmic Medicines
3	Acyclovir	Eye ointment	3 % w/w 4.5gm	Ophthalmic Medicines
4	Neomycin + bacitracin	Eye ointment	5 mg + 500 IU	Ophthalmic Medicines
5	Tobramycin + dexamethasone	eye drops	0.3 % + 0.1% w/v	Ophthalmic Medicines
6	Timolol (hydrogen maleate)	eye drops	0.25 %; 0.5 %	Ophthalmic Medicines

Ophthalmic Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Ophthalmic Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Ophthalmic Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Ophthalmic Medicines, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Ophthalmic Medicines is as follows:

$$\text{Total Requirement of Ophthalmic Medicines} = \frac{\text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH}}{\text{Average dose of drug per case / episode}}$$

Using the above methodology and formula, the estimated yearly requirements of Ophthalmic Medicines is

calculated and reflected in the table below:

Table 21. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Chloramphenicol	eye drops	273	300	330	363	399
2	Pilocarpine (hydrochloride or nitrate)	eye drops	318	350	385	423	466
3	Acyclovir	Eye ointment	227	250	275	302	333
4	Neomycin + bacitracin	Eye ointment	23	25	27	30	33
5	Tobramycin + dexamethasone	eye drops	182	200	220	242	266
6	Timolol (hydrogen maleate)	eye drops	91	100	110	121	133

The associated summary outputs for Ophthalmic Medicines are shown in Table 21. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need of Medicines for Ear, Nose & Throat

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains four drugs under the category of Medicines for Ear, Nose & Throat, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Betamethasone + neomycin	Drops	0.1%; 7.5ml	Medicines for Ear, Nose & Throat
2	Boroglycerine (<i>only for wax removing</i>)	ear drops	40%	Medicines for Ear, Nose & Throat
3	Polymyxin B sulphate + lignocaine	ear drops	each ml contains polymyxin B (sulphate) 10000 IU/ml, lignocaine:50mg/ml; 5ml	Medicines for Ear, Nose & Throat
4	Xylometazoline	nasal spray	0.05%	Medicines for Ear, Nose & Throat

Medicines for Ear, Nose & Throat are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Medicines for Ear, Nose & Throat for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Medicines for Ear, Nose & Throat

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Medicines for Ear, Nose & Throat, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Medicines for Ear, Nose & Throat is as follows:

$$\text{Total Requirement of Medicines for Ear, Nose \& Throat} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Medicines for Ear, Nose &

Throat is calculated and reflected in table below:

Table 22. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Betamethasone + neomycin	Drops	1,087	1,196	1,315	1,447	1,591
2	Boroglycerine (<i>only for wax removing</i>)	ear drops	1,630	1,793	1,973	2,170	2,387
3	Polymyxin B sulphate + lignocaine	ear drops	815	897	986	1,085	1,193
4	Xylometazoline	nasal spray /drops	543	598	658	723	796

The associated summary outputs for Medicines for Ear, Nose & Throat are shown in Table 22. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for I/V Infusions / Plasma Substitutes

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains nine drugs under the category of I/V Infusions / Plasma Substitutes, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Dextrose + saline	infusion	5 % + 0.9 % w/v;	I/V Infusions / Plasma Substitutes
		infusion	5% +0.45%	I/V Infusions / Plasma Substitutes
		infusion	4.5%+0.18% (i/5th)	I/V Infusions / Plasma Substitutes
2	Glucose / dextrose	infusion	25% 20ml	I/V Infusions / Plasma Substitutes
3	Saline	infusion	0.9% 100ml	I/V Infusions / Plasma Substitutes
		infusion	0.9% 500ml	I/V Infusions / Plasma Substitutes
4	Mannitol	infusion	20 % w/v	I/V Infusions / Plasma Substitutes
5	Potassium chloride	solution	11.2 % in 20-ml ampoule	I/V Infusions / Plasma Substitutes
6	Ringer Lactate + dextrose	infusion	500ml	I/V Infusions / Plasma Substitutes
7	Sodium bicarbonate	injection	7.5 % isotonic	I/V Infusions / Plasma Substitutes
8	Water for injection	ampoule	5 ml, 10 ml	I/V Infusions / Plasma Substitutes
9	Haemacel	solution	3%, 5%	I/V Infusions / Plasma Substitutes

I/V Infusions / Plasma Substitutes are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of I/V Infusions / Plasma Substitutes for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast I/V Infusions / Plasma Substitutes

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of I/V Infusions / Plasma Substitutes, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of I/V Infusions / Plasma Substitutes is as follows:

$$\text{Total Requirement of I/V Infusions / Plasma Substitutes} = \frac{\text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH}}{\text{Average dose of drug per case / episode}}$$

Using the above methodology and formula, the estimated yearly requirements of I/V Infusions / Plasma Substitutes is calculated and reflected in table below:

Table 23. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Dextrose + saline	infusion	1,183	1,301	1,432	1,575	1,732
		infusion	503	554	609	670	737
		infusion	378	415	457	503	553
2	Glucose / dextrose	infusion	705	775	853	938	1,032
3	Saline	infusion	730	803	883	972	1,069
		infusion	629	692	761	838	921
4	Mannitol	infusion	252	277	305	335	369
5	Potassium chloride	Solution	554	609	670	737	811
6	Ringer Lactate + dextrose	infusion	1,208	1,329	1,462	1,608	1,769
7	Sodium bicarbonate	injection	529	582	640	704	774
8	Water for injection	ampoule	655	720	792	871	958
9	Haemacel	Solution	126	138	152	168	184

The associated summary outputs for I/V Infusions / Plasma Substitutes are shown in Table 23. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Vitamins & Minerals

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains five drugs under the category of Vitamins & Minerals, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	B complex (B1, B6 and B12)	syrup	DRAP approved	Vitamins & Minerals
2	Ferrous salt (fumarate)	syrup	equivalent to 25 mg/ml iron	Vitamins & Minerals
		tablet		Vitamins & Minerals
3	Folic acid	tablets	5mg	Vitamins & Minerals
4	Pyridoxine (vitamin B6)	tablets	50mg	Vitamins & Minerals
5	Zinc sulphate (for acute diarrhea with ORS)	dispersible tablets	20 mg	Vitamins & Minerals
		syrup	20mg / 5ml; 60ml	Vitamins & Minerals

Vitamins & Minerals are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Vitamins & Minerals for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Vitamins & Minerals

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Vitamins & Minerals, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Vitamins & Minerals is as follows:

$$\text{Total Requirement of Vitamins \& Minerals} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Vitamins & Minerals is calculated and reflected in table below:

Table 24. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	B complex (B1, B6 and B12)	syrup	951	1,046	1,151	1,266	1,393
2	Ferrous salt (fumarate)	syrup	647	712	783	861	947
		tablet	123,279	135,607	149,167	164,084	180,492
3	Folic acid	tablets	34,244	37,669	41,435	45,579	50,137
4	Pyridoxine (vitamin B6)	tablets	26,254	28,879	31,767	34,944	38,438
5	Zinc sulphate (for acute diarrhea with ORS)	dispersible tablets	3,805	4,185	4,604	5,064	5,571
		syrup	799	879	967	1,064	1,170

The associated summary outputs for Vitamins & Minerals are shown in Table 24. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Anxiolytics

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains two drugs under the category of Anxiolytics, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Paroxetine	tablet	20 mg	Anxiolytics
2	Diazepam	tablets	5mg	Anxiolytics
		injection	10mg/ml in 2 ml ampoule	Anxiolytics

Anxiolytics are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Anxiolytics for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Anxiolytics

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Anxiolytics, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Anxiolytics is as follows:

$$\text{Total Requirement of Anxiolytics} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Anxiolytic is calculated and reflected in table below:

Table 25. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Paroxetine	tablet	2,427	2,670	2,937	3,231	3,554
2	Diazepam	tablets	2,697	2,967	3,263	3,589	3,948
		injection	1,348	1,483	1,632	1,795	1,974

The associated summary outputs for Anxiolytics are shown in Table 25. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Dermatological Medicines

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains five drugs under the category of Dermatological Medicines, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Betamethasone + gentamicin	ointment	15gm	Dermatological Medicines
2	Clotrimazole	cream	1.00%	Dermatological Medicines
3	Permethrin	lotion	5%	Dermatological Medicines
4	Polymyxin B (sulphate)+ bacitracin zinc	ointment	10000 IU/g + 500 IU/g	Dermatological Medicines
5	Silver sulphadiazine	cream	1% in 50gm	Dermatological Medicines

Dermatological Medicines are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Dermatological Medicines for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Dermatological Medicines

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Dermatological Medicines, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Dermatological Medicines is as follows:

$$\text{Total Requirement of Dermatological Medicines} = \frac{\text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH}}{\text{Average dose of drug per case / episode}} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Dermatological Medicines is

calculated and reflected in table below:

Table 26. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Betamethasone + gentamicin	ointment	431	474	522	574	631
2	Clotrimazole	cream	958	1,054	1,159	1,275	1,402
3	Permethrin	lotion	383	421	464	510	561
4	Polymyxin B (sulphate)+ bacitracin zinc	ointment	287	316	348	382	421
5	Silver sulphadiazine	cream	479	527	580	637	701

The associated summary outputs for Dermatological Medicines are shown in Table 26. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Medicines for Mental & Behavioral Disorders

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains single drug under the category of Medicines for Mental & Behavioral Disorders, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Amitriptyline (hydrochloride)	tablets	25 mg	Medicines for Mental & Behavioral Disorders

Medicines for Mental & Behavioral Disorders are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Medicines for Mental & Behavioral Disorders for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Medicines for Mental & Behavioral Disorders

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Medicines for Mental & Behavioral Disorders, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Medicines for Mental & Behavioral Disorders is as follows:

$$\text{Total Requirement of Medicines for Mental \& Behavioral Disorders} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Medicines for Mental & Behavioral Disorders is calculated and reflected in table below:

Table 27. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Amitriptyline (hydrochloride)	tablets	1,618	1,780	1,958	2,154	2,369

The associated summary outputs for Medicines for Mental & Behavioral Disorders are shown in Table 27. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Contraceptives

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHSDP) for Primary and Secondary Health Care facilities. The formulary contains two drugs under the category of Contraceptives, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	DMPA (medroxyprogesterone acetate)	injection	150 mg/ 1ml	Contraceptives
2	Ethinylloestradiol + norethisterone	CO pills	35 mcg + 1mg	Contraceptives

Contraceptives are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Contraceptives for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Contraceptives

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Contraceptives, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Contraceptives is as follows:

$$\text{Total Requirement of Contraceptives} = \frac{\text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH}}{\text{Average dose of drug per case / episode}}$$

Using the above methodology and formula, the estimated yearly requirements of Contraceptives is calculated and reflected in table below:

Table 28. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	DMPA (medroxyprogesterone acetate)	injection	475	523	575	632	696
2	Ethinylloestradiol + norethisterone	CO pills	2,485	2,734	3,007	3,308	3,639

The associated summary outputs for Contraceptives are shown in Table 28. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Vaccines & Sera

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains five drugs under the category of Vaccines & Sera, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Anti-rabies vaccine (PVRV)	single dose vial	>2.5 IU	Vaccines & Sera
2	Anti-snake venom serum			Vaccines & Sera
3	Rabies immunoglobulin (human)	injection	150 IU/ml	Vaccines & Sera
4	Tetanus toxoid	injection		Vaccines & Sera
5	Anti-D (Rho) immunoglobulin	injection		Vaccines & Sera

Vaccines & Sera are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Vaccines & Sera for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Vaccines & Sera

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Vaccines & Sera, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Vaccines & Sera is as follows:

$$\text{Total Requirement of Vaccines \& Sera} = \frac{\text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH}}{\text{Average dose of drug per case / episode}} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Vaccines & Sera is calculated and reflected in table below:

Table 29. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Anti-rabies vaccine (PVRV)	single dose vial	50	54	60	66	72
2	Anti-snake venom serum		39	42	47	51	56
3	Rabies immunoglobulin (human)	injection	44	48	53	59	64
4	Tetanus toxoid	injection	55	61	67	73	81
5	Anti-D (Rho) immunoglobulin	injection	28	30	33	37	40

The associated summary outputs for Vaccines & Sera are shown in Table 29. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Forecasted Need for Antiseptics / Disinfectants

The District Priority Formulary of Medicines is derived from Khyber Pakhtunkhwa's Essential Medicines List (EML), MCC formulary and Minimum Health Services Delivery Package (MHS DP) for Primary and Secondary Health Care facilities. The formulary contains three drugs under the category of Antiseptics / Disinfectants, as shown in the table below;

#	Generic Drug Name	Form	Strength	Category
1	Chlorhexidine digluconate (7.1%)	gel	equivalent to 4 % chlorhexidine	Antiseptics / Disinfectants
2	Hydrogen peroxide	solution	6 % v/v	Antiseptics / Disinfectants
3	Povidone-iodine	solution	10 % w/v 60ml	Antiseptics / Disinfectants
		scrub	7.5 % w/v, 450ml	Antiseptics / Disinfectants

Antiseptics / Disinfectants are generally meant for both secondary and primary level health care facilities including DHQ, THQ hospitals, Rural Health Centres and Basic Health Units.

The following input data is used to estimate the yearly requirements of Antiseptics / Disinfectants for the forecasting period 2020-2025. The forecast will provide the base for procurement and distribution of medicines to the primary and secondary health care facilities in the district.

DHIS Data Needed to Forecast Antiseptics / Disinfectants

- Average number of yearly cases / episodes of the health problem / priority disease.
- Standard or average treatment regimen for a case / episode of the health problem / priority disease.
- Expected projected changes in consumption (potential losses or scale-up in use)

The methodology used for calculation of total requirement of Antiseptics / Disinfectants, is based on the average number of cases / episodes of the priority disease and the standard or the average treatment regimen for a case / episode. The average number for the year 2020-21 is calculated based on the average of cases / episodes reported in District Health Information System (DHIS) during the years 2017-19.

The formula used for the calculation of total estimated requirement of Antiseptics / Disinfectants is as follows:

$$\text{Total Requirement of Antiseptics / Disinfectants} = \text{Yearly average number of cases / episodes of priority disease reported by primary \& secondary healthcare facilities of DoH} \times \text{Average dose of drug per case / episode}$$

Using the above methodology and formula, the estimated yearly requirements of Antiseptics / Disinfectants is

calculated and reflected in table below:

Table 30. Forecasted Yearly Estimations

#	Generic Drug Name	Unit	Forecasted Yearly Requirements				
			2020-21	2021-22	2022-23	2023-24	2024-25
1	Chlorhexidine digluconate (7.1%)	gel	252	277	305	335	369
2	Hydrogen peroxide	solution	503	554	609	670	737
3	Povidone-iodine	solution	176	194	213	235	258
		scrub	201	222	244	268	295

The associated summary outputs for Antiseptics / Disinfectants are shown in Table 30. By applying the different attributes and assumptions, the year-wise forecasted numbers for the period 2020-25 are estimated against each drug that needs to be procured for primary and secondary health care facilities of the district.

Overall Funding Estimates for District Priority Medicines (2020-25)

Based on the results of the forecasted requirement of Priority Medicines for the primary and secondary health facilities of the district, financing needs have been estimated, as shown in the following tables and figures. The estimates are based on limited data available for the forecasting exercise and are shown by different commodity category. Estimation of required quantities and funding for medicines categories with no or hardly any data was under taken using the proxy data of priority diseases.

Figure 4 below, shows the overall financing requirement for the priority commodities for the Department of Health, District Mohmand. The total five-year requirement is estimated as PKR. 79,950,847. It includes funding requirement for TB drugs, although the district is supplied with TB medicines by the National TB Control Program through the Provincial TB Control Program. Of this requirement, ~ 26.1 percent is for the Antibiotics / Antimicrobials medicines category, ~ 5.2 percent for Anti-Diabetic Medicines, ~ 8 percent for Anti-Leishmaniasis Medicines, ~9.2 percent for Anti-Tuberculosis medicines, ~ 13.9 per cent for Cardiovascular Medicines, ~ 5.4 percent for Anti-malarial medicines and ~ 4 percent for GI Medicines.

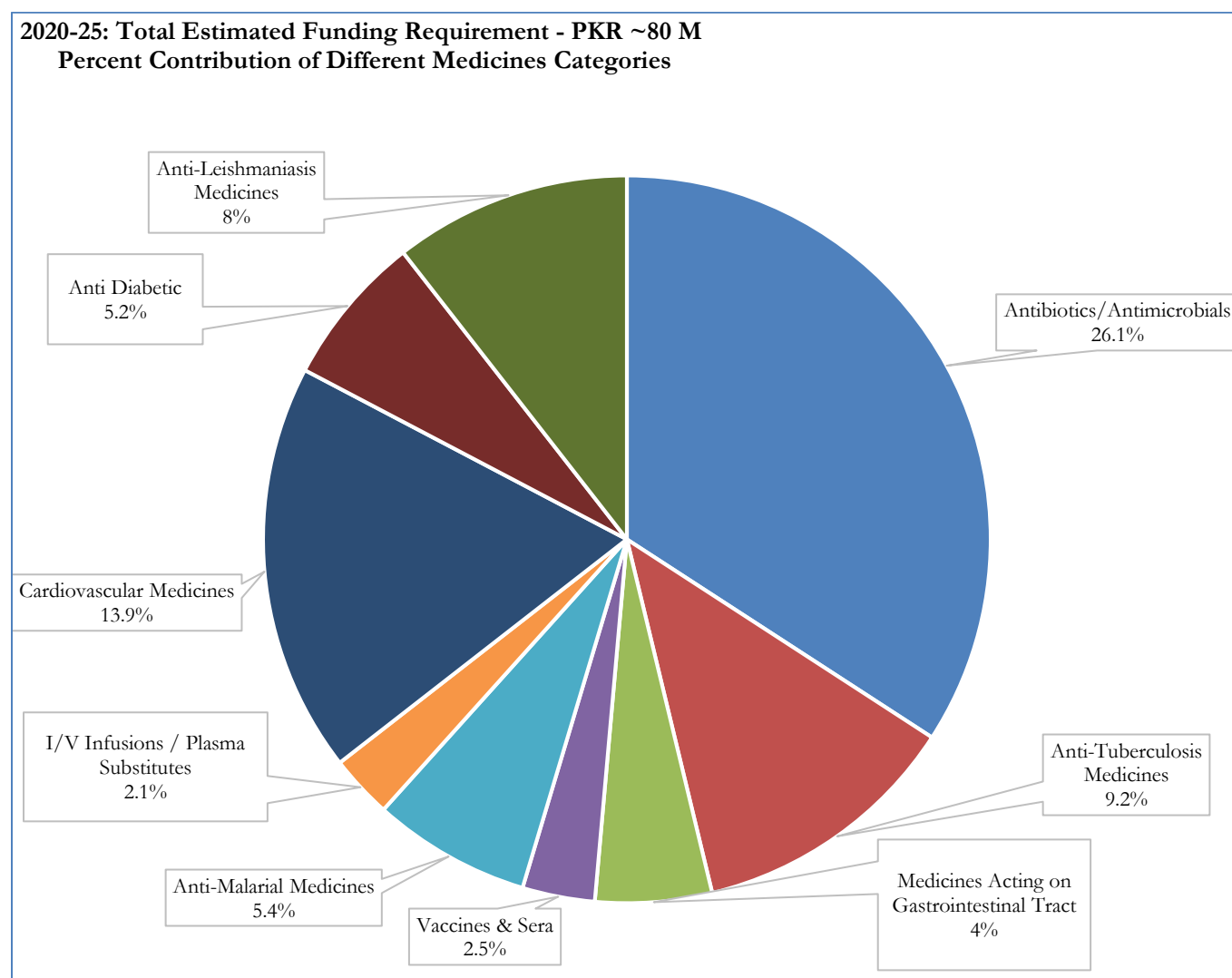


Figure 3: Overall Financing Requirement of Key District Priority Medicines for Department of Health, Mohmand.

Year-wise Funding Requirement for Different Key Categories of District Priority Medicines

Table 31 shows the year wise financing requirement for the Department of Health, Mohmand. It reflects the year wise financing requirement for different key medicine categories and diseases / health conditions. Of this year wise requirement, Antibiotics, Anti-Leishmaniasis medicines, Anti-TB drugs, Anti-Diabetic, Cardiovascular medicines and Anti-Malarial medicines categories have the maximum contribution over the years.

Yearly Funding Requirement for Key Medicine Categories (PKR)							
S. No	Medicine Category	2020-21	2021-22	2022-23	2023-24	2024-25	Total
1	Antibiotics/Antimicrobials	3,415,485	3,757,033	4,132,736	4,546,010	5,000,611	20,851,875
2	Anti-Tuberculosis Medicines	1,206,328	1,326,961	1,459,657	1,605,623	1,766,185	7,364,755
3	Medicines Acting on Gastrointestinal Tract	517,632	569,395	626,334	688,968	757,864	3,160,193
4	Vaccines & Sera	322,108	354,318	389,750	428,725	471,598	1,966,498
5	Anti-Malarial Medicines	703,402	773,742	851,116	936,228	1,029,851	4,294,339
6	Antiseptics / Disinfectants	149,299	164,229	180,652	198,717	218,589	911,485
7	Medicines Acting on Respiratory Tract	184,160	202,576	222,834	245,118	269,629	1,124,318
8	I/V Infusions / Plasma Substitutes	280,864	308,950	339,845	373,829	411,212	1,714,700
9	Anaesthetics	96,221	105,843	116,428	128,070	140,877	587,440
10	Cardiovascular Medicines	1,821,719	2,003,891	2,204,280	2,424,708	2,667,179	11,121,779
11	Analgesics / Non-Steroidal Anti-Inflammatory Medicines	456,473	502,120	552,332	607,566	668,322	2,786,814
12	Anti-Diabetic Medicines	675,571	743,129	817,441	899,186	989,104	4,124,431
13	ophthalmic Medicines	45,230	49,753	54,728	60,201	66,221	276,132
14	ENT Medicines	90,409	99,450	109,395	120,334	132,368	551,955
15	Anti-Leishmaniasis Medicines	1,054,194	1,159,613	1,275,574	1,403,132	1,543,445	6,435,957

Table 31: Year-wise Financing Requirement for Different Key Medicines Categories

Year-wise Funding Requirement for Antibiotics / Antimicrobial Medicines for the Department of Health, Mohmand

Figure 5 shows the year wise financing requirement for Antibiotics / Antimicrobial category of priority medicines for the Department of Health, Mohmand. The accuracy of this year wise requirement, heavily depends over the reliability, completeness and quality of data quoted by the district store of the health department of Mohmand. Using more complete, accurate and reliable data, district health authorities can come up with more accurate estimation of quantities and funds requirements, through this quantification modeling exercise for priority medicines.

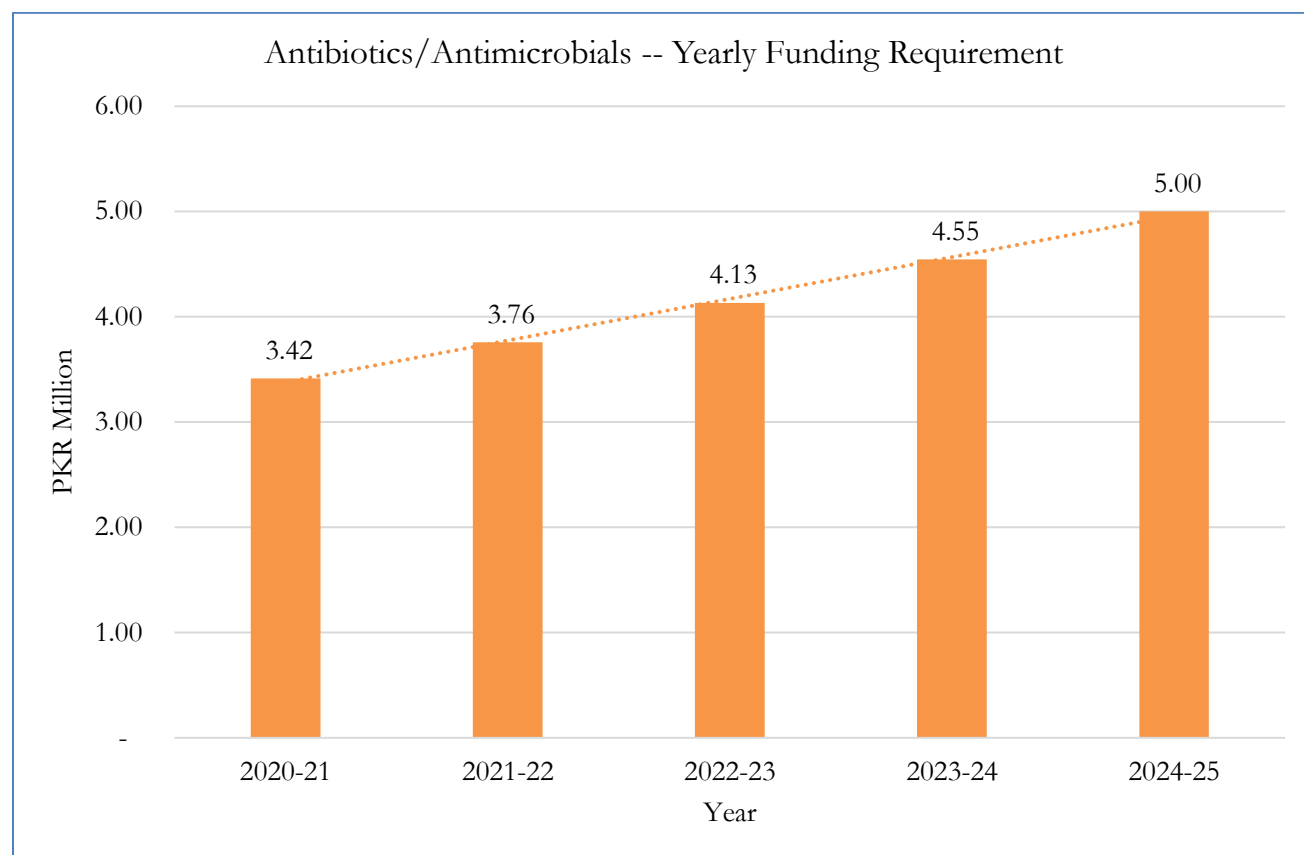


Figure 4: Year-wise Financing Requirement for Antibiotics / Antimicrobial Priority Commodities.

Year-wise Funding Requirement for Anti-Tuberculosis Medicines for the Department of Health, Mohmand

Figure 6 shows the year wise financing requirement for Anti-Tuberculosis category of priority medicines for the Department of Health, Mohmand. The accuracy of this year wise requirement, heavily depends over the reliability, completeness and quality of data quoted by the district store of the health department of Mohmand. Using more complete, accurate and reliable data, district health authorities can come up with more accurate estimation of quantities and funds requirements, through this quantification modeling exercise for priority medicines.

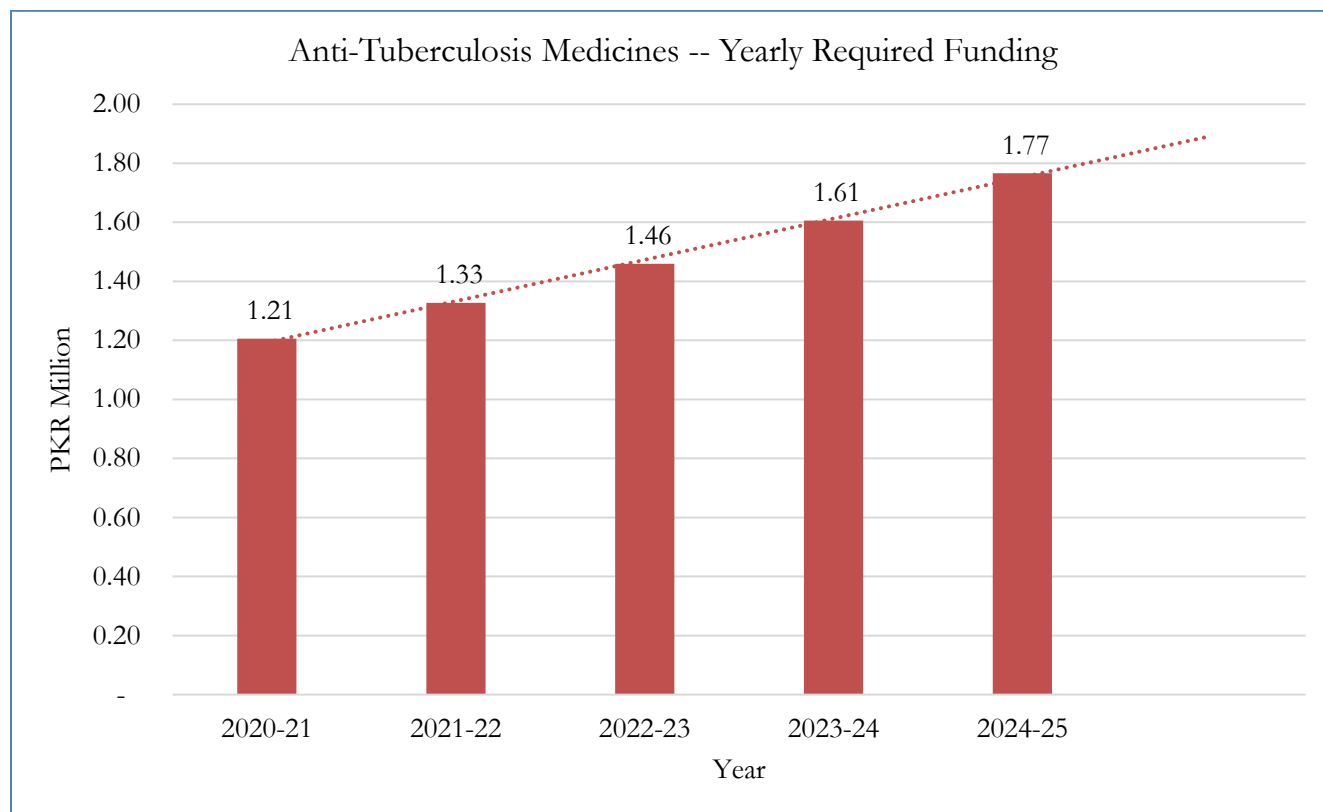


Figure 5: Year-wise Financing Requirement for Anti-Tuberculosis Commodities.

Year-wise Funding Requirement for Anti-Diabetic Medicines for the Department of Health, Mohmand

Figure 7 shows the year wise financing requirement for Anti-Diabetic Medicines category for the Department of Health, Mohmand. The accuracy of this year wise requirement, heavily depends over the reliability, completeness and quality of data quoted by the district store of the health department of Mohmand. Using more complete, accurate and reliable data, district health authorities can come up with more accurate estimation of quantities and funds requirements, through this quantification modeling exercise for priority medicines.

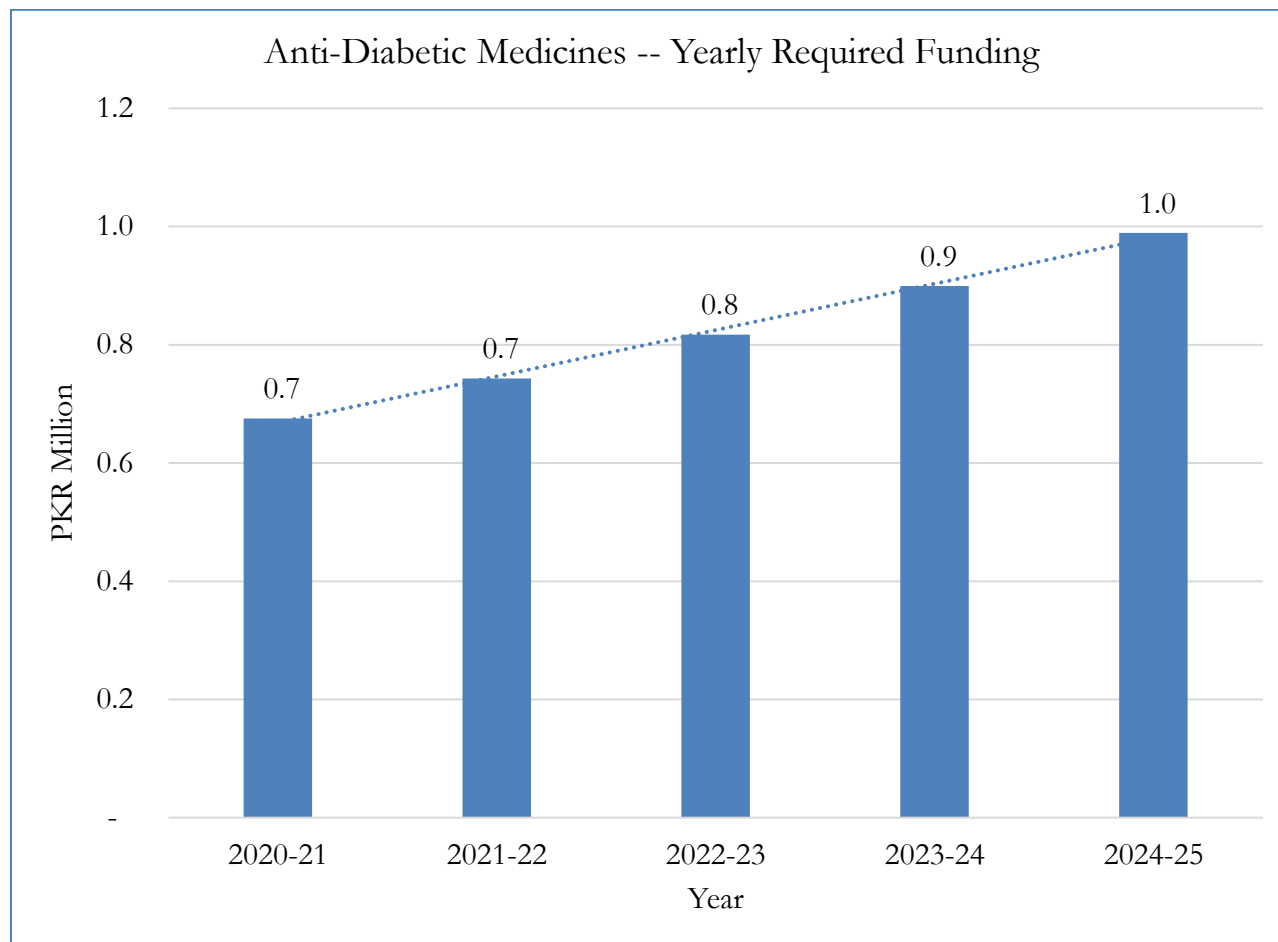


Figure 6: Year-wise Financing Requirement for Anti-Diabetic Medicines.

Year-wise Funding Requirement for Anti-Leishmaniasis Medicines for the Department of Health, Mohmand

Figure 8 shows the year wise financing requirement for Anti-Leishmaniasis Medicines category for the Department of Health, Mohmand. The accuracy of this year wise requirement, heavily depends over the reliability, completeness and quality of data quoted by the district store of the health department of Mohmand. Using more complete, accurate and reliable data, district health authorities can come up with more accurate estimation of quantities and funds requirements, through this quantification modeling exercise for priority medicines.

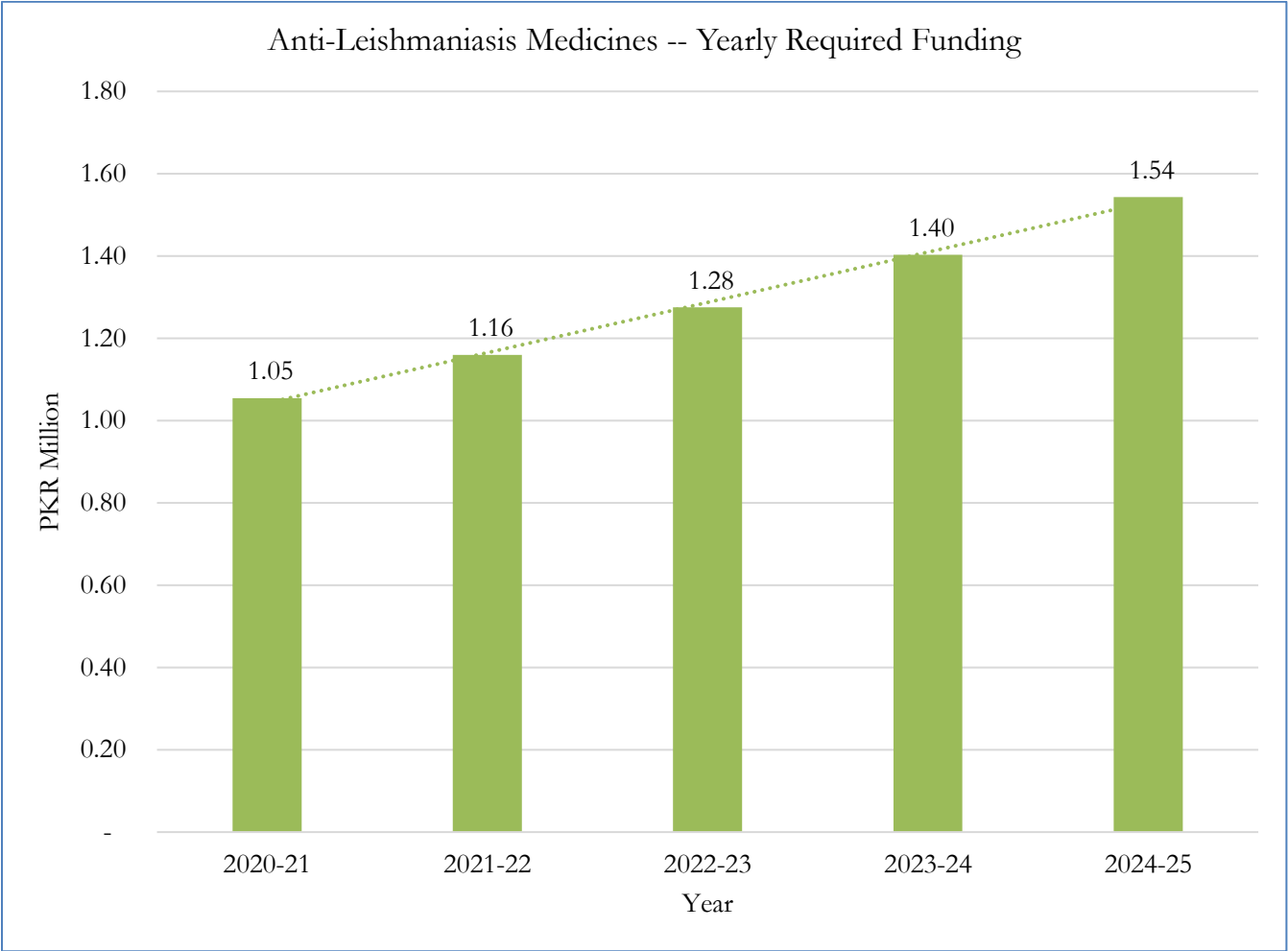


Figure 7: Year-wise Financing Requirement for the Anti-Leishmaniasis Medicines.

Year-wise Funding Requirement for the Cardiovascular Medicines for the Department of Health, Mohmand

Figure 9 shows the year wise financing requirement for the Cardiovascular Medicines category for the Department of Health, Mohmand. The accuracy of this year wise requirement, heavily depends over the reliability, completeness and quality of data quoted by the district store of the health department of Mohmand. Using more complete, accurate and reliable data, district health authorities can come up with more accurate estimation of quantities and funds requirements, through this quantification modeling exercise for priority medicines.

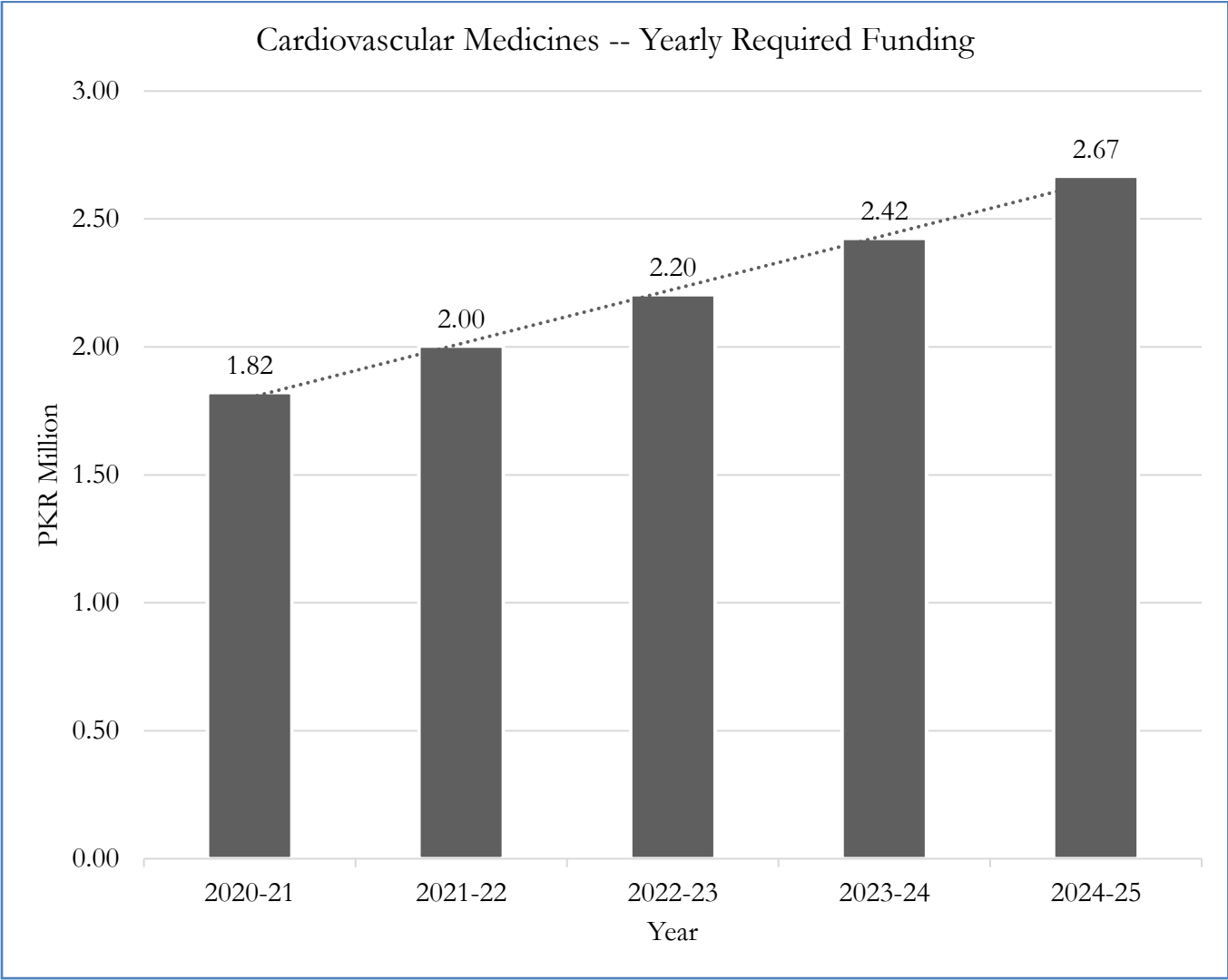


Figure 8: Year-wise Financing Requirement for Cardiovascular Medicines.

Adjust for Losses and Programmatic Changes

The proportion of patients likely to be treated with the priority medicines depends on service delivery policies, strategies and approaches of District Health Authority (DHA). For example, if the number of incidence or episodes of diarrhea is expected to change, these adjustments are made when estimating the number of episodes. For forecasting and budgetary purposes, we are adding a percentage for scale up and uncertainties in demand to avoid stock-outs. It is also important to stress that, in these forecasts, the primary and secondary health care facilities were considered, taking into account the existing strategies and priorities status (rate of scale up). When actual procurement of these commodities is being planned, DHA and DoH, KP will need to assess the status of implementation of formulary, and adjust the individual medicine requirement as per local requirement and relevance.

Forecast Limitations

Producing accurate forecasts of these district priority commodities remains a challenge in Khyber Pakhtunkhwa because of unavailability of quality data including procurement, issuance / consumption and stock-on-hand data. Some of the other challenges or limitations faced in producing this forecast include the following:

- Obtaining information on the different treatment regimens was a challenge in carrying out the exercise since standardized provincial treatment protocols do not currently exist for most of the conditions.
- The lack of a coordinated/unified provincial rate contracting and district level procurement and supply system within DoH for specific district priority commodities still remains a challenge. For example, different districts have different requirements and preferences for priority drugs.
- No formal linkages were available between priority medicines and priority diseases and the different target population groups.
- Information on the number of days of stock-outs of products at the district and sub-district levels is not available.
- Information on the minimum and maximum stock levels at different levels of supply chain and buffer stock for different commodities is not available.
- Data for all priority medicines is not readily available thus, limiting the costing and estimation of required quantities for full range of priority medicines.
- Reliable or official unit cost for different commodities is not available for costing purposes.
- The accuracy of this exercise fully depends on the availability of updated records and data at district level.
- There is a need that each district health authority should take appropriate measures to ensure excellent record keeping and data visibility at district and sub-district level.
- Forecast is limited to medicines data availability and yearly funds requirement is also limited to these medicines.

RECOMMENDATIONS

- Since there is no information and data on the actual consumption of Priority medicines, DoH, KP should develop a mechanism for collecting logistics data on a routine basis from the health facilities to enable expeditious determination of district requirements of Priority medicines.
- To ensure data availability and visibility, DHIS and DoH KP need to revise DHIS instruments so that these data collection tools can capture priority diseases and medicines supply chain data from primary and secondary health care facilities.
- DoH should include these Priority commodities in their logistics reporting forms and take necessary steps to make the logistics data available in their existing MIS and ensure the ultimate availability of the necessary data in web-based Pakistan LMIS.
- The technical capacity of the District DoH staff for conceptualizing the forecasting methodology, assumptions data validation process, and for undertaking the overall forecasting and supply planning exercise, must be strengthened. Quantification can be institutionalized in District DoH by establishing a unit of relevant technical personnel across the entities that can sensitize and transfer skills to the lower levels.
- Coordination among the different service delivery stakeholders is essential before priority commodities are procured.
- District can consider disseminating the forecasting report to the drug manufacturers to inform them of the quantity of commodities needed for the whole year, so they too can plan accordingly.
- This forecasting exercise should be reviewed annually by the entities and adjusted to account for changes in the assumptions or data in accordance with strategic plans and new data.
- District Managers can use the forecasting algorithms for each commodity presented in this document for their local procurement planning using their own routine health information systems and data.
- Different level healthcare providers and managers should maintain an effective coordination mechanism during procurement planning, particularly for items procured at district level. This effort will minimize the over stocking and potential wastage of commodities.

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ANNEX-I

KHYBER PAKHTUNKHWA DISTRICT PRIORITY MEDICINES LIST (FORMULARY)

#	Generic Drug Name	#	Form	Strength	Category
1	isoflurane	1	inhalation		Anaesthetics General
2	propofol	2	injection	10 mg / ml in 20 ml	Anaesthetics General
3	atracurium (besylate)	3	injection	30 mg/ml in 3ml; 5ml	Muscle Relaxants
4	glycopyrrolate	4	injection	0.2mg /ml in 1ml (for anesthesia only)	Muscle Relaxants
5	neostigmine (metilsulphate)	5	injection	2.5 mg in 1ml	Muscle Relaxants
6	bupivacaine (hydrochloride)	6	injection	0.50%	Anaesthetics Local
7	lignocaine (hydrochloride)	7	injection	2% in 10ml	Anaesthetics Local
		8	topical gel	2% w/w	Anaesthetics Local
8	tramadol	9	injection	50 mg / ml	Analgesics Opioid & Centrally Acting
9	acetylsalicylic acid	10	dispersible tablets	300 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		11	dispersible tablets	75mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
10	diclofenac (sodium)	12	tablets	50 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		13	ampoule	75 mg in 3ml	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
11	paracetamol	14	tablets	500 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		15	syrup	120 mg / 5ml	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		16	suppository	100 mg	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
		17	Infusion	10mg/ml	Analgesics / Non-Steroidal Anti-Inflammatory Medicines
12	chlorpheniramine (hydrogen maleate)	18	injection	22.7mg	Antiallergics and Medicines Used in Anaphylaxis
13	dexamethasone (disodium phosphate)	19	injection	4 mg / ml	Antiallergics and Medicines Used in Anaphylaxis
14	epinephrine (adrenaline)	20	ampoule	1 mg / ml	Antiallergics and Medicines Used in Anaphylaxis
15	hydrocortisone (sodium succinate)	21	injection	100 mg	Antiallergics and Medicines Used in Anaphylaxis
		22	injection	250 mg	Antiallergics and Medicines Used in Anaphylaxis
16	atropine (sulphate)	23	ampoule	1 mg in 1ml	Antidotes and Other Substances Used in Poisoning
17	charcoal activated	24	powder		Antidotes and Other Substances Used in Poisoning
18	naloxone (hydrochloride)	25	ampoule	400 mcg in 1ml	Antidotes and Other Substances Used in Poisoning
19	carbamazepine	26	tablets	200 mg	Anticonvulsant / Antiepileptic Medicines
		27	syrup	100mg / 5ml	Anticonvulsant / Antiepileptic Medicines
21	magnesium sulphate (For eclampsia only)	28	injection	500mg/ml, 10ml	Anticonvulsant / Antiepileptic Medicines
21	amoxicillin + clavulanic	29	tablets	625 mg	Antibiotics/Antimicrobials - Key

#	Generic Drug Name	#	Form	Strength	Category
	acid				Access Antibiotics
		30	syrup	125 mg amoxicillin + 312.5 mg clavulanic acid / 5 ml	Antibiotics/Antimicrobials - Key Access Antibiotics
		31	injection	1.2 Gm	Antibiotics/Antimicrobials - Key Access Antibiotics
22	doxycycline	32	capsule	100 mg	Antibiotics/Antimicrobials - Key Access Antibiotics
23	metronidazole	33	tablets	400 mg	Antibiotics/Antimicrobials - Key Access Antibiotics
		34	Injection	500 mg in 100-ml	Antibiotics/Antimicrobials - Key Access Antibiotics
		35	syrup	200 mg / 5ml (<i>benzgate</i>)	Antibiotics/Antimicrobials - Key Access Antibiotics
24	azithromycin	36	capsule	250 mg	Antibiotics/Antimicrobials - Watch Group Antibiotics
		37	suspension	125mg / 5ml in 22.5ml	Antibiotics/Antimicrobials - Watch Group Antibiotics
25	cefixime (trihydrate)	38	capsule	400 mg	Antibiotics/Antimicrobials - Watch Group Antibiotics
		39	suspension	200mg / 5ml	Antibiotics/Antimicrobials - Watch Group Antibiotics
26	ceftriaxone (sodium)	40	powder for injection	500 mg, 1gm	Antibiotics/Antimicrobials - Watch Group Antibiotics
27	Cefoperazone + Salbactam	41	injection	1gm	Antibiotics/Antimicrobials - Watch Group Antibiotics
28	Ciprofloxacin	42	tablet	250mg	Antibiotics/Antimicrobials - Watch Group Antibiotics
		43	syrup	100mg/5ml	Antibiotics/Antimicrobials - Watch Group Antibiotics
		44	infusion	200mg/100ml	Antibiotics/Antimicrobials - Watch Group Antibiotics
29	mebendazole	45	syrup	100mg/5ml	Anthelmintic Medicines
		46	tablets	500 mg (<i>with caution only for adults</i>)	Anthelmintic Medicines
30	clotrimazole	47	vaginal cream	10% w/v	Anti-Fungal Medicines
		48	vaginal tablet	500 mg	Anti-Fungal Medicines
31	fluconazole	49	capsule	150mg	Anti-Fungal Medicines
32	nystatin	50	drops	100,000 IU/ml	Anti-Fungal Medicines
33	ethambutol	51	tablets	100 mg	Anti-Tuberculosis Medicines - First line medicines
		52	tablets	400 mg	Anti-Tuberculosis Medicines - First line medicines
34	isoniazid	53	tablets	100 mg	Anti-Tuberculosis Medicines - First line medicines
		54	tablets	300mg	Anti-Tuberculosis Medicines - First line medicines
35	streptomycin	55	injection	1 gm	Anti-Tuberculosis Medicines - First line medicines
36	rifampicin + isoniazid (RH)	56	tablets	150mg + 75mg	Anti-Tuberculosis Medicines - First line medicines
		57	tablets dispersible	75mg + 50mg	Anti-Tuberculosis Medicines - First line medicines
37	rifampicin + isoniazid + pyrazinamide + ethambutol RHZE)	58	tablets	150mg+75mg+400mg+275 mg	Anti-Tuberculosis Medicines - First line medicines

#	Generic Drug Name	#	Form	Strength	Category
38	rifampicin + isoniazid + ethambutol (RHE)	59	tablets	150 mg + 75 mg + 275 mg	Anti-Tuberculosis Medicines - First line medicines
39	isoniazide + ethambutol	60	tablets	150 mg + 400 mg Strip/blister	Anti-Tuberculosis Medicines - First line medicines
40	Meglumine antimonite, and sodium stibogluconate	61	injection	333 mg	Anti-Leishmaniasis Medicines
41	glimepiride	62	tablets	2mg	Anti-Diabetic Medicines
42	sitagliptin + metformin	63	tablets	50/500mg	Anti-Diabetic Medicines
43	insulin regular	64	injection	100 IU / ml	Anti-Diabetic Medicines
44	insulin comp	65	injection	30 + 70 % w/v	Anti-Diabetic Medicines
45	metformin (hydrochloride)	66	tablets	500 mg	Anti-Diabetic Medicines
46	artesunate (<i>management of severe malaria</i>)	67	ampoule	60 mg/ml in 1-ml;	Anti-Malarial Medicines
47	chloroquine (phosphate or sulphate)	68	syrup	50mg/5ml	Anti-Malarial Medicines
48	artesunate and lumafantrine	69	tablet	80mg + 480mg	Anti-Malarial Medicines
49	primaquine (diphosphate) (<i>For Vivax</i>)	70	tablets	7.5 mg	Anti-Malarial Medicines
		71	tablets	15 mg	Anti-Malarial Medicines
50	quinine	72	injection	300 mg	Anti-Malarial Medicines
51	aluminium hydroxide + magnesium trisilicate	73	tablets	250mg +500mg	Medicines Acting on Gastrointestinal Tract
52	dimenhydrinate	74	injection	40mg	Medicines Acting on Gastrointestinal Tract
		75	suspension	12.5mg/4ml: 60ml	Medicines Acting on Gastrointestinal Tract
53	drotaverine	76	tablets	40 mg	Medicines Acting on Gastrointestinal Tract
54	metoclopramide	77	injection	10mg	Medicines Acting on Gastrointestinal Tract
55	omeprazole	78	tablets	20mg	Medicines Acting on Gastrointestinal Tract
		79	injection	40mg	Medicines Acting on Gastrointestinal Tract
56	ORS (low osmolarity) Recommended in combination with Zinc Sulphate 20 mg dispersible tablet in case of acute diarrhea	80	sachet	dry mixture (low osmolarity formula) in sachet for 1 liter of solution, each sachet contains glucose anhydrous 13.5gm B.P., trisodium citrate dihydrate 2.9 gm B.P , potassium chloride 1.5gm B.P. , sodium chloride 2.6gm B.P.	Medicines Acting on Gastrointestinal Tract
57	ranitidine	81	injection	25 mg / ml in 2ml	Medicines Acting on Gastrointestinal Tract
58	glycerine	82	suppository		Medicines Acting on Gastrointestinal Tract
59	enema	83	Small and larger		Medicines Acting on Gastrointestinal Tract
60	acyclovir	84	tablets	400mg	Antiviral Medicines
		85	injection	250mg	Antiviral Medicines
61	amlodipine (besylate)	86	tablets	5 mg	Cardiovascular Medicines
62	bisoprolol	87	tablets	5 mg	Cardiovascular Medicines

#	Generic Drug Name	#	Form	Strength	Category
63	dobutamine (hydrochloride)	88	injection	200mg	Cardiovascular Medicines
64	glyceryl trinitrate hydralazine (hydrochloride)	89	sublingual	500 mcg	Cardiovascular Medicines
65	isosorbide dinitrate	90	tablets	10mg	Cardiovascular Medicines
66	Valsartan + Hydrochlorthiazide	91	tablets	80mg + 12.5 mg	Cardiovascular Medicines
67	propranolol	92	tablets	10mg	Cardiovascular Medicines
68	amiodarone	93	injection	200 mg	Cardiovascular Medicines
69	streptokinase	94	powder for injection	1.5 million IU	Cardiovascular Medicines
70	rosuvastatin	95	tablets	10mg, 20mg,	Cardiovascular Medicines
71	Methyldopa	96	tablets	250mg	Cardiovascular Medicines
72	furosemide	97	injection	10 mg	Diuretics
73	furosemide + spironolactone	98	tablet	40mg+100mg	Diuretics
74	heparin	99	injection	5000i.u	Medicines affecting Coagulation
75	enoxaparin (low molecular weight heparin)	100	injection	40 mg	Medicines affecting Coagulation
		101	injection	60mg	Medicines affecting Coagulation
76	tranexamic acid	102	injection	100 mg/ml in 5-ml	Medicines affecting Coagulation
		103	capsule	250 mg	Medicines affecting Coagulation
77	oxytocin	104	injection	10 IU in 1-ml	Oxytocic & Antioxytocic Medicines
78	acefyline	105	syrup		Medicines Acting on Respiratory Tract
79	beclomethasone	106	inhaler	50 mcg/actu ; 800mcg/2ml	Medicines Acting on Respiratory Tract
80	salbutamol (sulphate) / albuterol	107	inhaler	100 micrograms	Medicines Acting on Respiratory Tract
		108	solution for nebulizer	5 mg /ml	Medicines Acting on Respiratory Tract
81	prednisolone	109	tablet	5mg	Medicines Acting on Respiratory Tract
82	chloramphenicol	110	eye drops	1%	Ophthalmic Medicines
83	pilocarpine (hydrochloride or nitrate)	111	eye drops	2%	Ophthalmic Medicines
84	acyclovir	112	Eye Oint	3 % w/w 4.5gm	Ophthalmic Medicines
85	neomycin + bacitracin	113	ointment	5 mg + 500 IU	Ophthalmic Medicines
86	tobramycin + dexamethasone	114	eye drops	0.3 % + 0.1% w/v	Ophthalmic Medicines
87	timolol (hydrogen maleate)	115	eye drops	0.25 %; 0.5 %	Ophthalmic Medicines
88	betamethasone + neomycin	116	drops	0.1%; 7.5ml	Medicines for Ear, Nose & Throat
89	boroglycerine (<i>only for wax removing</i>)	117	ear drops	40%	Medicines for Ear, Nose & Throat
90	polymyxin B sulphate + lignocaine	118	ear drops	each ml contains polymyxin B (sulphate) 10000 IU/ml, lignocaine:50mg/ml; 5ml	Medicines for Ear, Nose & Throat
91	xylometazoline	119	nasal spray	0.05%	Medicines for Ear, Nose & Throat
92	dextrose + saline	120	infusion	5 % + 0.9 % w/v;	I/V Infusions / Plasma Substitutes
		121	infusion	5% +0.45%	I/V Infusions / Plasma Substitutes
		122	infusion	4.5%+0.18% (i/5th)	I/V Infusions / Plasma Substitutes
93	glucose / dextrose	123	infusion	25% 20ml	I/V Infusions / Plasma Substitutes
94	saline	124	infusion	0.9% 100ml	I/V Infusions / Plasma Substitutes
		125	infusion	0.9% 500ml	I/V Infusions / Plasma Substitutes
95	mannitol	126	infusion	20 % w/v	I/V Infusions / Plasma Substitutes
96	potassium chloride	127	solution	11.2 % in 20-ml ampoule	I/V Infusions / Plasma Substitutes

#	Generic Drug Name	#	Form	Strength	Category
97	ringer Lactate + dextrose	128	infusion	500ml	I/V Infusions / Plasma Substitutes
98	sodium bicarbonate	129	injection	7.5 % isotonic	I/V Infusions / Plasma Substitutes
99	water for injection	130	ampoule	5 ml, 10 ml	I/V Infusions / Plasma Substitutes
100	haemaccel	131	solution	3%, 5%	I/V Infusions / Plasma Substitutes
101	B complex (B1, B6 and B12)	132	syrup	DRAP approved	Vitamins & Minerals
102	ferrous salt (fumarate)	133	syrup	equivalent to 25 mg/ml iron	Vitamins & Minerals
		134	tablet		
103	folic acid	135	tablets	5mg	Vitamins & Minerals
104	pyridoxine (vitamin B6)	136	tablets	50mg	Vitamins & Minerals
105	zinc sulphate (for acute diarrhea with ORS)	137	dispersible tablets	20 mg	Vitamins & Minerals
		138	syrup	20mg / 5ml; 60ml	Vitamins & Minerals
106	Paroxetine	139	tablet	20 mg	Anxiolytics
107	Diazepam	140	tablets	5mg	Anxiolytics
		141	injection	10mg/ml in 2 ml ampoule	Anxiolytics
108	betamethasone + gentamicin	142	ointment	15gm	Dermatological Medicines
109	clotrimazole	143	cream	1.00%	Dermatological Medicines
110	Permethrin	144	lotion	5%	Dermatological Medicines
111	polymyxin B (sulphate)+ bacitracin zinc	145	ointment	10000 IU/g + 500 IU/g	Dermatological Medicines
112	silver sulphadiazine	146	cream	1% in 50gm	Dermatological Medicines
113	amitriptyline (hydrochloride)	147	tablets	25 mg	Medicines for Mental & Behavioral Disorders
114	DMPA (medroxyprogesterone acetate)	148	injection	150 mg/ 1ml	Contraceptives
115	ethinyloestradiol + norethisterone	149	CO pills	35 mcg + 1mg	Contraceptives
116	anti-rabies vaccine (PVRV)	150	single dose vial	>2.5 IU	Vaccines & Sera
117	anti-snake venom serum	151			Vaccines & Sera
118	rabies immunoglobulin (human)	152	injection	150 IU/ml	Vaccines & Sera
119	tetanus toxoid	153	injection		Vaccines & Sera
120	anti.-D (Rho) immunoglobulin	154	injection		Vaccines & Sera
121	chlorhexidine digluconate (7.1%)	155	gel	equivalent to 4 % chlorhexidine	Antiseptics / Disinfectants
122	hydrogen peroxide	156	solution	6 % v/v	Antiseptics / Disinfectants
123	povidone-iodine	157	solution	10 % w/v 60ml	Antiseptics / Disinfectants
		158	scrub	7.5 % w/v, 450ml	Antiseptics / Disinfectants



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