2.3 Gujarat Medical Services Corporation Limited

IT Audit of Drug Logistic Information and Management System (DLIMS)

Executive summary

A web-based system named Drug Logistics Information and Management System (DLIMS) was developed by National Informatics Centre (NIC) for Gujarat Medical Services Corporation Limited (Company) to cover activities starting from the collection of indents to the distribution of indented items of drugs and surgical items.

Issues related to system efficiency

No documentation existed of the authority which could create master data, nor were procedures for its amendment or verification prescribed; as a result unauthorised creation and tampering of master data could not be ruled out.

Quality Control

There was no pre-dispatch testing at four out of five depots. Further as the module for quality assurance monitoring had not been developed, the same was being done manually.

Inventory Management

The principle of First Expired First Out (FEFO) was not facilitated in the system hence issue of drugs was not made on the basis of FEFO. DLIMS was also not having any automotive alert for Near to Expiry Drugs.

Issue of Stores

A review of stock receipt module and stock issue module of drugs revealed that in 16 out of 3,16,347 cases, date of issue was prior to manufacturing dates. In 253 cases, date of dispatch to depots was prior to date of issue from depots and in 92 cases stores were issued but not dispatched. This indicates that the control needs to be strengthened.

Integrity and Reliability of data

Six cheques involving 23 bills were issued prior to the passing of bills and 25 out of hundred cheques issued were not found in the system database. Further, bill numbers were not system generated.

Documentation

There was no agreement or understanding between the Company and NIC and the Company was not having system development related documents.

Monitoring and Internal control

The Hospitals and other health institutions did not submit e-receipt for acknowledging receipt of stores from depots. Audit trail was not facilitated in the system to recover the history of transactions.

Conclusion and Recommendation

IT audit of DLIMS revealed that due to improper planning without taking into account inter-related activities of the Company and lack of support from the developer etc., the Company was left with a system which had issues relating to integrity and reliability of information. It is recommended that an integrated software package be developed which would take care of the entire business operations of the Company with forward and backward integration.

Introduction

2.3.1 The Central Medical Stores Organisation (CMSO) was established with the objective to procure and supply drugs, medicines, surgical items and medical equipments to cater to the needs of all the Government medical institutions[21] (hereinafter referred to as hospitals and other health institutions) of Gujarat State. Funds for purchase of drugs are placed at the disposal of four Additional Directors (ADs[22]), Gandhinagar working under Commissioner of Health, Medical Services, Medical Education and Research. The drugs are received at five depots[23] and are supplied as per the indents of the medical institutions. With a view to match the changing demands and pace of development in the health sector, CMSO was transformed into Gujarat Medical Services Corporation Limited (Company) with effect from July 2012.

About DLIMS

2.3.2 A web-based application named Drug Logistics Information and Management System (DLIMS) was developed (2007) by National Informatics Centre (NIC), free of cost, to cover interrelated activities starting from the collection of indents from hospitals and other health institutions to the distribution of the indented items. DLIMS only covers the procurement of drugs and surgical items. The system was developed using SQL server 2005 as back end and dot-net 2005 as front end. The system is hosted in the central server of NIC to get the benefit of the technical support.

Through DLIMS, online annual indents for drugs are received from approximate 500[24] hospitals and other health institutions. The indents are automatically consolidated for centralised purchase. A separate e-tender system is utilised for determining the lowest bidder and to fix rate contract (RC) for each item. After finalisation of RCs, purchase orders (POs) for supply of drugs are issued to vendors. The drugs, received from the suppliers are stored at five depots. Distribution of drugs is made to the hospitals and other health institutions from these depots against their indents. Stock available with the hospitals and other health institutions can also be monitored through DLIMS.

Objectives of DLIMS

2.3.3 DLIMS was developed with the following objectives:

* to improve efficiency and effectiveness of drug logistics system;
* to integrate all inter-related activities through common database to avoid redundancy, increase accuracy and enhance transparency;
* to improve various functions to serve in a better and effective manner; and

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[21] All medical colleges-hospitals, district hospitals, sub-district hospitals, Community Health Centres (CHCs) and Primary Health Centres (PHCs).

[22] In charge of Health, Medical Education, Medical Services and Family Welfare.

[23] Amreli, Gandhinagar, Jamnagar, Patan and Surat.

[24] Numbers of hospitals and other health institutions 470 (2009-10), 493 (2010-11), 499 (2011-12), 498 (2012-13), 502 (2013-14).

- to facilitate online monitoring of all activities.

Modules

2.3.4 Following modules are available in DLIMS:

Table 2.3.1: Modules under DLIMS

Sl. No.	Modules	Functioning
01.	e-IS	e-Indenting System
02.	PPS	Purchase Order Processing System
03.	BPS	Bill Payment System
04.	SIM	Store Issuable Monitoring System
05.	SRM	Store Receipts Monitoring System
06.	SMS	Stock Monitoring System
07.	MIS	Management Information System

Organisation structure of the Company

2.3.5 The Managing Director is the head of the Company. He carries out the activities through its Drugs branch which processes and finalises rate contracts for supply of drugs on receipts of e-indents from hospitals and other health institutions, its Depots, which distribute the stores to hospitals and other health institutions and its Quality Assurance branch which supervises the quality of the drugs. Each Depot is headed by a Manager.

Audit Objectives

2.3.6 IT Audit of the DLIMS was conducted to evaluate:

- whether there was effective planning for implementation of the system and the business rules were mapped adequately;
- adequacy and robustness of the system in achieving the stated objectives;
- completeness, correctness and reliability of data; and
- adequacy and implementation of various controls in the system.

Audit Criteria

2.3.7 The DLIMS was evaluated considering the business rule governing the functioning of the Company. Planning of computerisation, methodology of development and data management was examined keeping in view the best practice of IT governance.

Scope and Methodology

2.3.8 Records/data related to DLIMS for the period 2009-14 were reviewed at the Company, Gandhinagar. Two[25] out of five depots were selected for assessing supply of drugs against indents, quality assurance of drugs supplied by vendors etc. Entry and Exit conferences were held in April 2014 and

[25] Amreli and Gandhinagar.

November 2014 with the Managing Director and other officers of the Company.

IDEA (Interactive Data Extraction and Analysis) a data analysis tool, was used for analysis of data (2009-14) captured in DLIMS. Besides examining the data, adequacy of general and application IT controls was also assessed.

Audit Findings

Planning Management

Dependency on manual system for supplementary indents

2.3.9.1 DLIMS facilitates submission of online annual indent from all the hospitals and other health institutions. After due date, the procedure for online submission of annual indent is closed. Against their requirement, drugs are procured and supplied to the hospitals and other health institutions. However, during the year, if particular hospitals and other health institutions require additional quantity of items or new items, which had earlier not been included in the online indent, they are required to intimate the Company in writing to be included as supplementary indents.

Thus, due to non-facilitation of online indents for supplementary requirements, dependency on manual system continued. Audit noticed that there had been no effort towards enhancing the features of DLIMS to include additional demands. The Company had also not approached the developer on the issue.

The Management replied (November 2014) that due to less business of supplementary indents, matter of online submission of supplementary indents was not considered and same was done manually. The Management further stated that software development documents have not been provided by NIC and that a new software E-Aushadhi was under development through C-DAC[26], a unit of Government of India. It further assured that the audit suggestion would be attended to in the new software.

Manual dependency for risk purchase

2.3.9.2 As per clause 50 of the tender documents of the Company, risk purchase of the items ordered at the cost and the risk of the party will be carried out when the party fails to supply the items during the validity period. The risk purchase will be done at any time after the delivery period and it will be done from main/parallel/substitute RC holders for undelivered quantity of the stores. The vendor will be penalised to the extent of 10 *per cent* of the cost of undelivered items or difference of the purchase amount, whichever is higher. Audit observed that a manual register was maintained to work out the penalty for risk purchase and to monitor their recovery. The system had not facilitated the generation of risk purchase recovery order; the same was

[26] Centre for Development of Advanced Computing.

manually calculated and issued for affecting the recovery. The Management assured that the same would be incorporated in the new software.

Non-inclusion of various in-house modules to DLIMS

2.3.9.3 The Company requested (September 2008) NIC to develop four modules viz., (i) Quality Assurance/Control (QC) Module; (ii) Earnest Money Deposit/Security Deposit Monitoring; (iii) Grant Monitoring System; and (iv) Instrument Purchase Monitoring System. Three modules excluding QC module were developed in-house by the Company. NIC was requested to add these in-house developed modules to DLIMS but the same had not been done.

The Management replied (November 2014) that NIC had not developed the required modules for DLIMS by citing staff-scarcity and being overloaded by various tasks of the State Government.

This has kept these modules out of DLIMS with the result that the possibility remained of duplication of work for the same information at various places, redundancy of data and human interference during transferring data from one system to another.

Integration with HMIS developed for hospital management

2.3.9.4 Hospital Management Information System (HMIS) was developed (2007-08) by M/s Tata Consultancy Services Ltd. (TCS) to provide clinical and diagnostic tool, hospital management tool and to integrate various in-house functions. It covered six teaching (major) hospitals and 24 non-teaching (minor) hospitals across the State. HMIS is having module 'STORE' to capture drugs, medicines etc., received from the Company. It also receives online indents from various IPD/OPD wards, emergency counter, etc., and issues the stores to them.

Audit observed that even after six years of roll-out of DLIMS, no interface had been developed for integration with HMIS. Stocks received from the Company were manually entered by the hospitals into HMIS and manually updated on account of consumption at both the systems. This resulted in continuity of manual entry of medicines received from the Company into HMIS. The integration would also facilitate monitoring of consumption of medicines in the hospitals through DLIMS.

The Management replied (November 2014) that a meeting was held (May 2011) between NIC and TCS for integration between both the systems. However, there was no progress in this regard. They assured that same would be done in the new software.

Alert facility for monitoring of minimum stock at Depots

2.3.9.5 A Reorder Level (ROL[27]) of each item of drug was required to be defined for each depot based on the consumption pattern, so that the Company

[27] A quantity of an item which a company holds in stock, such that, when stock falls to this quantity, the item should be reordered.

can maintain minimum stock for a defined period and minimum stock in pipeline to reduce the chances of stock-out at the depot. The system was to be designed to give alert once the stock reached the minimum level.

Audit observed that such facility was not available in the system and thus no alert is popped up when the stock of an item goes down the minimum cut-off level. While a minimum cut-off level was defined for 218 items of drugs of Amreli Depot and 228 items for Gandhinagar, these levels were not maintained. During the period of five years (2009-14), the re-ordering levels were not maintained in 46,895 and 46,942 instances in the above two depots respectively.

The Management replied (November 2014) that at the time of development, NIC was requested (September 2008) to provide ROL facility in the system. However, the same would be facilitated in the new software.

Issues relating to System Efficiency

Input control

2.3.10.1 A system should be designed to control the risk of input of incorrect data in the system. The system should ensure that the data entered are accurate and without duplication. Weak input control may increase the risk of entry of un-authorised/irrelevant /incomplete /duplicate/redundant data with the possibility of error or fraud in the computerised system.

- **Reliability of Master Data -** Information stored in the master data files is usually critical for processing and reporting of financial and operational data. Master data affects many related transactions and must therefore be adequately protected from unauthorised and uncontrolled changes. There were approximately 500 hospitals and other health institutions from whom online indents were received during 2009-14. However, as per database[28], the hospitals and other health institutions were 1868 including 34 units, which were not actual hospitals or other health institutions in nature thus, creating doubts about the reliability and integrity of master data files. Further, procedures for changing of master data, verification of integrity of master data with proper manual records, etc., had also not been prescribed.
- **Duplicate code for drugs -** Drugs have been classified into various categories *viz*., tablet and capsule, injection, surgical items, etc. Each drug has been coded with a unique identification number. Audit noticed that there were 13 items out of 1,107 for which more than one code have been allotted.
- **Updation of declared formulary items -** A list of essential drugs/items is prepared annually by Formulary Committee after inviting opinions from all the stake-holders like district/civil hospitals, medical colleges, etc. There were 466 items of

[28] dbo_CMSO_DDO.

drugs/medicines/surgical/dressing etc., which have been included in the list of formulary for the year 2013-14. In the database, there were 1,107 drugs that were classified as formulary or non-formulary. Logically, those classified as non-formulary should be those not appearing in the list and vice-versa. However, Audit observed 569 drugs out of them have been classified as formulary which did not match with the declared 466 items of formulary drugs for the year 2013-14. It indicates that formulary list was not being updated in the DLIMS.

- **Data in rate contract -** Each rate contract (RC) has its validity period. Date of entering into an RC is invariably prior to the validity period of RC. However, in five cases, the validity of RCs was prior to the dates of the RCs.
- **Price preferences to non-SSI units as per database -** In order to encourage small scale industries (SSIs) and cottage industries to enable them to compete with large scale units, such units are eligible for price preference as per State Government policy (September 1997). Price preference for more than 15 *per cent* will not be admissible. Audit observed that 29 out of 39 units to whom price preferences were given were not SSI units as per the database. Thus, system was not designed in such a way to restrict price preference only to those vendors who were listed as SSI units in the database which would have been in consonance with the Government policy.

The system should be designed in such a way that there should be minimal possibility of input of incorrect data from the users' side. However, Audit observed that there were several cases, as discussed above, where mistakes occurred in capturing the data from the users due to inadequate input controls.

The Management replied (November 2014) that price preference had never been given to non-SSI units. Such errors might have occurred due to mistake and non-validation in data entry for the SSI status. They assured that adequate input control would be provided in the new software for avoiding such type of incorrect data entry.

Process control

2.3.10.2 A system should ensure that data is accurately and completely processed for generation of correct, complete and reliable output data. This objective is achieved by providing various controls. Weak process controls may lead to wrong outputs/results, unauthorised changes in the existing data etc.

- **Closing balance of stock -** Monthly stock (item-wise) of hospitals and other health institutions was captured in the table 'dbo_dlims_stock'. Audit observed that in 283 cases out of 75,05,641 cases, pertaining to eight hospitals and other health institutions, closing balances were not correctly calculated. This indicated that system-processed closing balances were not reliable.

- **Auto-change of quantity of items -** Quantities of the items which have been issued/supplied by the depots to the hospitals and other health institutions, automatically increased to twice or sometime more than four times the original quantity, which required re-check by the depot staff to ensure the supply of correct quantity to the hospitals and other health institutions. The possible implication could be erroneous stock position and incorrect bill generation, if the manual verification is not carried out.

The Management replied (November 2014) that NIC was requested (August 2014) to rectify it but the NIC has not taken action to upgrade the system. The entity assured that the same would be considered in new software.

Penalties for late supply

2.3.10.3 Audit observed that:

- **Manual calculation of penalty:** Despite having facility for auto-calculation of penalty for delay in delivery, it was manually calculated in a separate excel sheet and the same was put into DLIMS for further process. This indicated that either system process calculation was not reliable or altered value of penalty was effected in the system, which required dependency on manual system.
- **Incorrect/less penalty:** In 25 cases, though the drugs were supplied within the stipulated delivery period, even then penalty was deducted while in 1,311 cases, the penalty was not recovered as per the scheduled rates. There were differences between the system calculated penalty and penalty worked out by audit. The difference worked out to ` 41.50 lakh.

The Management agreed (November 2014) that lacunae in DLIMS resulted in incorrect calculation of penalty. Hence, late supply penalty was manually calculated. The Company also stated that in some cases, the amount of risk purchase was incorrectly shown as late supply penalty and in some cases the delivery period was extended upto eight to 12 weeks, whereas, in DLIMS, provision is made for a period upto six weeks only.

Quality control

2.3.11.1 Pre-dispatch testing (PDT) system at four depots

At the time of commencement of DLIMS, the samples were randomly taken and sent for testing to Food and Drug Laboratory (FDL), Vadodara, a Government laboratory.

On need-felt basis, a system of pre-dispatch testing (PDT) was started (July 2010). The PDT system was to be achieved up to 100 *per cent* by next three years. As per PDT procedure, the samples were required to be drawn by Senior Drug Inspector and sent to FDL for quality assurance. Drugs were

required to be kept in quarantine and not to be distributed to hospitals and other health institutions till test report was received.

Audit observed that out of five depots PDT system was adopted only at Gandhinagar depot and drugs were distributed from other four depots without adopting PDT system, which could pose risk of consumption of drugs without pre-dispatch testing. Instead of following PDT system, post testing process was followed at four depots which was ineffective and served no purpose due to significant delay in getting the test results from FDL.

Module for Quality Assurance of medicines

2.3.11.2 The Quality Assurance Module has not been developed and thus the entire functioning of the Quality Assurance was being done manually.

The Management replied (November 2014) that NIC was repeatedly requested to develop module for Quality Assurance, however, the NIC expressed (August 2013) its inability for any modification/upgradation in DLIMS. The Company also stated that same would be developed in the new software.

Supply of drugs to hospitals and other health institutions against indents

2.3.12 On analysis of table containing data of indents of hospitals and other health institutions and supply of medicines there against, Audit observed that:

- **Negative value of demand –** In one case, the indent/demand of a IO named Central Jail, Vadodara for an item code 1,065 was found in a negative value (-10). This showed that there was no validation check to prohibit the user to enter irrelevant data in the demand field.
- **Supply against no demand -** In 9,681 cases, there were instances of supply against no demand from the hospitals and other health institutions. The quantity of supply made to these units ranged from one to 40,000 numbers when there was no demand for drugs from them.
- **Excess supply than demand -** In 32,585 cases, the supply of drugs was in excess of demand and the quantity of excess supply ranged from one to 57,000 numbers.

This indicated that the system lacked various validation checks. The Management agreed (November 2014) with the audit observations and stated that adequate controls would be facilitated in the new software for monitoring of supply of drugs against the demand.

Inventory Management

Adherence to principles of FEFO for issuing of drugs

2.3.13 An efficient drug logistics system should ensure that the principle of First Expired First Out (FEFO)[29]is followed while issuing drugs, so that expiry of drugs is avoided. Audit observed that the Company took up (September 2008) matter with NIC for requirement of issue of drugs on the basis of FEFO. However, the same was not facilitated in the system and as such inventory was not maintained on FEFO basis. DLIMS was also not having any automatic alert for 'Near to Expiry Drugs', so that the expiry of drugs can be avoided by issuing these to the hospitals and other health institutions or by depot transfer.

The Management replied (November 2014) that requests were made to NIC for using of FEFO principles. However, NIC expressed (August 2013) its inability to extend any module in DLIMS. They assured that the same would be done in the new software.

Issue of stores

Issuance of stores from Depots to hospitals and other health institutions

2.3.14.1 On receipt of drugs from the suppliers, stock is updated in Stock Receipt Module (SRM) and then these are dispatched by own/hired vehicles to the hospitals and other health institutions through Stock Issue Module (SIM) after showing issue from the store. Audit observed that:

- **Store issue dates prior to manufacturing dates -** In 16 out of 3,16,347 cases, the drugs were found issued from four depots (Amreli, Jamnagar, Patan and Surat) even before manufacturing dates.
- **Dispatch dates of stores prior to stores issue dates -** In 253 cases, date of dispatch of stores by own/hired vehicles to the hospitals and other health institutions were found prior to the date of issue of stores from depots.
- **Stores issued but not dispatched -** In 92 cases, the stores were shown issued from the SIM module but these were not found dispatched from depots in the module.
- **Store issue rate in negative value -** In 145 cases, the rate of drugs issued to the hospitals and other health institutions was found 'null' (i.e with no data input), while in 14 cases the rate of drugs issued was in negative value.

The above shows that the controls need to be strengthened.

The Management replied (November 2014) that mistakes were occurred at the time of manual data entry due to disconnection of internet/DLIMS and their

[29] A method of drug inventory management in which drugs with the earliest expiry date are the first products issued, regardless of the order in which they are received.

post entry in DLIMS. For stock issue rate in negative, the reason was attributed to deficiency in DLIMS.

Availability of transportation codes for four depots

2.3.14.2 The names of the vendors with whom rate contracts were entered into by the depots except Gandhinagar Depot, were not available in the database. Resultantly, other depots were forced to use the codes meant for transporters contracted for Gandhinagar depot, which was not proper. Thus, due to non-availability of transportation codes for four depots, incorrect codes were used by them.

The Management stated (November 2014) that these transportation codes for other four depots were not provided by NIC resulting in forced use of transportation codes of Gandhinagar depot by them. The same would be considered in the new software.

Stock Monitoring System

Reliability of Stock data

2.3.15 As per Stock Monitoring System (SMS), stock of a depot is processed monthly. Audit observed that:

- **Expiry dates prior to manufacturing dates:** In 81 cases, expiry dates of the drugs were prior to the manufacturing date of the drugs.
- **Invoice date prior to purchase order date:** In 36 cases, the invoice dates submitted by the vendors at the depot were prior to the dates of purchase order issued by the Company.
- **Closing balance of stock in 'minus':** Monthly stock of each depot is maintained in the database. In 26 cases, the closing stocks were in minus. Thus, the system was not properly designed to control issue of drugs in excess of availability of stock, which was not practically possible.

The Management stated (November 2014) that due to deficiency and limitation of DLIMS, the data entry errors were occurred. The same would be resolved in the new software.

Integrity and Reliability of data

Bill Processing System

2.3.16 Prior to commencement of the Company, the accounts branch of CMSO sanctioned the bills and sent them to the treasury for prescribed checks before issue of cheques. After set-up of the Company, its accounts branch sanctioned the bills and issued cheques to the suppliers. Audit observed that:

- **Issuance of cheques prior to preparation of bills:** Dates of six cheques (involving 23 bills) for making payment of ` 39.58 lakh to the suppliers were prior to the dates of passing of bills.

The Management replied (November 2014) that manual register was maintained for monitoring the issue of cheques to the vendors, but incorrect dates were mistakenly entered in the DLIMS, which would be rectified.

- **Cheques issued but not found in DLIMS:** Audit randomly selected 100 cheques for their verifications in DLIMS database. Out of them, 25 cheques were not found in the database. Further, discrepancies were found in three cheques wherein the names of vendors on cheques did not match with the names of vendors in the database.

The Management replied (May 2014) that the manual system of issue of purchase order and preparation/passing of bills was adopted and hence their corresponding entries were not made in DLIMS. However, the discrepancy was not clarified by the Company.

- **Receipt of stores prior to purchase orders:** In 14 cases, the dates of receipt of drugs at depots were prior to the dates of purchase orders issued by the Company. It included two records wherein the receipt dates of drugs were even one year prior to purchase order dates.
- **Gap in Bill Numbers:** Bill numbers were not system generated but manually allotted numbers, following the preceding number. Further, bill numbers were having huge gaps between the bill numbers 1 and 092942. This indicated that either bill numbers were not chronologically followed or these numbers were deleted after allotting the bill numbers, for which no reasons were offered by the entity.

The Management stated (November 2014) that while preparing the bills in DLIMS, next bill number is given manually after considering the numbers of bills prepared outside the DLIMS. However, the fact remained that completeness of the data in DLIMS was not ensured as evident from the gaps.

Documentation

System Development Documentation

2.3.17 To ensure the effective utilisation and future maintenance of a system, all the system development related documents should be prepared and suitably updated for any changes. Lack of updated documentation hampers the continuity of development activity.

Audit observed that there was no agreement or Memorandum of Understanding between the Company and NIC. Normal software development methodologies like preparation of URS, SRS, SDD[30], Users Manual etc., were not adopted by NIC. Maintenance and changes in the application were not

[30] URS-User Requirement Specification, SRS-System Requirement Specification, SDD-System Design Document.

recorded. No policy was adopted to document the authorisation of changes/modification/up-gradation required in DLIMS. Resultantly, the Company was not having system development related documents. Absence of documentation policies increases the risk of unauthorised working practices being adopted and may render the system difficult for future maintenance.

The Management replied (November 2014) that software development documents have not been provided by NIC. They further stated that a new software E-Aushadhi was under development through C-DAC, a unit of Government of India and assured that the audit suggestion would be attended in the new software.

Monitoring and Internal control

2.3.18 The existence of an adequate system of internal control minimises the risk of errors and irregularities. However, the Company has not defined any such policy to reduce risks associated on account of lack of internal control.

Submission of e-receipt by hospitals and other health institutions for acknowledging the receipt of stores from depots

2.3.18.1 Hospitals and other health institutions were required to issue e-receipts as acknowledgment for receipt of the drugs from their respective depots. Audit noticed that:

- In 14,851 out of 23,619 cases, e-receipts had not been issued by hospitals and other health institutions. In other cases, time taken in delivery of the stores to these units after dispatch from the depot ranged up to 1,579 days from the dates of dispatch.

The Management replied (November 2014) that the quoted cases might pertain to the legacy data. Reply was not correct as these pertained to the period 2009-14.

- In 176 cases, the dates of receipt of stores by hospitals and other health institutions were even prior to the date of dispatch of vehicles from depots, which were unreliable. Audit observed that the e-receipts to be issued by these units had not been monitored by the Company for ensuring actual delivery of stores to them.

The Management accepted (November 2014) the audit observations and stated that incorrect data entry might have been the reason for such discrepancies. It was further stated that care would be taken to avoid such deficiency in the new software.

Audit Trail

2.3.18.2 There was no internal control mechanism to detect any attempts of deletion which may enhance the risk of manipulation by unauthorised users. 'Audit trail' was not facilitated in the system to recover the history of

transactions *viz*., updated by, updated on, updated from, deleted by, etc. In absence of the activity logs for audit trail, changes/modifications done by NIC were not available on record. Consequently, the activities of all the users including managerial/monitoring staff could not be tracked for fixing responsibility in case of any unauthorised manipulation.

Thus, the Company had not considered the designing and incorporating audit trails to track the transactions and to monitor the changes made to the data.

Business Continuity Plan and Disaster Recovery Plan

2.3.18.3 Business continuity and Disaster recovery plan is to enable a business organisation to continue its operations in the event of a disruption and to survive disastrous interruption to their information systems. Further, backup media is required to be kept at a location other than the server room, so as to avoid fatal loss of the vital data in case of any unforeseen accident. Further, backup media is required to be tested for assuring recovery in the case of database servers getting damaged.

Audit observed that no such policy has been framed for continuing their operations in case of any disaster, security policy for the periodical back-up of data and its testing for retrieval of data. This would lead to disruption of activities in case of any unforeseen eventuality.

The Management replied (July 2014) that audit suggestion would be considered for the new software.

The matter was reported to Government/Management (September 2014); while the Management replies were received (November 2014) which have been duly incorporated, a formal reply from the Government is awaited (December 2014).

Conclusions and Recommendations

DLIMS was a web-based system developed by NIC free of cost for the Company to cover inter-related activities starting from the collection of indents to the distribution of indented items to improve efficiency and effectiveness of the drug logistics system. The following deficiencies were noticed in the implementation of this system:

- On account of planning without taking into account the inter-related activities of the entity, lack of support from the developer for timely updation etc., the Company was left with a system which had issues relating to the integrity and reliability of information stored and processed therein.

  - ***The Company should formulate IT strategy defining inter-alia the goals and objectives of the intended computerisation and benefits which would accrue from it.***

* Non-integration of various in-house modules and modules of HMIS has defeated very purpose of computerisation of drug logistics system.

  - ***It is essential that an integrated software package be developed which would take care of the entire business operations of the Company with forward and backward linkages from demand generation to procurement as well as issue to hospitals and other health institutions and other users of the healthcare system in Gujarat.***

* Important functions such as Quality Control and real time pre-dispatch testing system were yet to be fully comprehended. Data captured in the system was not fit for immediate benefit to the organisation. Hence, the manual system was still in use for various purposes.

  - ***The Company should ensure documentation of all stages of system development and the changes carried out to the system at later date to ensure its smooth and error free functioning***.

* Running the system in the present form based on the information generated by it may affect the decision making process. The software is yet to stabilise its system controls.

  - ***Adequate validation checks for data entry, use of barcode system to avoid human error and auto capturing the vital information of drugs and efficiency of process control should be embedded in the systems to avoid erroneous data entries and incorrect generation of reports.***