

System Design Support to Deliver Quality Drugs at Public Health Facilities in Uttar Pradesh

AN OVERVIEW NOTE



BACKGROUND

A well-functioning health system ensures equitable access and use of essential medical products, vaccines and technologies with a high standard of quality, safety, the efficacy that are cost-effective¹. Essential drugs² should be available at all times, in adequate amounts, in the appropriate dosage, with assured quality, and at an affordable price¹.

The availability of quality essential drugs at public healthcare facilities reduces out-of-pocket expenditure (OoPE) and enhances the community's confidence in the public health system. A lack of it drives people towards the private sector³. In India, ~60–70% of health care is catered to by the private sector⁴ leading to high OoPE. However, even those seeking care in public health facilities incur significant OoPE due to drugs, accounting for over 80% and 50% of OoPE in outpatient and inpatient care, respectively⁵. Moreover, most private and public⁶ insurance packages do not cover outpatient expenses.

In this context, system design to deliver quality drugs in public health facilities is critical. This note captures the system design changes done by the Government of Uttar Pradesh (GoUP) with the support of the Uttar Pradesh Technical Support Unit (UPTSU) in establishing a well-functioning public health supply chain system.



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THE LEGACY MODEL OF UP PUBLIC HEALTH DRUG SUPPLY CHAIN AND ITS ISSUES

The Performance Audit Report by the Comptroller and Auditor General (CAG) of India for public health facilities in Uttar Pradesh highlighted some of the critical challenges in the public health drug supply chain⁷. In 2017-18, rate contracts⁸ were available for only 18% of the 1036 drugs in the essential drug list. Further, the district medical authorities – Chief Medical Officers (CMO) and the Chief Medical Superintendents (CMS), were able to procure only 3% to 42% of the essential drugs. This is reflected in the availability of essential drugs where shortfalls ranged between 76% to 96% in District Women Hospitals and District Combined Hospitals and 58% to 93% in Community Health Centres where the study was conducted. There was also dependence on vendor-provided quality certificates instead of independent quality assurance. The audit report noted that the weak supply chain for procurement of essential drugs potentially exposed patients to financial hardships and diminished public trust in the health system. A serious policy response was recommended to address gaps in drug and equipment procurement in Uttar Pradesh.

This necessitated a thorough review of the then existing public health drug supply chain system model, studying best practices in other states countries redesigning for ensuring availability of essential drugs required for the patients at all public health facilities.

Figure 1 (Pg 4) explains the legacy public health supply chain model in UP.

CMSD did price discovery by a tendering process based on the demand collected from the public health facilities. But CMSD was devoid of any meaningful responsibility for the availability of drugs in the value chain in terms of either indenting, supplier performance, quality assurance or prompt payments.

District Chief Medical Officers (75 CMOs, more than 100 CMSs) placed independent supply orders directly with the vendors identified by the CMSD from time to time without advantage of economies of scale, lack of powers to ensure the performance of vendors and with limited small storage space.

The Suppliers were not getting unified, predictable, continuous work orders to plan supply as each district followed different schedules, multi-location payment processing increasing cost of business and was self-certifying the quality of drugs with a potential conflict of interest.

Overall, there was a limited incentive for contract adherence by all three stakeholders as the responsibility matrix was fluid for different steps in the process and outcome. Most importantly, the two most important stakeholders, namely the care providers and the patients, were mere recipients of the 'push model' with no influence on the availability of drugs directly or indirectly.



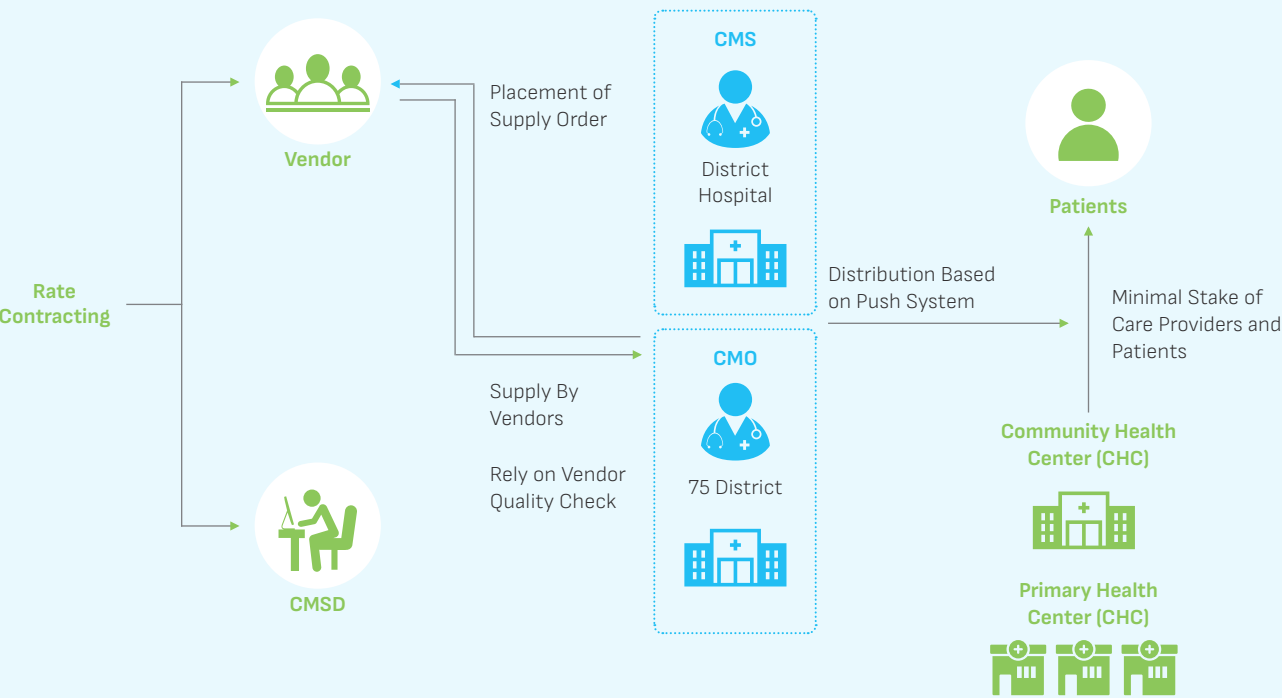
The key stakeholders as per the legacy model were

- 1 State-level intradepartmental body (within Directorate of Health Services) named "Chief Medical Store Depot (CMSD)",
- 2 District Chief Medical Officers / Chief Medical Superintendents
- 3 Suppliers








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Figure 1: Legacy Public Health Supply Chain Model in Uttar Pradesh



As noted in the CAG report, the procurement process was time-consuming, lacked transparency and was riddled with inefficiencies resulting in shortage or unavailability of essential drugs. Some of the gaps in the processes have been noted below.

-  The CMSD followed the practice of single-year rate contracts with one vendor per drug basis. This resulted in delays in drug supplies and subsequent stock as a single vendor often lacked the capacity to supply drugs in large quantities.
-  The district medical authorities (including 75 CMO and 167 CMS) had to deal with multiple vendors for their drug requirement. Conversely, the vendors had to respond to multiple unpredictable demands from the district medical authorities. Often, the vendors insisted on minimum quantity thresholds for the drugs, which led to irrational purchases.
-  There was often no scientific demand estimation, which led to inconsistent purchase requests from the district authorities. With no clear guidelines on the distribution of drugs to the lower facilities, it was often left to the discretion of the district medical authorities and facility in charge to indent and supply drugs. This led to non-uniform and inadequate availability of essential drugs across all the facilities in the districts.
-  The paper-based inventory management process provided limited visibility on stock levels and often resulted in delayed initiation of procurement process leading to stock-outs of essential drugs.
-  The quality assurance of drugs supplied was self-reported by vendors and, in certain cases, dubious in the absence of an independent quality check.

REDESIGNED PUBLIC HEALTH SUPPLY CHAIN MODEL FOR UTTAR PRADESH

Government of Uttar Pradesh, with its firm commitment to ensure quality drugs at all levels of the public health facilities and with support from the Uttar Pradesh Technical Support Unit (UP TSU), a unit implemented by India Health Action Trust (IHAT) in partnership with the University of Manitoba, Canada, studied public health supply chain models deployed across various states in India to identify an efficient solution for UP's public health supply chain.

It was recommended by UPTSU to have a separate company for procurement of drugs and equipment required for public health facilities replacing the intradepartmental body (CMSD), which was duly accepted. Accordingly, in March 2018, the Uttar Pradesh Medical Supplies Corporation (UPMSC) was incorporated as an independent corporation with clearly defined goals to undertake centralised procurement and management of essential drugs, equipment and medical supplies.

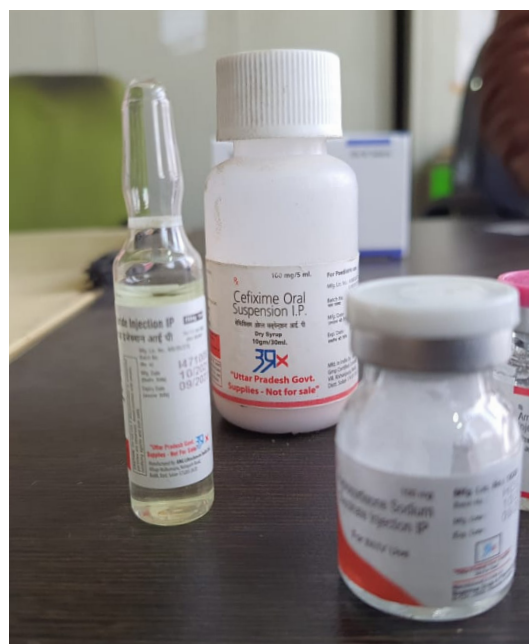
UPTSU further supported the Government of Uttar Pradesh (GoUP) in operationalising UPMSC by developing Articles of Association (AoA) and Memorandum of Association (MoA) that defined the organisational structure, recruitment of human resources, development of policies and standard operating procedures, identification and operationalisation of warehouses. In addition, UPTSU helped in the customisation and rollout of the Drugs and Vaccine Distribution Management System (DVDMS) – which serves



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as the IT backbone for managing the supply chain of drugs in the state. UPTSU continues to support GoUP in strengthening UPMSC to be responsive to the needs of the public health supply chain system.

Best practices from various states were adapted to design the model that has fewer hierarchy levels, leaner teams and streamlined processes (including digitisation), leading to a transparent, efficient and responsive system.



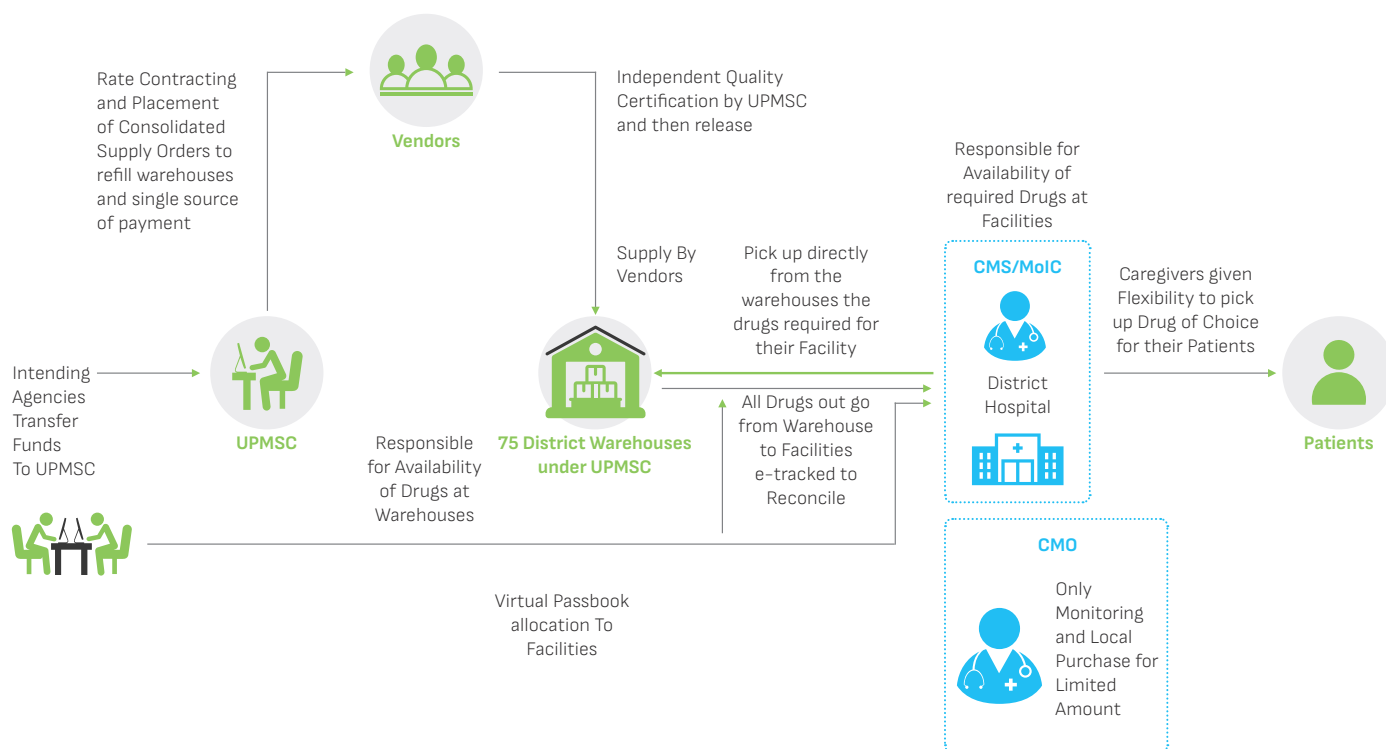
REDESIGNED MODEL OF SUPPLY BY UTTAR PRADESH MEDICAL SUPPLIES CORPORATION

UPMSC is the nodal organisation for centralised procurement and supply chain management of drugs, equipment and medical supplies for all the public health facilities of Uttar Pradesh. UPTSU assessed and

recommended the changes based on six essential pillars (Figure 3). The overview of the redesigned model (Figure 2) and its essential features are described first.



Figure 2 : The Public Health Supply Chain in Uttar Pradesh : Redesigned Model



QUANTITY ESTIMATION OF ESSENTIAL DRUGS FOR INITIATION OF TENDERS BY CONSUMPTION DATA INSTEAD OF DEMAND ESTIMATION THROUGH DISTRICTS

UPMSC will estimate state-level requirements for essential drugs based on accurate past years' outgo from its own warehouses for tendering to finalise rate contracts. But due to the limited availability of past years' consumption data from CMSD, UPTSU did an estimate of annual drug requirements at the State level based on disease patterns and consumption data available from other States to

initiate the process. Contrary to the popular notion of collecting demand from districts, UPTSU advocates consumption data being the basis for quantity estimation for tender purposes at the State level, which will get refined over a period of time.



➔ **Multiple suppliers:** Contrary to the earlier model, for each drug, rate contracts are maximised to be established with multiple vendors for a period of two years. This is a significant shift from legacy practice to reduce the dependency on single vendors for supply. UPMSC also monitors the performance of suppliers to build a database of credible suppliers to ease transaction costs of suppliers in future, like automatic pre-qualification in tenders for longer duration etc.

➔ **Warehouses:** Each of the districts of Uttar Pradesh has one dedicated warehouse operated by UPMSC to which the drugs are supplied by the suppliers instead of the CMO stores earlier. The management of the drugs in the warehouse is not dependent on the CMO of the district. Rental warehouses were identified by UPTSU for UPMSC, with whom contracts were signed. Simultaneously, GoUP is establishing permanent warehouses in all 75 districts for which funding and space has been secured.



➔ **Placement of supply orders:** The supply orders are placed centrally by UPMSC on a monthly or quarterly basis combining the deficit below the Mean Stock Level (MSL) derived for each of the drugs from individual warehouses instead of each of the districts CMOs and CMSs placing small quantity orders denying the benefit of bulk production and supply to the suppliers. UPTSU arrived at the initial MSL based on consumption from district warehouses, which will keep evolving as more accurate outgo data gets digitally captured. UPTSU has supported UPMSC in recently implementing automatic generation of supply orders from the digital system.

➔ **Quality Testing:** Rather than depending on the vendor-provided quality certificate, after the supply of drugs directly to the district level UPMSC warehouses as per the supply order, each batch of drugs supplied undergo a quality control check from UPMSC empanelled National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited laboratories before the batch is released for distribution to the health facilities.

e-Tracking: While supply chain systems envisage tracking the consumption at the endpoint which in this case is the multiple dispensing counters in many facilities, the UPMSC system design tries to maximise the results by tracking digitally only the entry of drugs in warehouses from suppliers and the exit of drugs to the individual facilities. This single point of data capturing permits analysis of heterogeneity of drug lifting by facilities of the same class (Eg SC, PHC, CHC), types of drugs used frequently, reconciling budget with drug utilisation, etc. Towards this objective, DVDMS, an online Logistic Management Information System for procurement and inventory management of drugs, serves as the IT backbone of UPMSC. It provides real-time data on stock inventory at the various warehouses and helps generate automatic placement of supply orders by consolidating the deficit below the Mean Stock Level (MSL) for each EDL drug from all the warehouses with a specific quantity per consignee (Warehouses).

➔ **Facilities:** The treating physician is the closest in understanding the needs of the patient, and the facilities are given complete autonomy to indent any quantity of required EDL drugs with reference to the type of patients they cater to. In order to strengthen the autonomy of the facilities to have drug of choice,

UPTSU advocated a PULL system wherein the facilities indent and pick up the drugs of choice instead of the PUSH System wherein UPMSC was trying to supply the drugs up to the facilities. This recommendation was accepted, and a Government Order was issued on 13th Mar 2019. This step also demarcates clearly the responsibility of required drugs between the two major stakeholders – UPMSC at the warehouses and facility in-charges at the concerned facility.



Passbook System: To reconcile the budget allocated to UPMSC (the centralised agency) for payment to the vendors centrally with the lifting of drugs by facilities, understand consumption pattern of facilities, facilitate the inter-hospital transfer of drugs, promote rational usage etc. a virtual allocation of the total funds allocated to UPMSC is divided to the facilities by the funding agency (DGMH, NHM) and is entered in the DVDMS system. A double-entry system is maintained by the warehouse of the district and each of the facilities on the virtual allocation amount available in the passbook and deducted/added while picking up the drugs required or dropping off non-usable drugs.



Vendors payment: Centralised at one location rather than more than 200 units earlier with higher business costs and longer delays.

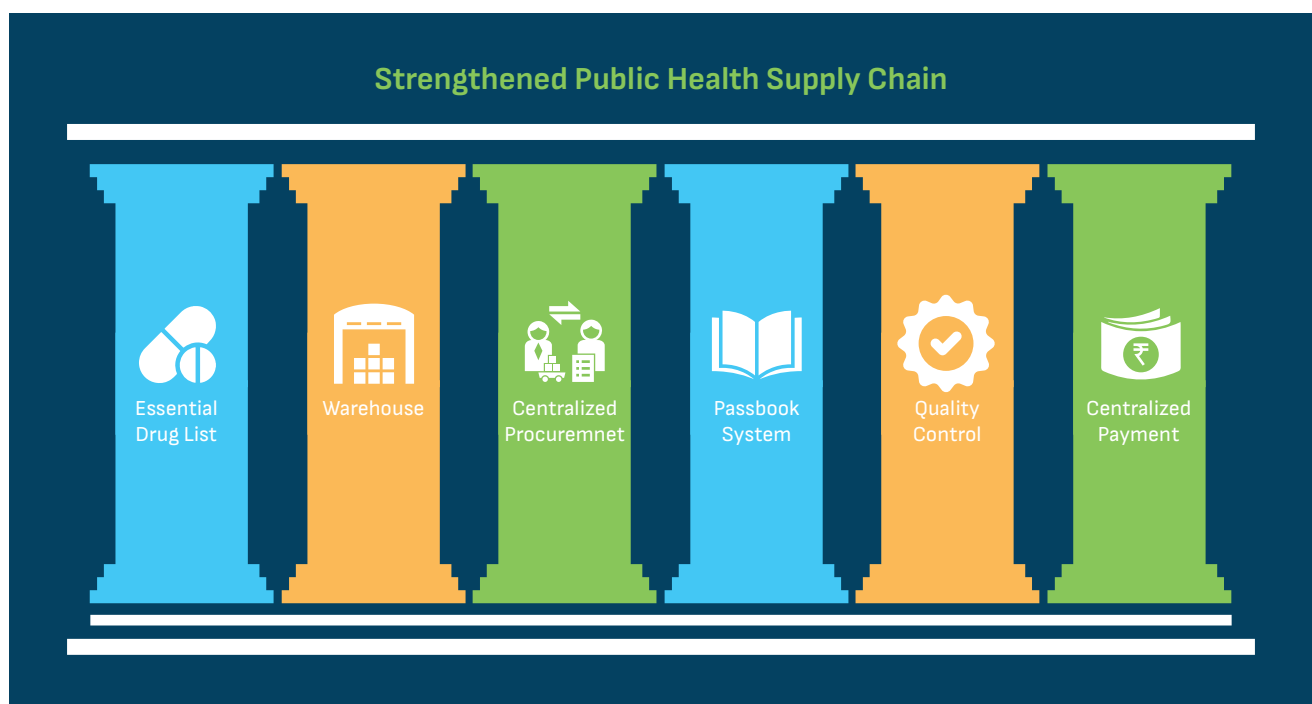
Table 1: Key changes in the critical supply chain process in Uttar Pradesh with support of UP TSU

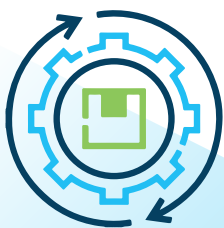
Supply Chain Function	Legacy Model	UPMSC Model
Demand	<ul style="list-style-type: none"> Fully depends on demand aggregation from facilities/districts 	<ul style="list-style-type: none"> Estimation of drugs quantity required for tendering purpose to be titrated by continuous outgo data of the warehouse
EDL list	<ul style="list-style-type: none"> Very large essential drugs list (~1300 drugs) 	<ul style="list-style-type: none"> Essential Drugs List was reviewed and rationalised to identify the most critical drugs resulting in a list of ~300 drugs
Vendor dependency	<ul style="list-style-type: none"> Rate contracts limited to a single vendor for the entire state 	<ul style="list-style-type: none"> Rate contracts established for a two-year period with multiple vendors
Warehouses	<ul style="list-style-type: none"> Absent leading to direct supply to small CMO stores by vendors 	<ul style="list-style-type: none"> Present in all 75 districts on a rental basis and permanent warehouses under construction. Responsibility of UPMSC to make all EDL available in all 75 warehouses across 365 days.
Placement of Supply Orders	<ul style="list-style-type: none"> By more than 200 units in 75 districts, disaggregated and at variable times 	<ul style="list-style-type: none"> Auto-generation of supply orders by only one unit (UPMSC) aggregating the deficit below Mean Stock Level in 75 warehouses
Quality control	<ul style="list-style-type: none"> Supplies were accepted based on vendor-provided Quality Testing certificates with random sampling done by Drug Controller 	<ul style="list-style-type: none"> Each batch of supplies shall be quality tested by NABL certified labs
e-tracking	<ul style="list-style-type: none"> absent 	<ul style="list-style-type: none"> Warehouse input and outgo to facilities tracked
Facilities	<ul style="list-style-type: none"> Though facilities could intend drugs, depended on the PUSH method as an informal mechanism 	<ul style="list-style-type: none"> The facilities have complete freedom for intending and are responsible for the availability of drugs at the facility
Passbook System	<ul style="list-style-type: none"> Absent 	<ul style="list-style-type: none"> Dual entry passbook at the warehouse and facility
Vendor payment	<ul style="list-style-type: none"> More than 150 location 	<ul style="list-style-type: none"> Single location with less business cost and reduced delays

SIX ESSENTIAL PILLARS FOR A RESPONSIVE AND EFFICIENT PUBLIC HEALTH SUPPLY CHAIN SYSTEM

The sustenance and effectiveness of UPMSC are contingent on continuous improvement of the processes to adapt and respond to the needs of the public health supply chain while ensuring a continuous supply of quality essential drugs and equipment to the health facilities. Best practices from successful supply chain models in the country (Tamil Nadu Medical Supplies Corporation, Rajasthan Medical Services Corporation Limited, Gujarat Medical Services Corporation Limited, etc.) were referred to identify six pillars of responsive and efficient supply chain process. These pillars, depicted below, have been adapted to UP's context and provide the foundation for the functioning of Uttar Pradesh Medical Supplies Corporation.

Figure 3: Six Essential Pillars for a Responsive and Efficient Public Health Supply





UPMSC is responsible for maintaining a **24 * 7 supply of all essential drugs** at the warehouses.

1 Essential Drug List (EDL): Essential drug list includes those generic drugs which are necessary to satisfy the priority healthcare needs of the majority of the state population.

In UP, the Essential Drug List has been pruned down from ~1300 to ~300 items. Initial demand was forecasted based on end-user consumption, disease patterns and demography of the state. Only the drugs that are consumed are replenished, leading to a consumption-based ordering which ensures that the drug budget is utilised on drugs that are actually being consumed.

2 Warehouses: District Warehouses are critical cogs of the public health supply chain system where drugs are stored. Warehouses with adequate storage space and climate conditions for drugs and equipment have been established in each district. UPMSC is responsible for maintaining a 24 * 7 supply of all essential drugs at the warehouses.

UPMSC is establishing state-of-the-art district warehouses in each of the 75 districts in Uttar Pradesh with support from the National Health Mission (NHM). Funds have been approved through NHM for the construction of these warehouses in all 75 districts of Uttar Pradesh. Currently, the construction of 25 warehouses is in progress. In the interim, rental warehouses have been established and operationalised with UPTSU support in all 75 districts of Uttar Pradesh.

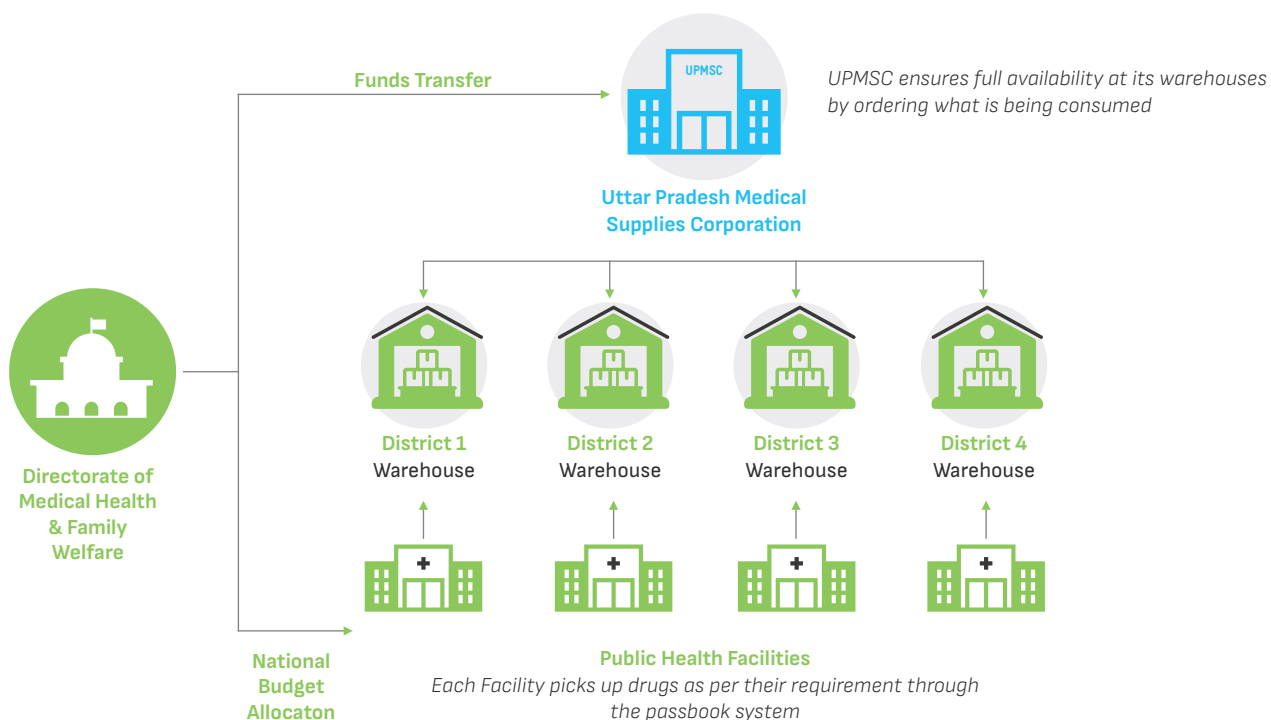
3 Centralised Procurement: UPMSC conducts centralised procurement of drugs through rate contracting, scientific forecasting and past consumption analysis and issuance of purchase orders. This helps in the generation of economies of scale, reduction in costs and maintenance of uniformity of drug availability across the state.

The process of finalising rate contracts was accelerated by adopting an e-tendering process and reducing the number of levels at which mandatory approvals were required. Additionally, rate contracts are established for two-year periods to rationalise the amount of time that goes into tendering and approval process each year. The DVDMS facilitates inventory management leading to better stock visibility, which aids monitoring and increases the effectiveness of the procurement process. Centralised inventory management also reduces drug expiry losses resulting in reduced overall costs.

4 The Passbook System: A passbook system has been established with notional budgets allotted to each facility. The passbook is not a financial tool as it works on a notional budget but acts as a record-keeping tool. Each facility is responsible to pick up supplies as per their requirement within the budget allocated. The passbook system ensures that budget is being spent on drugs that are being consumed, provides visibility on drug consumption patterns among health facilities, facilitates rational budget usage, links high footfall facilities with drug usage, forecasts drug requirements and prevents pilferage due to the double-entry system.

All the public health facilities, including Medical Colleges in Uttar Pradesh, are connected through the DVDMS and have been allotted a passbook budget. As of August 2021, 99% of District Hospitals, 97% of CHCs and 61% of PHCs have started using the passbook system to pick up the essential drugs as per their requirement.

Figure 4: Illustration of the Passbook system – Linking budget and utilization



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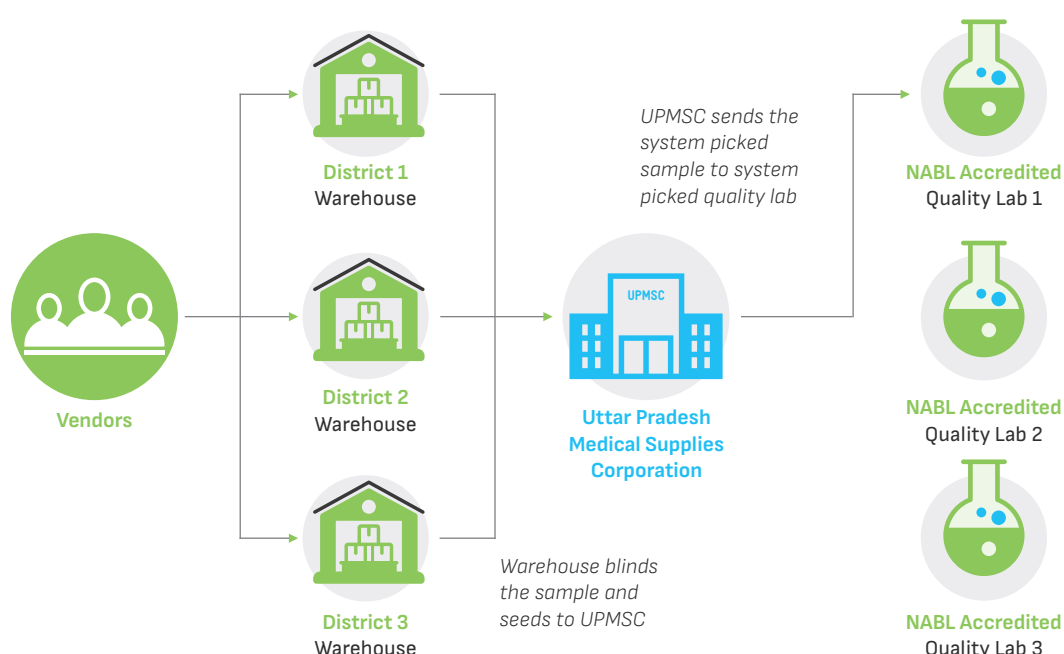
Quality Control: Each batch of drugs supplied at warehouses is tested by empanelled NABL accredited laboratories to ensure the quality of the drugs. A “Double Blind” method is followed to ensure no single party knows details about the batch or the laboratory where the sample has been sent for testing. The blinding process involves removing the identifiers that can link the sample to the manufacturer or warehouses and adds a system-generated code.



Samples from each of the warehouses where the drugs are supplied are sent to UPMSC Head Quarters. The DVDMS performs two-step randomisation where it first randomly selects a sample that has been received and then randomly assigns an accredited quality control laboratory where the sample will be sent for testing. . UPMSC blinds (removing the identifiers) the sample and sends it to the nominated lab. The drugs under testing are kept under the “quarantine” area and are released to public health facilities only after successful testing by the laboratories.

UPMSC has empanelled 11 NABL laboratories to conduct a quality check of the drug samples received from the vendors. Quality Control Policy was finalised, and Quality Control SOPs include a double-blind methodology. The essential drugs undergo quality testing, as explained above, before being dispatched to health facilities.

Figure 5: Illustration of a Double Blind Quality Check Process



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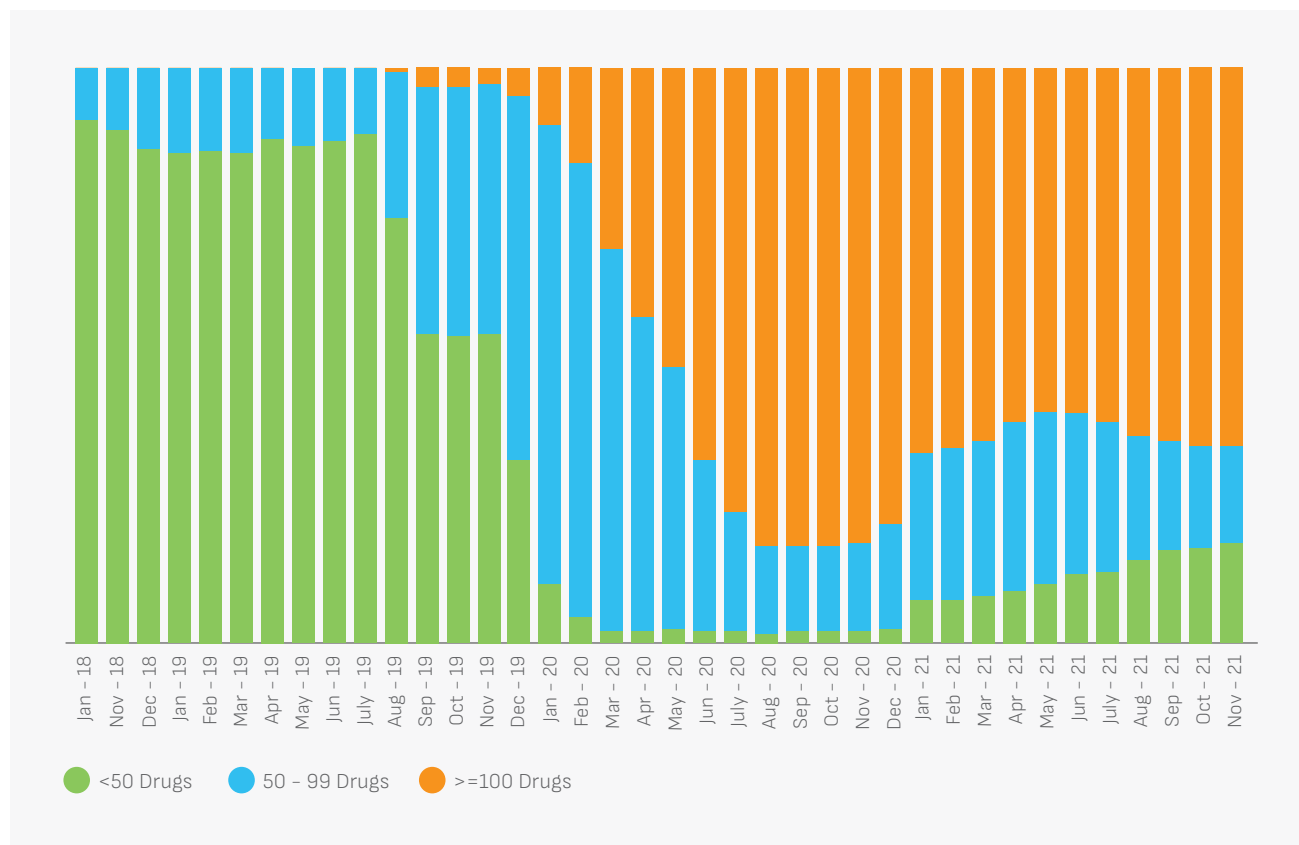
Centralised Payment: Centralised payments are being made in a timely manner to the vendors so that they are not required to follow up with the district level authorities for release of their payment. This encourages drug vendors with large capacity of manufacturing drugs to participate in the procurement process.



PROGRESS SO FAR

Availability of essential drugs has improved after the establishment of UPMSC. There is an increasing trend observed in drug availability since UPMSC started the supplies, as shown in the figure below.

Figure 6: Availability of drugs in CMO/CMS stores in 75 districts



- There has also been substantial progress in the process indicators required for success.
- Streamlined procurement process leading to reduction in procurement cycle time.
- Limited dependency on single vendor owing to availability of parallel rate contracts.
- Centralised procurement leading to economies of scale
- Online Inventory management through DVDMS leading to improved data visibility for effective monitoring
- Adoption of e-Passbook System to provide freedom to health facilities to pick up drugs as per their requirement.
- Auto placement of supply orders to maintain minimum stock levels
- 3rd party testing by empanelled NABL labs to ensure the availability of quality drugs at health facilities.
- Centralised payment leading to a reduction in payment delays
- Defined responsibility matrix leading to accountability for availability and non-availability of drugs at health facilities and warehouses.

WAY FORWARD

UP TSU continues to provide technical support to GoUP to strengthen the public health procurement system in Uttar Pradesh. The focus is to strengthen the six pillars of the public health supply chain to facilitate the provision of an uninterrupted supply of essential drugs and medical supplies to the facilities. Processes need to be developed to periodically review the essential drugs list to ensure that the list caters to the public health priorities of the state. The-state-of-the-art warehouses will be established across all 75 districts of the state.

The use of passbook system has to be saturated across all public health facilities. Demand estimation has to be consumption based and a centralised payment system has to be streamlined to ensure minimum lead time for payment.



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5. http://mospi.nic.in/sites/default/files/publication_reports/KI_Health_75th_Final.pdf
6. Including pan India Pradhan Mantri Jan Arogya Yojana (PM-JAY)
7. Performance Audit Report of the Comptroller and Auditor General of India Hospital Management in Uttar Pradesh, Government of Uttar Pradesh, 2019
8. A Rate Contract means the agreement for supply of goods/ materials between Supplier and Procurement Agency, for a fixed rate and fixed period of time (i.e till validity of Rate Contract) on mutually agreed terms and conditions.



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