Public Health Department

2.4 IT Audit of e-Aushadhi System

Executive summary

The Government of Maharashtra initiated the e-Aushadhi system in February 2013 to streamline the process of inventory management of drugs and consumables in Government hospitals, Primary Health Centres, Drug Warehouses etc. throughout the State. An IT Audit of the system conducted for the period 2013-15 revealed that while the demand generation module, a critical module of the supply chain management was not implemented, the finance module was incomplete. The implementation of the System suffered due to poor documentation, weaknesses in IT planning and inadequacies in the application software. Discrepancies in issues and receipts of drugs/consumables, recording of local purchases and incorrect rates of drugs/consumables captured in the system weakened the reliability of data and transparency in purchases. The monitoring of the system was poor due to insufficiency of MIS reports. Inadequate IT security, especially due to inadequate logical access controls, non-documentation and testing of disaster recovery plan and inadequate audit trail, made the system further vulnerable to errors and manipulations.

2.4.1 Introduction

Maharashtra State has a wide network of Government hospitals and Primary Health Centres (PHCs)/Sub-Centres (SCs) to cater to the health needs of the population. These Government hospitals and PHCs/SCs provide free drugs to the patients. The majority of the essential drugs and consumables[1] required by these Government hospitals and PHCs/SCs are procured centrally by the Director of Health Services (DHS) under the Public Health Department (Department). The drugs/consumables are delivered to the Drug Warehouse headed by the Civil Surgeon for further distribution to Sub-District hospitals, Rural hospitals *etc.* in addition to the Drug Warehouses headed by the District Health officer for further distribution to the PHCs/SCs. The drugs/consumables are also delivered to the State Drug Stores headed by the Bureau officer of Malaria, TB and Leprosy.

The e-Aushadhi is a web based Supply Chain Management system developed by Centre for Development of Advanced Computing (CDAC) which deals with the purchase, inventory management and distribution of various drugs and consumables to various Government hospitals and PHCs/SCs. Considering the wide network of Government hospitals and PHCs, the Department initiated the implementation of e-Aushadhi in February 2013. For overseeing project execution and management of Information Technology projects including e-Aushadi, the Department appointed KPMG Advisory Services Private Limited (KPMG) as a consultant.

The application has a Web Based Architecture, Java as front end application and database maintained in Oracle 11g. The system is hosted at the CDAC centre at

[1] The list of essential drugs and consumables are finalised by the Department every year

Noida. The data relating to centralised procurement of drugs and consumables captured in the computerised system during 2013-15[2] is shown in **Table 2.4.1**

Table 2.4.1: Purchase orders captured in the system

Year	No. of purchase orders	Amount (` in crore)
2013-14	31251	324.77
2014-15	23447	271.11

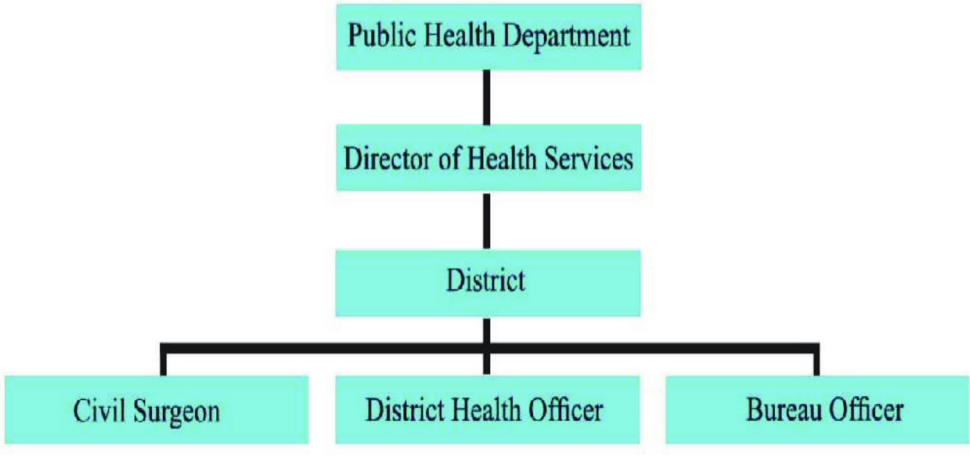
The e-Aushadi system is critical for the Department as it is used for purchasing and distributing more than 500 essential drugs and consumables catering to 2,336 hospitals, Drug Warehouses, primary health centres *etc.* throughout the State. The system has 10 modules.

The objectives of computerisation were as follows:

- to streamline the process of inventory management and bring transparency in the system;
- to track the real time stock position and drug distribution;
- to establish Quality Assurance systems for testing of medicines;
- to improve evidence based decision;
- to improve the payment process for suppliers; and
- to procure inventory based on predefined requirements.

2.4.2 Organisational set-up

The Directorate of Health Services under the Principal Secretary, Public Health Department administers the overall functioning of the e-Aushadhi system. The organisational set-up with reference to the implementation of e-Aushadhi system is given below.



In each district there is a Civil Surgeon (CS), District Health Officer (DHO) and Bureau Officer (BO). The CS is the head of various hospitals in the district.The DHO is the head of the various PHCs/SCs located in the villages. The Bureau

[2] Data from April 2013 is captured in the system

Officer supervises and manages various health programs/schemes in the district for *e.g.*the Malaria bureau, TB bureau and Leprosy bureau.

2.4.3 Audit objectives

The audit objectives were to evaluate whether:

- the planning and implementation of e-Aushadhi system was appropriate to meet the objectives of computerisation;
- the input, processing and output controls were adequate to ensure integrity of the system and that it complied with the rules and procedures;
- reliable controls were in place to ensure data security and necessary audit trails were incorporated in the system; and the system met the requirements of internal audit.

2.4.4 Audit criteria

The planning and implementation of the e-Aushadhi system, data management and monitoring were examined with the provisions in MoU between GoM and CDAC, Manual of Office Procedure for Purchase of Stores by the Government Departments, Hospital Administration Manual, Government Resolutions (GR), Guidelines/Instructions issued by the DHS, Maharashtra State e-Governance policy 2011 and generally accepted good IT practices.

2.4.5 Audit scope and methodology

Data relating to e-Aushadhi were analysed with the help of Computer Aided Audit Techniques. The data analysis covered the data available from April 2013 to March 2015. For this purpose, apart from records maintained in the Department and DHS, audit covered offices of Civil Surgeon, District Health Officer, District Hospitals and PHC's in eight districts[3] selected on random sampling and three State level Bureau Offices of Malaria, Leprosy and TB at Pune.

The Entry Conference was held with the Principal Secretary, Public Health Department (PHD) in May 2015 wherein the audit objectives and criteria were discussed.The audit findings and recommendations were discussed in the exit conference held on 30 October 2015. The Principal Secretary, PHD, Director of Health Services and other officers from PHD and DHS attended the meeting. The Government furnished paragraph-wise replies on 16 February 2016 which have been incorporated at appropriate places in the report.

2.4.6 Acknowledgement

Audit acknowledges the cooperation of the Department, DHS and other field units in providing the necessary information and records to audit.

[3] Nashik, Sindhudurg, Gadchiroli, Solapur, Satara, Raigad, Thane and Dhule

Audit observations

2.4.7 General controls

Planning and Management

2.4.7.1 Incomplete system

As per Article 2 of the MoU, a detailed schedule for application customization was prepared. As per the project plan, 10 modules[4] were to be customized for implementation within 75 days from April 2013. Audit observed one module (Demand Generation) was yet to be implemented as the user requirement intimated to CDAC was not clear. As a result, the yearly demand for the drugs/consumables by the end users was sent to DHS in Excel sheet before the beginning of each year for centralised procurement.

Test-check of records in the selected Drug Warehouses revealed excess supply of drugs to DHO, Thane and Civil Surgeon, Nashik *vis-à-vis* the demands during the year 2013-15 as shown in **Table 2.4.2**

Table 2.4.2: Excess quantity of drugs supplied

Name of Drug	Unit	Quantity demanded	Quantity supplied	Value of excess quantity supplied (` in lakh)
Doxycycline Cap 100 mg	Capsule	2356066	4000000	11.64
Amoxycillin + Clavulanic acid dry Syrup 200 mg + 28.5 mg 30 ml	Bottle	21300	100000	9.21
Source: Annual demand and data in e-Aushadhi				

Thus, due to inadequate demand generation mechanism, the Department remained exposed to the risk of supply of excess quantity or less quantity of drugs/consumables. Also, the Department could not achieve the objective of procuring inventory based on predefined requirements.

Though the Finance module was stated to be implemented, audit scrutiny revealed that the actual payments made to the suppliers by the Finance wing in DHS were not entered in the system since October 2014. Further, the bill-wise reports generated for payment to suppliers by the procurement wing of DHS was not saved in the system to monitor the bills pending for payment and ascertain any delay in payment of bills thus, resulting in inadequate monitoring of payment process to the suppliers.

The Government stated (February 2016) that the DHS was ready to take demands through online demand generation module and also to use the finance module.

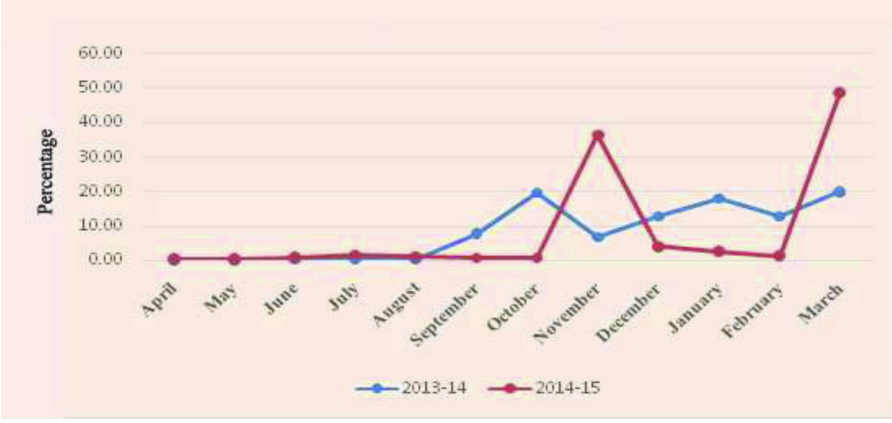
[4] Supplier Rate Contract, Demand Generation, Procurement, Challan Process, Drug Inventory View, Quality Control, Indent Desk, Issue Desk & Acknowledge Desk, Drug Transfer and Finance

2.4.7.2 Purchase of drugs

The yearly demand for the purchase of drugs/consumables is prepared by the end-users and compiled at District Drug Warehouses and forwarded to the DHS for verification and approval in the beginning of the financial year. On finalisation of Rate contract for supply of drugs/consumables, purchase orders are generated through the system.

Data in e-Aushadhi system relating to purchase orders showed that the majority of purchase orders for drugs/consumables for a financial year were placed at the last quarter of the financial year as shown in **Chart 1**

Chart 1: Month-wise procurement of drugs/consumables during 2013-15 (in percentage)



As seen from **Chart 1**, of the total purchase orders placed during 2013-14, 20 *per cent* of the orders (in terms of value) were placed in the month of March 2014 which increased to 49 *per cent* during 2014-15. Further, during 2013-14 and 2014-15, 51 *per cent and 53 per cent* of the purchase orders (in terms of value) were placed in the last quarter of the financial year.

The delays in placing purchase orders and the consequent delays in supply of drugs/consumables adversely affected the annual requirements of the hospitals and PHCs thus, necessitating local purchases at higher rates, as discussed in **paragraph 2.4.8.8**. Further, the annual requirement finalised at DHS did not take into account the delayed purchase orders placed at the end of the year. In view of the delays in placing purchase orders and the consequent impact on the annual requirement of drugs/consumables, the Department fell short of achieving the objective of streamlining the process of inventory management.

The Government stated that the issue flagged by audit has been noted and necessary action would be taken to streamline the procurement process in a staggered manner for ensuring timely availability of drugs and consumables to the hospitals/PHCs.

2.4.7.3 Constitution of Information Technology Cell

As per the MoU, an Information Technology (IT) cell was to be constituted by the Department and CDAC was to provide training on System Administration and subsequent operationalization. The IT cell was required to coordinate with various entities such as, the Department, CDAC and the end users (hospitals/PHCs and district Drug Warehouses). The IT Cell was also responsible for report preparation at defined frequency, providing training to field units and contribute to enhancement of application after completion of the

project. As per the Maharashtra State e-Governance policy 2011, the State Government had to build capacities within the system for e-Governance, Program and Change Management by training the manpower and deploying appropriate infrastructure and machines. The IT Cell was created by DHS in January 2013 and four IT posts were sanctioned for manning the IT Cell on yearly contract basis.

Audit observed that personnel from DHS were not identified as per the e-Governance policy of the State Government to build capacities within the Department to handle system administration and database administration of e-Aushadhi system. It was further observed that IT cell was also assigned the job of data entry of purchase orders and rate contracts in addition to system administration. Thus, there was no clear demarcation of user functions and system administration. The resultant delay in recording the purchase orders in the system is discussed in **paragraph 2.4.8.1**.

The Government stated that the IT Cell was not assigned the job of data entry of purchase orders. In the exit conference, the Principal Secretary stated (October 2015) that personnel from the Department would be identified and trained.

The reply of the Government is not borne out of facts because, the job chart details furnished (July 2015) by the IT Cell to audit clearly indicated that the personnel from IT Cell were also carrying out the task of data entry relating to purchase orders.

2.4.7.4 Documentation

Documentation of an IT system such as, System Requirement Specifications (SRS), System Design Documentation (SDD) and Entity Relation Diagram (ERD), Data Dictionary *etc.* are necessary for a quality system and future maintenance. As per MoU between the Department and CDAC, the Technical Documentation such as, the SDD, ERD and Data Dictionary of the database system was to be provided by CDAC. Audit however, observed that the Technical Documentations of the e-Aushadhi system were not available with Department.

In absence of proper documentation relating to various stages of the system development, the extent to which the user requirements were incorporated in the system could not be ascertained. Lack of technical documentation would not only increase the dependency on outside qualified personnel but also pose a major risk in continued future usage of the system, and system up-gradation.

The Government assured that necessary documentations would be obtained.

2.4.7.5 System implementation

As per paragraph 12.3 of the Maharashtra State e-Governance policy 2011, each Government Department was required to constitute a Departmental Project Implementation Committee (PIC) for overseeing departmental e-Governance projects with representations from the Planning, Finance, Industries and IT Departments, apart from members of the parent Department.

Though the PIC was formed by the Department in February 2012 but, there was no evidence to substantiate that the PIC had met for reviewing the e-Aushadhi project. Lack of documentation of the system, incomplete

application and system implementation indicated inadequate monitoring of the e-Aushadhi system by the consultant (KPMG).

The Government stated that review of e-Aushadhi system by PIC would be taken for which necessary instructions have been issued.

Recommendation 1: The Government may streamline the procurement process by staggering the purchases for ensuring timely availability of drugs and consumables. The demand generation module may also be implemented early so that procurement is based on predefined requirements.

2.4.8 Application controls

Application controls consist of input, output and processing controls and help to ensure rule mapping, proper authorisation, completeness, accuracy and validity of transactions.

Input controls

Input controls ensure that the data entered is complete and accurate. The accuracy of data input in a system could be controlled by imposing computerised validity checks. Weaknesses in the input controls noticed in audit are discussed below.

2.4.8.1 Delay in recording purchase orders

The Procurement module of e-Aushadhi has the provision to generate automated Purchase order number and take print of the Purchase order from the system. Procurement wing at DHS finalises the Rate contracts/Purchase orders for supply of drugs/ consumables.

Audit observed that in spite of having provision for generating purchase order from the system, the Procurement wing was preparing the purchase orders manually and the same were issued to suppliers. Thereafter, purchase order details were entered in the system.

Though purchase orders were issued manually but, no control registers were available with the procurement wing or other mechanism exist to monitor the timely and complete entry of all purchase orders in the e-Aushadhi system. Scrutiny of data relating to purchase orders placed during 2014-15 revealed that 50 *per cent* of the total purchase orders valuing ` 271.10 crore were entered in the e-Aushadhi system in the next financial year (2015-16) with a delay of 23 to 179 days. The delay in entering the purchase orders in the system affected timely acceptance of drugs at the district Drug Warehouses, as the system does not allow acceptance of drugs by the Drug Warehouses without recording of purchase orders.

The Government stated that completeness and correctness of data captured in the system would be ensured.

2.4.8.2 Purchases at unit level not recorded in the system

Information obtained from the tested-checked units revealed that three units[5] did not use the system for recording local purchases at the unit level amounting to ` 14.36 crore during 2013-15. Further information received from nine units

[5] DHO, Thane; CS, Solapur; and CS, Raigad

revealed that as against local purchase of ` 30.40 crore done during 2013-15, only ` 11.40 crore was recorded in the system **(Appendix 2.4.1)**.

The Government did not furnish any specific reply. In the exit conference, the Director, DHS stated that the Department had initiated a monthly review to ensure that the local purchase entries were in order.

Processing controls

Process controls inbuilt in the system must ensure that process was complete and accurate and processed data was updated in the relevant files.

As per the contract terms and conditions for centralised procurement of drugs/consumables, if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the Contract, deduct from the contract price, as liquidated damages, a sum equivalent to 0.5 *per cent* of the delivered price of the delayed goods for each week or part thereof of delay until actual delivery, up to maximum deduction of 10 *per cent*. Once the maximum is reached, the purchaser may consider for termination of the contract. Where the supplier fails to commence delivery as scheduled or to deliver the quantities ordered within the delivery period stipulated in the contract, the purchaser has the discretion either (a) to extend the delivery period stipulated in the contract, and (b) to cancel the contract in whole or part for the unsupplied quantities without any show-cause notice. In the event of extension, liquidated damages were applicable. The defect in the programming logic and the non-incorporation of all the business rules with respect to contract conditions in the system noticed in audit are discussed below.

2.4.8.3 Non-levy of liquidated damages for non-supply or short-supply

The system did not identify purchase orders against which no supplies or less supplies were received for levy of liquated damages as per the contract conditions. Data analysis for the year 2013-14 revealed that though there was short-supply/non-supply of drugs/consumables against 278 purchase orders, liquidated damages amounting to ` 2.49 crore were not levied as detailed in **Table 2.4.3**

Table 2.4.3: Non-levy of liquidated damages for purchase orders placed in 2013-14

(₹ in crore)

Type of order	No. of purchase orders	Purchase order amount	Supplied quantity amount	Difference amount	Liquidated damages not levied
First order	169	23.49	7.94	15.55	1.56
Repeat orders	109	13.82	4.55	9.27	0.93
Total	**278**	**37.31**	**12.49**	**24.82**	**2.49**

Scrutiny of records also revealed that of 43 cases of non-supply, bank guarantees were not available in the purchase files in respect of five purchase orders.The system also did not generate Management Information System (MIS) reports to monitor the failure of the suppliers to supply and levy of liquidated damages.

Further, penalty rate for the delay in supply was calculated by the system at 0.071429 *per cent* per day (0.5 *per cent* ÷ 7 days) of the delivered price of the delayed goods, instead of 0.5 *per cent* for each week or part thereof. This

incorrect mapping of business rules resulted in computation of less liquidated damages. For instance, in one case, liquidated damages calculated by the system were ` 9.82 lakh as against the actual liquidated damages of ` 10.25 lakh.

The Government stated that action was taken only against repeated defaulters. It added that penalty was being calculated on per day basis.

The reply is not correct because as per contract conditions, penalty was to be levied at 0.5 *per cent* for each week or part thereof of delay.

2.4.8.4 Business rules on risk-purchase not mapped

The contract also provided that in case the purchaser decides to cancel the contract on failure of the supplier to supply and repurchase at the risk and cost of the supplier, the supplier would be liable to pay any loss by way of extra expenditure or other incidental expenses which the purchaser may sustain on such repurchase. The purchaser could also debar the defaulting supplier from future orders for maximum period of three years or till recovery of the extra expenditure on account of cancellation and repurchase whichever is later. Audit observed that the system did not generate notice for issue to the supplier in case of non-supply or short supply of drugs/consumables as per the purchase order. The system also did not have option to record cancellation of purchase order so as to issue notice for repurchase at the risk and cost of the defaulting supplier or debar the supplier from future orders.

The Government accepted the fact and stated that necessary action would be taken.

2.4.8.5 Procurement of drugs and consumables at higher rates within the contract period

As per the standard term and conditions for centralised procurement of drugs/consumables, the rates were valid for a period of one year from the date of signing the contract and any increase in rate was not admissible. Further, the quantities mentioned in the contracts were indicative and the Joint Director, DHS reserved the right to increase or decrease the quantities without assigning any reasons.

Audit observed that nine drugs/consumables were purchased through fresh orders at higher rates though the earlier contracts for the same drugs/consumables were valid for placing orders for additional quantities, leading to extra expenditure of ` 59.13 lakh. The system did not have facility to generate MIS reports to identify contracts whose validity period had not expired before placing fresh orders.

The Government stated that new purchase orders had to be floated because, the original suppliers were not ready to supply quantities in excess of that indicated in the tenders.

The reply is not acceptable as the action breached the standard terms and conditions of the centralised procurement process.

Recommendation 2: The Government may ensure that all the business rules are adequately mapped in the system so that issues like levy of liquidated damages, repeat orders within the validity of the original contracts and procurement at risk-purchase are enforced efficiently through the system to safeguard financial interests of the Government.

2.4.8.6 Quality control process

The drugs/consumables procured centrally are to be tested by Quality Control (QC) wing of DHS from the National Accreditation Board for Testing and Calibration Laboratories (NABL) recognised laboratories. Drugs can be rolled out in supply chain only if the quality is approved by the laboratory. The QC wing sends request for sample to the Drug Warehouse. On the basis of such request, the drug sample is collected by the approved laboratories appointed by DHS from the Drug Warehouses and the report is delivered depending upon the testing period of sample (10 or 21 days) prescribed for various categories of drugs and consumables.

The supplies are deemed to be completed only upon receipt of the quality certificates from the laboratories and till then the drugs are kept in quarantine status. If the drugs/consumables pass the laboratory test, the QC wing updates the status of the drugs/consumables in the system as "Active". Where the drugs/consumables fail the laboratory test, the status is updated as "Rejected". Active status drugs/consumables are ready to issue while rejected drugs/consumables are returned to suppliers.

Analysis of data relating to drugs kept in quarantine status (as on 07 April 2015) revealed that 2,108 batches of drugs/consumables involving supplies to various Drug Warehouses valuing ` 15.30 crore were shown under quarantine status for a significantly long period ranging between 85 and 497 days, due to pendency of laboratory test results, non-updation of quarantine status despite receipt of test results *etc.*. Since these drugs/consumables were kept under quarantine, the same could not be issued, indicating deficient monitoring by the DHS and deprival of essential drugs/consumables to needy patients.

The Government stated that necessary efforts would be made to build up capacity for effective monitoring of the quarantine status.

2.4.8.7 Issue of sub-standard drugs

Analysis of data for the period 2013-15 revealed that three drugs valuing ` 4.63 lakh declared sub-standard by the approved laboratories were issued by the district Drug Warehouses to PHCs/hospitals for issue to patients as detailed in **Table 2.4.4.**

Table 2.4.4: Issue of sub-standard drugs

Name of drug	Batch No.	Date of QC report	Period of issue	Quantity	Amount (in ₹)
Amoxycillin + Clavulanic Acid Inj 1000 gm + 200 gm Vial (Vial)	DB4030	19-08-2014	03-04-2014 to 16-09-2014	14,180	4,41,834
Amoxycillin + Clavulanic acid dry Syrup 200 mg + 28.5 mg 30 ml Bottle (bottle)	CDS1308018	11-01-2014	10-02-2014 to 14-02-2014	191	4,870
Paracetamol Syrup 250 mg /5 ml 60 ml (bottle)	MGL/111	01-03-2014	20-02-2014 to 27-03-2014	2,588	16,149
Total				**16,959**	**4,62,853**

Since the system design did not permit issue of drugs which are kept under quarantine or rejected, the issue of sub-standard drugs indicated manual intervention in the database.

Failure to update the quarantine status of stocks for long periods, absence of monitoring to ensure timely receipt of test results from laboratories and issue of sub-standard drugs diluted the objective of having a robust quality assurance system for testing drugs/consumables.

In the exit conference, the Director, DHS stated that this has been viewed seriously and the Principal Secretary assured that such instances would not be repeated. The Government stated that due to some programming errors, the problem had occurred, which has since been resolved.

Recommendation 3: The Government may (i) review the stocks of drugs/consumables which are lying in quarantine status for unduly long periods to ensure their timely availability to the patients, and (ii) institute a stringent control mechanism to prevent issue of sub-standard drugs.

2.4.8.8 Local purchase of drugs/consumables at unit level

Any local purchases done by the PHCs/hospitals were required to be entered in the e-Aushadhi system. Scrutiny of data in 11 test-checked units[6] revealed that 110 items of drug/consumables though locally purchased during 2013-15 were shown as receipts from third party[7]. Incidentally, the rates of these drugs/consumables were also higher than the central procurement rates by ` 69.13 lakh.

The recording of local purchases as receipts from third party dilutes the control of Management over local purchases to ensure transparency in procurement.

The Government stated that necessary steps would be taken to ensure that local purchases are not recorded as third party receipts.

2.4.8.9 Discrepancies in drugs/consumables issued and received

Drugs/consumables are issued from District Drug Warehouses to PHCs/hospitals. Scrutiny of issue of drugs/consumables and its receipt in the test-checked units revealed the following.

Drugs/consumables recorded as issued to PHC but not received

Drugs/consumables valuing ` 1.36 crore (85 items) were shown as issued in the system in test-checked units of DHO, Thane and Raigad. The summarised details of the transfer and value of drugs is shown in **Table 2.4.5**.

[6] DHO, Thane; DHO, Sindhudurg; CS, Solapur; DHO, Solapur; CS, Satara; CS, Nashik; DHO, Nashik; CS, Raigad; DHO, Raigad; CS, Dhule; and DHO, Dhule

[7] Units other than DHS units are categorized as "Third party "

Table 2.4.5: **Issued items not received in PHCs**

(₹ in lakh)

Drugs issued by	Drugs shown as issued to	Period of issue	No. of items	Value of drugs
DHO, Thane	PHC, Kon (Thane)	04 July 2014 to 09 March 2015	26	5.21
DHO, Raigad	PHC, Gadab (Raigad)	03 December 2013 to 25 March 2015	59	130.61
			85	**135.82**

Cross-verification by audit in the respective PHCs revealed that 85 drugs/consumables valuing ` 1.36 crore were not received by them.

The Government stated that the DHS would investigate the matter and necessary action as deemed fit would be taken.

Drugs/consumables recorded as issued to hospitals but not received

The issue of drugs/consumables from the district Drug Warehouses to hospitals is recorded in the system. However, the receipts of drugs/consumables by these hospitals and its issue to patients are recorded offline in the manual stock registers.

Scrutiny of records in seven test-checked hospitals[8] revealed that drugs/consumables (321 items) valuing ` 6.95 lakh though shown as issued in the system were not found recorded as receipts in the stock registers maintained in the wards of these hospitals.

The above discrepancies showed that there was no system of obtaining information of drugs/consumables received periodically and its reconciliation with the issues shown in the system, for effective inventory management. The system also did not have the facility to generate MIS reports showing item-wise reconciliation of issues and receipts within the units under DHS for effective inventory management.

The Government stated that the DHS would investigate the matter and necessary action as deemed fit would be taken.

2.4.8.10 Inadequacies in transactions relating to issue of drugs

Scrutiny of database and records relating to third party issues in the test-checked units revealed the following inadequacies in recording the transactions under this category:

- Drugs/consumables transferred from units under DHS were recorded as third party issue in 14 units (2,242 transactions) instead of recording the same under drug transfer module for transfer between various units under DHS.
- In 12 units, third party issue of drugs/consumables in respect of 2,983 transactions were shown as issued to "Others" instead of mentioning proper name of the receivers.

[8] CS, Thane; CS, Sindhudurg; CS, Satara; CS, Raigad; CS, Nashik; CS, Gadchiroli; and CS Solapur

- Indents and acknowledgements of drugs/consumables shown as third party issues in three DHO (Sindhudurg, Satara and Raigad) and CS Solapur in respect of 134 transactions (January 2015) were not available.
- The State Level Bureau Offices of TB and Leprosy recorded all issues of drugs/consumables to district units as third party issue instead of recording the same under issue desk module.

The above inadequacies in recording of issues in the third party module of the system indicated that the procedure for recording of inter-unit transfers was not properly followed and there was no effective control over inventory management. Also, there was no system to reconcile the issues shown under the third party issue module and thus, fraught with risk of unauthorised issues being entered in the system.

In the exit conference, the Director, DHS stated that there was a confusion regarding the term "third party" and a circular was issued in September 2015 to clear this concept. The Government stated that necessary action would be taken to rectify the inadequacies in the system.

Output controls

Output controls ensure that computer output is complete and accurate.Weaknesses in the output controls noticed in audit is discussed below.

2.4.8.11 Incomplete payment data

A computerised system should ensure that all the necessary data be captured correctly and any invalid data in this regard should be reconciled in a timely manner so as to provide a reliable and responsive system. A report titled 'Supplier payment detail report' is generated from the e-Aushadhi based on which the bills are approved by the procurement cell in DHS and sent to the Finance wing in DHS for making payments Thereafter, actual payments made are entered in the system.

The data relating to payments made to the suppliers was not captured in the system since October 2014. Analysis of data relating to payments made to suppliers prior to October 2014 showed that the payments recorded were more than the amounts of accepted quantities of drugs in respect of eight purchase orders valuing ` 1.66 crore.

The Government acknowledged the audit observation and stated that instructions have been issued to payment issuing authorities for making appropriate entries in the system.

2.4.8.12 Abnormally high rate of drugs

Abnormal rate of drugs were shown in the e-Aushadhi system relating to third party receipt of drugs due to errors in the application software. Some of the cases noticed in Civil surgeon, Thane are illustrated in **Table 2.4.6.**

Table 2.4.6: Abnormal rate of drugs shown in the system

(Amount in ₹)

Sr. No.	Name of drug	Receipt date	Quantity	Rate per capsule/tablet	Total amount
1.	Amoxycillin Cap 250 mg	18/12/2014	118400	1110111.20	131437166080
2.	Diclofenac Sodium Tab 50 mg	26/09/2014	638000	2047.00	1305986000
3.	Omeprazole Cap 20 mg	14/05/2014	1100000	951.40	1046540000
4.	Vitamin B Complex Tab	26/09/2014	595000	1350.00	803250000

The abnormal rates shown in the system had the effect of wrong valuation of drugs/consumables shown as issued and consumed in the MIS reports. This also indicated that the software was not properly tested before its implementation.

In the exit conference, the Director, DHS stated that abnormally high rates of drugs were captured due to software issues which were being sorted out.

2.4.8.13 Management Information System

The application System should provide for various Management Information System (MIS) reports which could act as a tool for decision making and monitoring.

Audit observed that crucial MIS reports (i) for monitoring the failure of suppliers to supply drugs/consumables and consequent levy of liquidated damages; (ii) for identification of such contracts whose validity period had not expired to enable placing repeat orders at old rates; (iii) showing item-wise reconciliation of issues and receipts of drugs/consumables within the units under DHS for effective inventory management; (iv) showing difference between the system generated payments due and actual payments made for taking suitable corrective action *etc.* were not available. In the absence of these vital MIS reports, the objectives of tracking drug distribution and improving the payment process remained largely unachieved.

The Joint Director, DHS stated (July 2015) that necessary facilities to generate MIS reports would be made available in the system.

2.4.9 Information system security

2.4.9.1 Information Technology security policy

An effective IT security policy is important for protection of the information assets created and maintained by IT and IT enabled activities. By way of enunciating an IT security policy, the organisation demonstrates its ability to reasonably protect all business critical information and related information processing assets from loss, damage or abuse and also creates enhanced trust and confidence between organisations, trading partners and external agencies as well as within the organisation. It was observed that IT security policy was not available and the Department did not issue any security guidelines for e-Aushadhi.

The Government stated that application is hosted at CDAC data centre and CDAC always maintains standard security and data backup policy in its data centre.

The reply is not convincing because, the Department being the owner and user of the application, the onus of framing a robust IT security policy rests with the Department.

2.4.9.2 Digital signature

As per the terms and condition of contract for centralised procurement, 100 *per cent* payment shall be made to the suppliers upon submission of various documents including receipt certificates issued by the consignees. Also, as per paragraph 7.21 of the Maharashtra State e-Governance policy 2011, digital signature was to be introduced in all departmental computerization processes, so as to ensure authenticity and integrity of Electronic Data Interchange.

A module was developed in the e-Aushadhi system to digitally sign the receipt certificates in respect of drug/consumables received at district Drug Warehouses. The certificates could be viewed by the procurement cell at DHS. Audit observed that the module was not in use and the payments were made to the suppliers without enforcing the requirement of digitally signed certificates.

The Government stated that CDAC had tested the digital signature feature in the system and suggested some changes, which would be implemented soon.

2.4.9.3 Logical access controls

In the computerized system, access to data was required to be restricted to authorized individual users only. Audit observed that the logical access controls available in the application was inadequate due to the following reasons:

- Single user ID allotted was shared by multiple users. In the absence of individual user IDs, the transactions made in the system could not be traced to an individual.
- The passwords were not changed since allotment in respect 1,841 users. Further, identical passwords were being used by these 1,841 users, which increased the risk of manipulations and fraudulent transactions.
- The user ID of Medical Officer was shared with Pharmacy Officer for the functions of approval of transactions related to issue of drugs/consumables in 10 district Drug Warehouses/hospitals/PHCs. As a result, the system was vulnerable to errors or manipulations.

In the exit conference, the Director, DHS stated that the system of allotment of user ID/password for individual users would be implemented soon to facilitate tracing of transactions to individuals.

2.4.9.4 Business continuity and disaster recovery plan

An organisation should have a business continuity and disaster recovery plan with associated controls to ensure that the organisation can accomplish its mission and not lose the capability to process, retrieve and protect information maintained in case of eventualities due to interruption or disaster leading to temporary or permanent loss of computer facilities and data.

e-Aushadhi application and data are hosted at CDAC, Noida. However, no documents were available to show that there was a regular backup plan of data and its safe storage. Further, though the e-Aushadhi is a critical system and is used throughout the State, business continuity and disaster recovery plan for e-Aushadhi system were not documented or tested.

The Government stated that the application is hosted at CDAC data centre, so all standard policies were followed in the data centre for business continuity and disaster recovery.

The reply is not convincing because, being the owner and user of the application and given the magnitude and the criticality of the system, the Department should have ensured that business continuity and disaster recovery plan was properly documented and tested.

2.4.10 Audit trail

Audit trail depict the flow of transactions necessary in a system in order to track the history of transactions, changes/modifications in data, system failures, erroneous transactions, *etc.* Scrutiny of the database in this regard revealed the following:

- In the event of cancellation of issue of any drugs/consumables, the system must capture the date of cancellation, user ID of the person cancelling the issue and remarks for such cancellation. Analysis of the data for the month of January 2015 revealed that in 26 transactions, the cancellation dates and user ID were not captured in the system.
- The system did not have facility to capture the date of cancellation and the user who had cancelled the purchase order for maintaining audit trail.
- Data was modified through back-end thereby compromising the audit trail.

These discrepancies indicated inadequate facilities in the application to maintain adequate audit trail over any modification and deletion of data in the system.

The Government stated that CDAC was requested to customise the application to maintain audit trail.

Recommendation 4: The Government may ensure adequate audit trail, logical access controls and business continuity and disaster recovery plan for safety and security of data.

2.4.11 Internal audit

Internal audit system both in the manual as well as computerised environment ensures that the controls are in place. Deputy Director of Health Services, Budget and Administration, Pune was responsible for internal audit of Hospitals and Drug Warehouses of the Department. Audit observed the following:

- There was no audit module in the e-Aushadhi system to generate customized reports for facilitating conduct of internal audit.
- Though the system is being implemented since 2013-14, the internal audit wing did not verify the transactions and stock balances in the system at the district Drug Warehouses, hospitals and other units for two years (2013-15).

The Government stated that a module to facilitate internal audit would be incorporated in the system and internal audit of the transactions would be conducted.

2.4.12 Conclusion

The Government of Maharashtra initiated the e-Aushadhi system in February 2013 to streamline the process of inventory management of drugs and consumables in Government hospitals, Primary Health Centres, Drug Warehouses *etc.* throughout the State. An IT Audit of the system revealed that while the demand generation module, a critical module of the supply chain management, was not implemented, the finance module was incomplete. Of the total purchase orders placed during 2013-14, 20 *per cent* of the orders (in terms of value) were placed in the month of March 2014 which increased to

49 *per cent* during 2014-15. Failure to update the quarantine status of stocks for long periods, absence of monitoring to ensure timely receipt of test results from laboratories and issue of sub-standard drugs diluted the objective of having a robust quality assurance system for testing drugs/consumables. The effective implementation of the system suffered due to poor documentation, weaknesses in IT planning and inadequacies in the application software. Discrepancies in issues and receipts of drugs/consumables, recording of local purchases and incorrect rates of drugs/consumables captured in the system weakened the reliability of data and transparency in purchases. The monitoring of system was poor due to insufficiency of MIS reports. Inadequate IT security, especially in view of inadequate logical access controls, non-documentation and testing of disaster recovery plan and inadequate audit trail, made the system further vulnerable to errors and manipulations.