DISSERTATION

ON

Root Cause Analysis of Service Restoration in Clinical Orders

SUBMITTED BY

SHARMILA YADAV

PG/14/075

UNDER THE GUIDANCE OF

Mr. Surendra Tyagi

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT & RESEARCH

Internship Training

at

Deloitte Consulting India Pvt. Ltd

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Post Graduate Diploma in Hospital and Health Management

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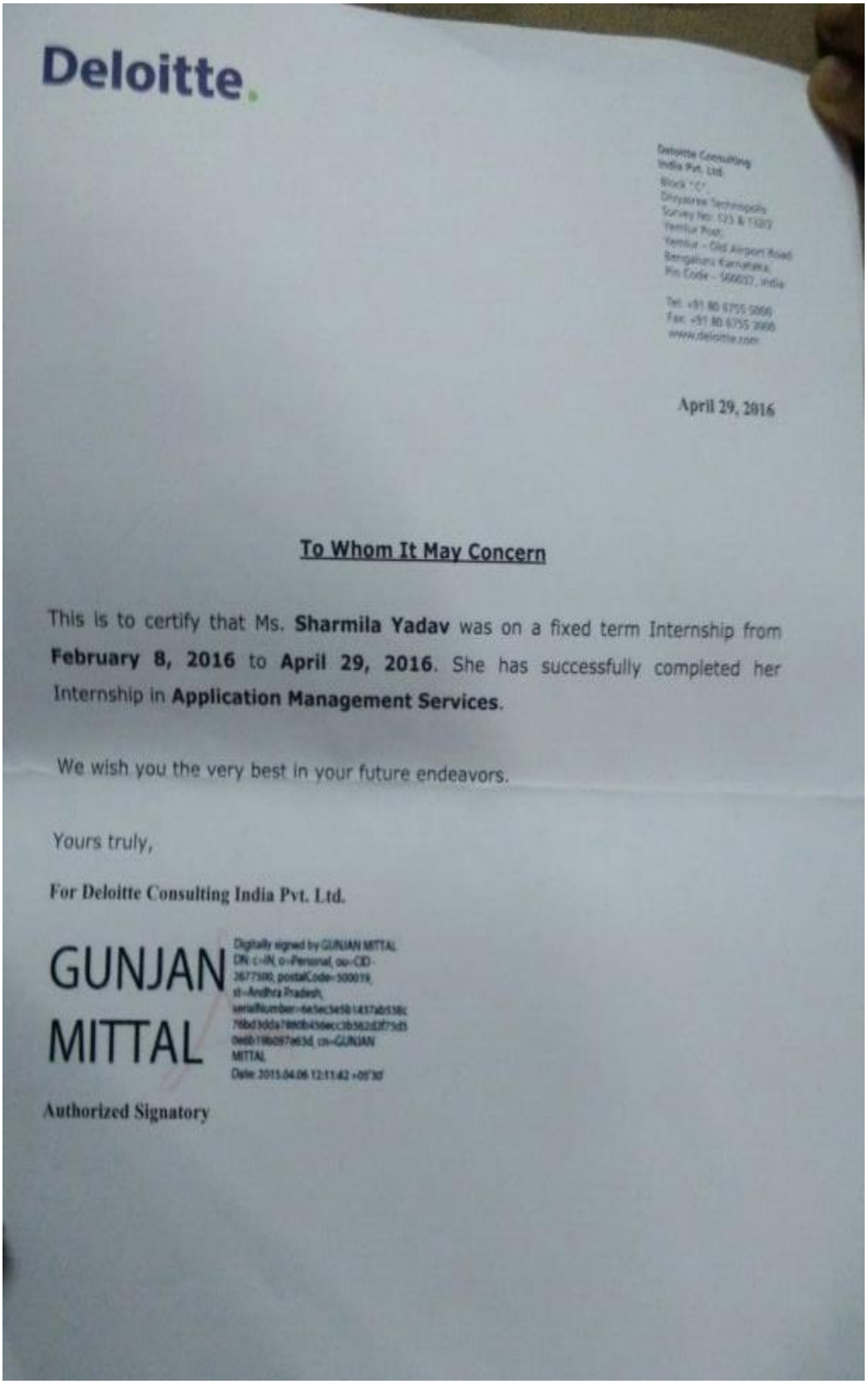
International Institute of Health Management Research

New Delhi



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We wish you the very best in your future endeavors.

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Certificate of Approval

The following dissertation titled **"Problem management of Clinical Orders"** at **"Deloitte Consulting India Pvt. Ltd."** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

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This is to certify that **Sharmila Yadav**, a student of Post Graduate Diploma in Hospital and Health IT Management (PGDHIM) from International Institute of Health Management Research, New Delhi has undergone internship training at "**Deloitte Consulting India Pvt. Ltd, Bangalore**" from **8 February, 2016** to **29 April, 2016**.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

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I wish him all success in all his future endeavours.

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Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Sharmila Yadav,** a graduate student of the **Post- Graduate Diploma in Health and Hospital Management** has worked under our guidance and supervision. He/ She is submitting this dissertation titled "**Problem management of Clinical Orders**" at "**Deloitte Consulting India Pvt. Ltd.**" in partial fulfillment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management.**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

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Sharmila Yadav
PG/14/075
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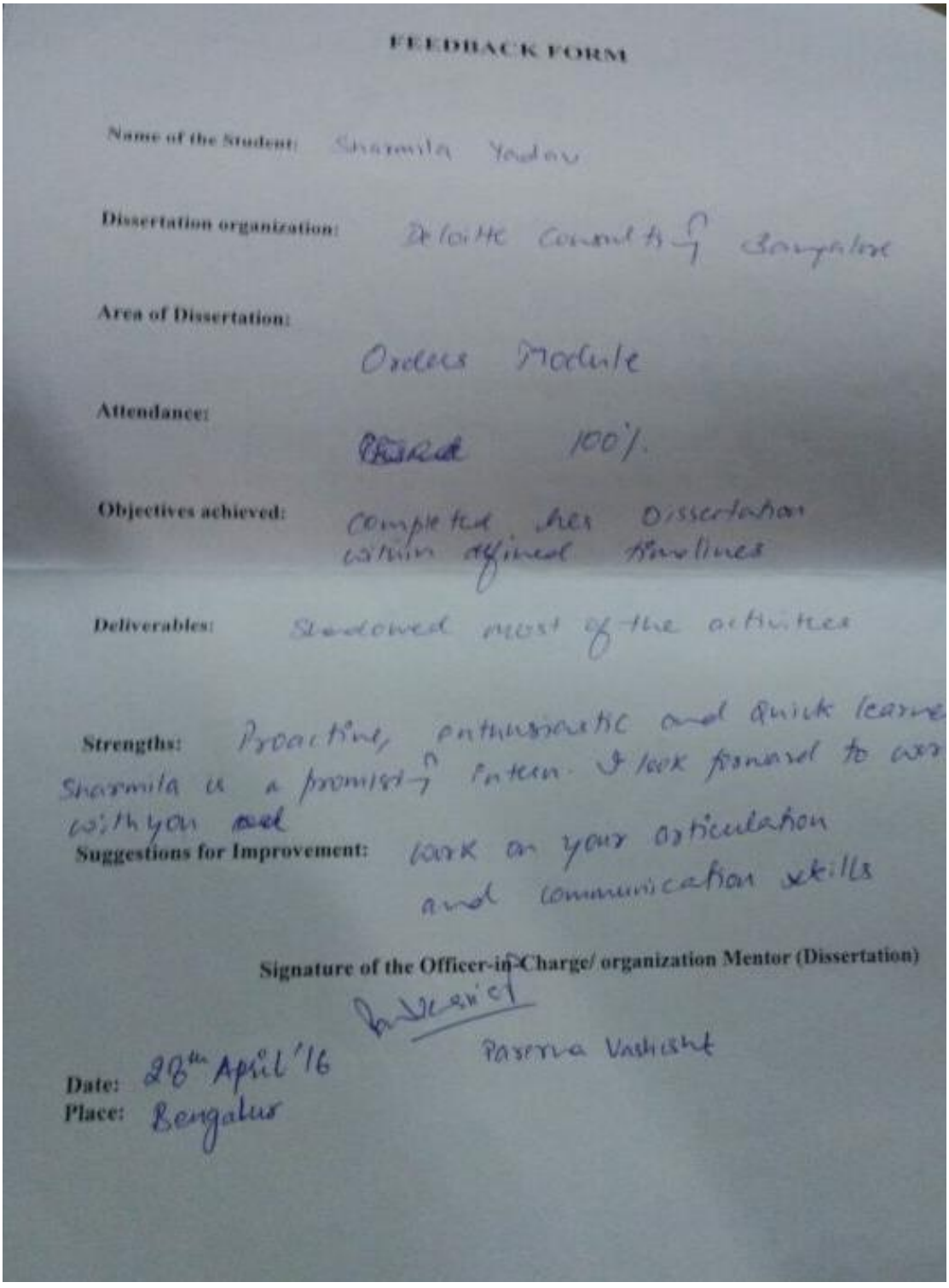

FEEDBACK FORM

Name of the Student: Sharmila Yadav

Dissertation organization: Deloitte Consulting, Bangalore

Area of Dissertation: Orders Module

Attendance: Regular 100%.

Objectives achieved: Completed her Dissertation within defined timelines

Deliverables: Shadowed most of the activities

Strengths: Proactive, enthusiastic and quick learner. Sharmila is a promising intern. I look forward to working with you again

Suggestions for Improvement: Work on your articulation and communication skills

Signature of the Officer-in-Charge/ organization Mentor (Dissertation)

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Date: 28th April '16

Place: Bengaluru

ABSTRACT

To low down the count of errors occurring related to medication, implementing health information technologies in conjunction with other process improvements such as, Computerized Physician Order Entry (CPOE) which is a health information technology (Health IT) system that is commonly used by hospitals and other health care providers to prevent medication, procedure related errors to increase efficiency in medication.

Computerized Physician Order Entry (CPOE) is a system that allows direct entry of medication orders and instructions for the treatment of patients by a medical practitioner. The orders are communicated through a computer network to medical staff or other various departments responsible for fulfilling an order, including Pharmacy, Radiology or Laboratory. CPOE decreases delay in order completion, reduces errors related to handwriting or transcriptions, allows order entry at point-of-care or offsite, provides error checking for duplicate or incorrect doses or tests, and simplifies inventory and positing of charges.

An Order set is a group of orders that are commonly placed together based on a diagnosis or treatment plan. Order Sets can contain both procedure and medication orders. Having them come in a pre-packaged "set" increases providers' efficiency in placing orders while still giving them the opportunity to customize the orders for their patient. Order sets are preconfigured groups of orders that are commonly ordered together for a specific problem or diagnosis. They are designed for inpatient settings.

There is a proper well defined process for the intake of issue incident. The analyst collects all required information from the user and gives resolution. The incident is closed after proper documentation.

This retrospective study was conducted analyzing an EMR Application related data taken for three months. After analyzing 300Issue incidents, it was found there were many issues which were leading to these incidents. They were user training issue (34.6%), Build required (17.71%), Printer Mapping issue (7.33%), Issue unidentified (5.95%), Interface (2.33), Chart Correction issue (1%) and Auto resolved as 17.3%.

Pareto Analysis technique was used to find out the major issues which cause around 80% of incidents. As a result, it was found to be user training issue and build required issue primarily. Further, in-depth analysis was done to understand the root cause of these issues. User training incidents were noted and which were related to workflows such as lack of knowledge for placing a procedure order, releasing future order, cancelling of an order, reconciliation of order, logging into a department etc. Build issues were found to be related mainly to Laboratory.

ACKNOWLEDGEMENT

It is not possible to prepare a project report without the assistance and encouragement of other people. This one is certainly no exception.

On the very onset of this report, I would like to extend my sincere and heartfelt obligation towards all the personages who have helped me in this endeavor. Without their active guidance, help, cooperation & encouragement, I would not have made headway in the project.

My deepest sense of gratitude towards **Ms. Deepika Sharma,** Manager, Deloitte Consulting India Pvt. Ltd and **Ms. ParernaVashisht,** Team Lead Deloitte Consulting India Pvt. Ltd, Poornima Ramesh,and all my **team members**at Deloitte Consulting India Pvt. Ltd for their immense support and guidance.Warm thanks and appreciation to all the people at Deloitte for their kind support.

I am extremely thankful and pay my gratitude to my guide and mentor **Mr. Surendra Tyagi** for his valuable guidance and support.

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LIST OF ABBREVIATIONS

1.	CPOE	Computerized Physician Order Entry
2.	IT	Information Technology
3.	EMR	Electronic Medical Record
4.	ADE	Adverse Drug Event
5.	CDS	Clinical Decision Support
6.	CDSS	Clinical Decision Support System
7.	ICD	International Classification of Diseases
8.	TATs	Turnaround Times
9.	NA	Not Applicable

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LEARNING

During the internship in Deloitte Consulting India Pvt. Ltd,lot of things were learnt. These are as follows:

- US health care system and how providers and payers work together in health care industry,
- Underwent trainings for various processes followed in the organization,
- Underwent EMR specific trainings,
- Brief knowledge about HIPAA,
- Brief knowledge about impact of ICD-10 on operations and
- Other trainings related to healthcare industry.

INTRODUCTION OF THE STUDY

The safe use of medications is an important area of concern within health care. In an average week in the United States, four out of every five adults will use prescription medications, over-the-counter drugs, or dietary supplements of some sort; nearly a third of adults will take five or more medications. These medications usually provide some benefits to the person taking them, or at least do not cause harm. Yet medications occasionally cause injury. Process-related medication errors and adverse drug events (ADEs) are still too common, often preventable, costly, and they can result in serious injury or death.

To reduce the occurrence of medication-related errors, computerized provider order entry (CPOE) which is a health information technology (health IT) system was developed. CPOE is commonly used by hospitals and other health care providers to prevent medication-related errors and increase efficiency in medication administration.

CPOE is an application that enables providers to enter medical orders into a computer system that is located within an inpatient or ambulatory setting. CPOE replaces more traditional methods of placing medication orders, including written (paper prescriptions), verbal (in person or via telephone), and fax. Most CPOE systems allow providers to electronically specify medication orders as well as laboratory, admission, radiology, referral, and procedure orders.

On its own, CPOE has an impact on safety by ensuring that orders are legible. Yet the value of this EMR functionality is increased by adding clinical decision support (CDS) systems. CDSS is a technology that provides clinicians with real-time feedback about a

wide-range of diagnostic and treatment-related information as they are entering electronic orders. By running electronic rules in the background, decision support can check for a variety of potential errors. Examples include drug interactions, patient allergies to prescribed medications, medication contraindications, and renal- and weight-based dosing.[1]

If the physician is ordering a series of tests and medications for a common diagnosis, the computer can offer the use of a pre-programmed, institutionally reviewed and approved sets of orders to facilitate the process and help the physician follow accepted protocols for that diagnosis.[2]

In most (but not all) CPOE implementations, orders entered into the system are communicated electronically to the departments and personnel responsible for their execution, and frequently, the departments send back notification of the status of the order and/or the results of order execution (eg., Laboratory results, X-ray results). CPOE can thus improve process turnaround times – for example, reduce the time from ordering to arrival of the medication. It can improve documentation received by ancillary departments, such as pharmacy and radiology, thereby reducing the chance of misinterpretation of an order and improving documentation needed for payment.

FEATURES OF CPOE SYSTEMS

- Ordering

  Physician orders are standardized across the organization, yet may be individualized for each doctor or specialty by using order sets. Orders are communicated to all departments and involved caregivers, improving response time and avoiding scheduling problems and conflict with existing orders.

- Patient-centered decision support

  The ordering process includes a display of the patient's medical history and current results and evidence-based clinical guidelines to support treatment decisions. Often uses medical logic module to facilitate fully integrated Clinical Decision Support Systems (CDSS).

- Patient safety features

  The CPOE system allows real-time patient identification, drug dose recommendations; adverse drug reaction reviews, and checks on allergies and test or treatment conflicts. Physicians and nurses can review orders immediately for confirmation.

- Regulatory compliance and security

  Access is secure, and a permanent record is created, with electronic signature.

- Portability

  The system accepts and manages orders for all departments at the point-of-care, from any location in the health system (physician's office, hospital or

home) through a variety of devices, including wireless PCs and tablet computers.

- Management

  The system delivers statistical reports online so that managers can analyze patient census and make changes in staffing, replace inventory and audit utilization and productivity throughout the organization. Data is collected for training, planning, and root cause analysis for patient safety events.

- Billing

  Documentation is improved by linking diagnoses (ICD-9-CM or ICD-10-CM codes) to orders at the time of order entry to support appropriate charges.

ADVANTAGES OF CPOE:

- Reducing the potential for human error.
- Reducing time to care delivery.
- Improving order accuracy.
- Decreasing time for order confirmation and turnaround.
- Improving clinical decision support at the point of care.
- Making crucial information more readily available.
- Improving communication among physicians, nurses, pharmacists, other clinicians, and patients.

INTEROPERABILITY

Effective CPOE implementation requires integration with existing hospital information systems such as registration, pharmacy, laboratory and electronic medical record systems. Problems can occur if there is no integration between the modules or between different vendors.

TECHNICAL SUPPORT

Ready and immediate access to technical support is critical to the success of CPOE. Organizations can expect the users to have many concerns and questions about CPOE during and after the implementation. Because of the nature of inpatient care, questions regarding CPOE may occur at any time of the day or night. Therefore organizations need to have 24*7 technical support. [3]

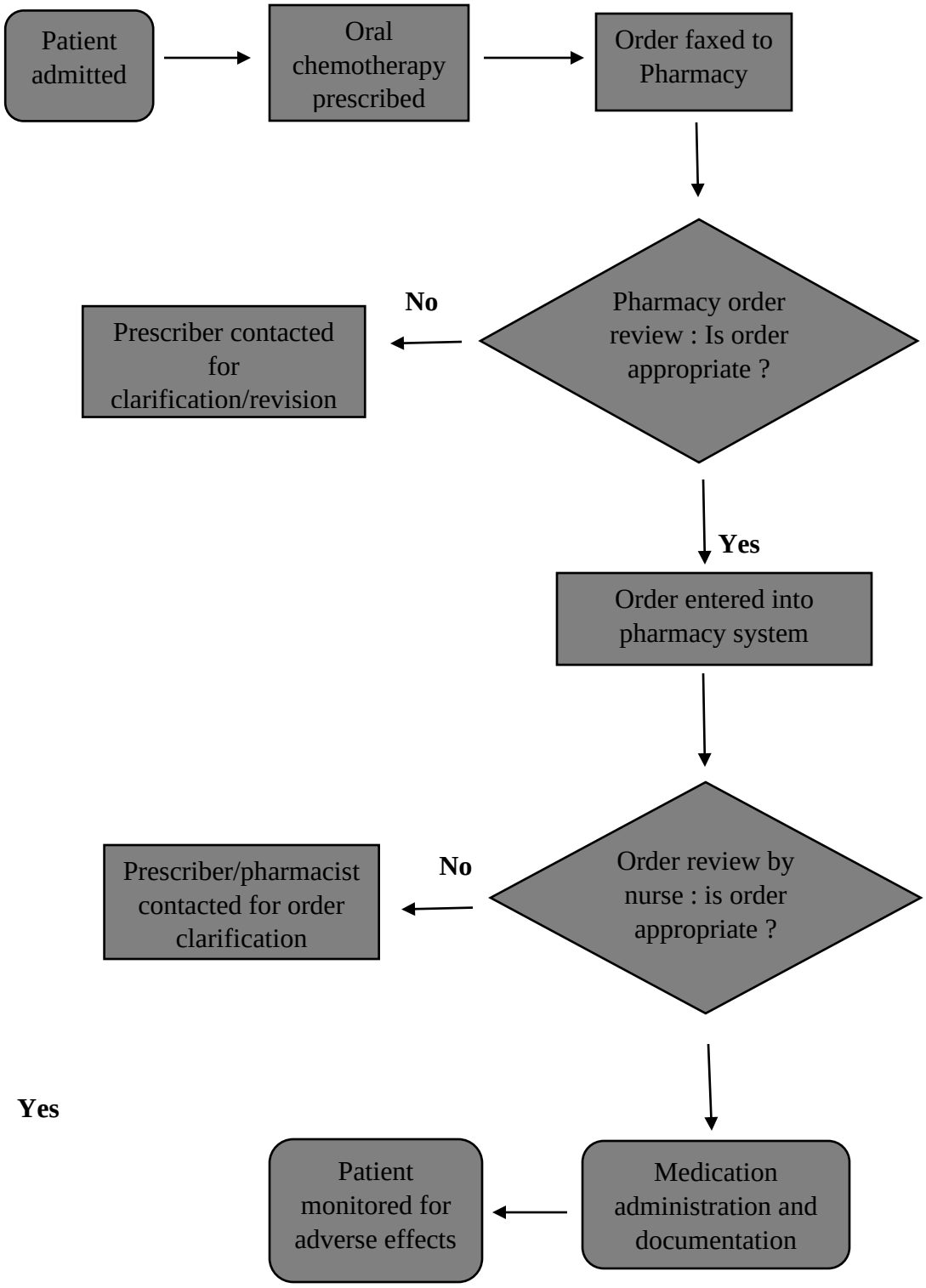
Patient admitted
Oral chemotherapy prescribed
Order faxed to Pharmacy
Pharmacy order review : Is order appropriate ?
No
Prescriber contacted for clarification/revision
Yes
Order entered into pharmacy system
Order review by nurse : is order appropriate ?
No
Prescriber/pharmacist contacted for order clarification
Yes
Medication administration and documentation
Patient monitored for adverse effects

Figure 1 - CPOE Inpatient Workflow

ORDER SETS

An orderset is a group of related orders which a physician can place with a few keystrokes or mouse clicks. An order set allows users to issue prepackaged groups of orders that apply to a specified diagnosis or a particular period of time. One of the main impetuses for order sets comes from the need to improve user acceptance of computer-based physician order entry, by decreasing the time physicians require to enter orders. Using order sets reduces both time spent entering orders and terminal usage.

Benefits

There are many reported benefits of order sets. Order sets represent a potential solution to the time constraints of busy physicians and may even improve quality and safety. Obstacles to overcome would include physician acceptance, costs of creation and maintenance, and user interface issues.

Order set reduces medical errors, especially omission errors. It eases access to linked guidelines, integrate evidence based guidelines into daily physician's point of care-practice. They also facilitate ordering of routine parts of patient care enabling the physicians to focus on unique need of each patient.

1. Reduction of transcription errors.
2. Promotion of adherence to consistent standards of care

3. Focus attention upon unique features of a patient.
4. Quicker order entry
5. Reduction in delays due to inconsistent or incomplete orders

A strong advantage for using order sets is that they minimize time required for clinicians to order routine and guideline-driven tests and medications. Default values for orders can dramatically reduce the time needed to order a test or medication. For example, they can automatically complete certain data fields, such as dosage, length of treatment, and testing interval. Clinicians viewed default values as "recommended values" and were offended by the CPOE systems "suggestions" for how they should practice medicine. Some systems provided with many free text fields providing opportunities for error, and can result in confusion among the lab technicians and pharmacists who receive completed orders.[4]

WELL-DESIGNED ORDER SETS HAVE THE POTENTIAL TO:[5]

- Integrate and co-ordinate care by communicating best practices through multiple disciplines, levels of care, and services.
- Modify practice through evidence-based care.
- Reduce variations and unintentional oversight through standardized formatting and clear presentation of orders.
- Enhance workflow with pertinent instructions that are easily understood and organized.
- Reduce the potential for medication errors through integrated safety and reminders.
- Reduce unnecessary calls to physicians for clarifications and questions about orders.

However if standard order sets are not carefully designed, reviewed, and maintained to reflect best practices and ensure communication, they may actually contribute to errors.

OBJECTIVES

GENERAL: To carry out root cause analysis of major identified issues leading to variousissue incidents raised by end users.

SPECIFIC:

- To understand the workflows of incident resolution,
- To identify various issues leading to issue incidents,
- To carry out root cause analysis of major issues identified using Pareto analysis technique,
- To find the count of issue faced by the users,
- To identify and analyze the different types of issues faced by the user and
- To recommend solutions for these issues.

REVIEW OF LITERATURE

Effect of a Computerized Provider Order Entry (CPOE) System on Medication Orders at a Community Hospital and University Hospital [6]

With a pre-post study design, the effects of a CPOE system on the medication ordering process at both a community and university hospital were assessed. The two environments differed significantly in that the community hospital's patients had orders entered by staff physicians or physician assistants. At the university hospital, the majority of orders were entered by housestaff (residents and fellows) or medical students. In both settings, adopting CPOE was a significant undertaking, requiring extensive resources, process, and cultural changes.

The time from provider ordering to pharmacist verification decreased by two hours with CPOE at the community hospital ($p<0.0001$) and by one hour at the university hospital ($p<0.0001$). The rate of medication clarifications requiring signature was 2.80 percent pre-CPOE and 0.40 percent with CPOE ($p<0.0001$) at the community hospital. The university hospital was 2.76 percent pre-CPOE and 0.46 percent with CPOE ($p<0.0001$). CPOE improved medication order processing at both community and university hospitals. These findings add to the limited literature on CPOE in community hospitals.

This study demonstrated that CPOE improves efficiency in the medication order processing at both the community hospital and a university hospital, specifically the time

from medication ordering to pharmacist verification. Medication clarifications requiring signature were reduced 6–7 fold with CPOE compared with handwritten orders at both hospitals.

Another study was conducted which included a meta-analysis of nine papers that compared the medical error rates in hospitals before and after their adoption of CPOE. At the rate of CPOE adoption and implementation in 2008, the study said, medication errors were reduced by 12.5% nationally, meaning there were 17.4 million fewer errors than there would have been without CPOE. If all hospitals adopted CPOE and if the implementation level remained around 60%, the researchers added, up to 51 million medication errors a year could be averted. [7]

Efficiency Gains with Computerized Provider Order Entry [8]

This project was carried out to measure efficiency gains in turnaround times with the implementation of a computerized provider order entry (CPOE) system.

Pre- and post-CPOE turnaround times (TATs) were measured for orders placed for laboratory, radiology, and pharmacy. The pre-CPOE group was nonrandomized and included a convenience sample of 240 patients with a sample of 1,420 total orders (laboratory N = 340; radiology N = 490; and pharmacy N = 590). The post-CPOE group was randomized and included 241 patients with a sample of 2,390 total orders (laboratory N = 750; radiology N = 680; and pharmacy N = 960).

TATs were statistically significantly lower ($P < 0.0001$) in all three departments: laboratory TATs decreased 54.5 percent, from 142 to 65 minutes; radiology TATs

decreased 61.5 percent, from 31.0 to 11.9 hours; pharmacy TATs decreased 83.4 percent, from 44.0 to 7.3 minutes.

Implementation of CPOE resulted in dramatic improvements in TATs, which, in turn, can lead to more timely treatment of patients and enhanced communication of results to providers. It also supports the effort to improve quality of patient care and patient safety.

Another study was conducted by Van Doormaal et al in 2009 to evaluate the expectations and experiences of physicians' and nurses' regarding computerized physician order entry system (CPOE) and provide suggestions for future optimization of the system and the implementation process. 18 physicians and 42 nurses were interviewed from four internal medicine wards of two Dutch hospitals. Semi- structured questionnaire was used as the tool for evaluation and the statements were measured on a 5-point Likert scale. Chi-squared tests were used to compare the experiences and expectations of the respondents and for assessing the differences between them. The study reported that both physicians and nurses were positive about CPOE both before and after implementation. The nurses were not clear about the overview of patients' medication use. It was concluded that CPOE could be improved especially the technical aspects and decision support on drug-drug interactions to fit into the clinical practice.[9]

A literature review to gain an insight into the impact of Computerized Provider Order Entry systems on inpatient clinical workflow was carried out in 2009 by Zahra Niazkhani et al. various databases like PubMed and Cochrane were searched for journal articles, conference proceedings and summaries. 51 publications were selected which included 31 journal articles, 16 proceedings papers and 4 proceedings abstracts. The research designs

used were mixed method, quantitative and qualitative studies. The beneficial effects reported were as follows:[10]

- Remote access to enter orders or view their status
- Multiple people enabled to view the same patient's orders simultaneously
- Access to knowledge sources, order sets, geographical display of data, and easier charting of medications
- Removal of many intermediary and time-consuming tasks for physicians, nurses and ancillary departments
- Decreased order turnaround times
- Decreased verbal orders

METHODOLOGY

This retrospective study was done analyzing an EMR Application related datataken for three months (December 2015 to February 2016). The data was analyzed using Microsoft Excel. Tables and graphs were generated and inferences were drawn using appropriate software.

- Study area – Deloitte Consulting India Pvt. Ltd, Bengaluru
- Sample size – 300issue incidents
- Duration of the study – 15th March, 2016 to 30th April, 2016
- Technique– Pareto analysis technique was used to identify major issues. Root cause analysis was done for the identified major issues.

Ethical Considerations:

- Security of Deloitte Data
- Privacy and Confidentiality shall be maintained

RESULTS AND DISCUSSION

Whenever any issue incident comes, there is a process to intake that issue.

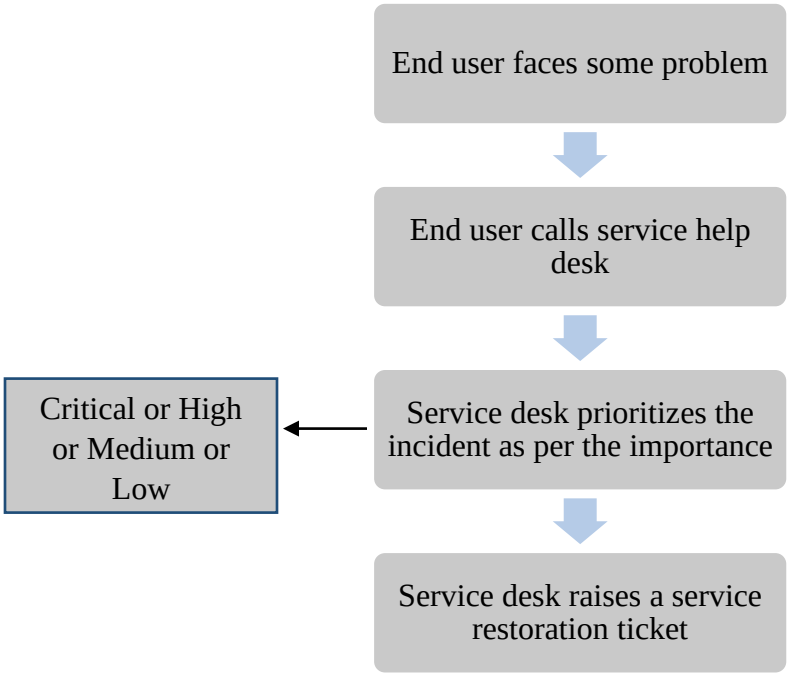

Figure 2 – Incident Intake Process

Whenever some issue is faced by an end user, he calls the help desk regarding that issue. Help desk tries to understand the issue and as per the user, prioritizes the issue as either critical or high or medium or low. Then aissue ticket is raised and the incident is received by an analyst.

Critical and High incidents are those which are directly affecting patient care, thus, have to be resolved as soon as possible.

Once the incident has been received by an analyst, the analyst starts resolving the issue.

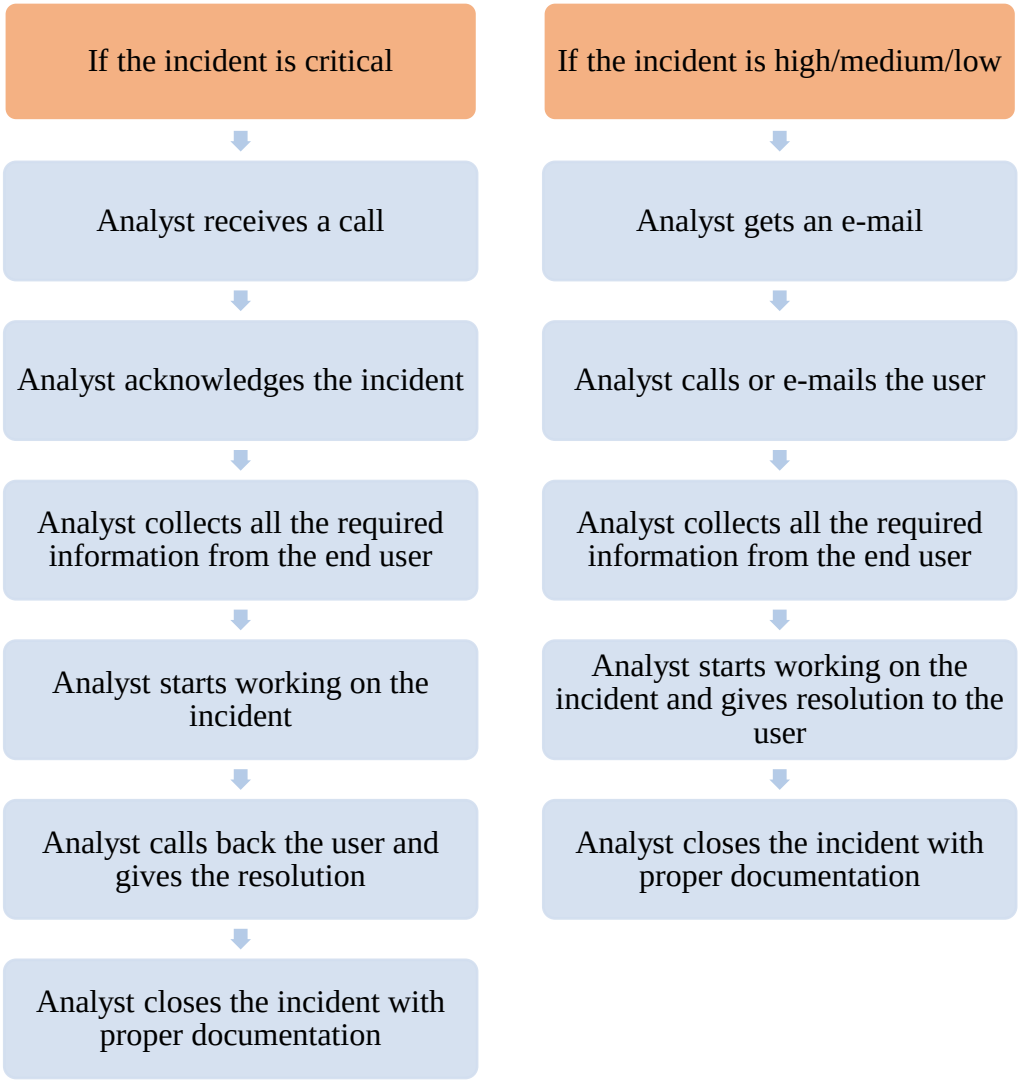

Figure 3 – Incident Resolution Process

If the incident is critical, the analyst immediately responds to it as it is affecting patient care directly. The analyst gets a phone call for a critical incident. As it is critical, the analyst starts working on it after collecting all the required information from the user. Then the analyst calls back the user and gives the appropriate resolution. After confirmation from the user, the analyst closes the incident with all the required documentation.

If the incident is high or medium or low, the analyst gets an e-mail in which all the details regarding the incident are mentioned. Still if the analyst finds some information missing, the analyst emails the user and asks for the information. After collecting all the information, the analyst starts working on it and gives the user a resolution. After confirmation from the user, the analyst closes the incident with all the required documentation.

There is also a specified time limit within which the analyst is required to respond to the incident and resolve it.

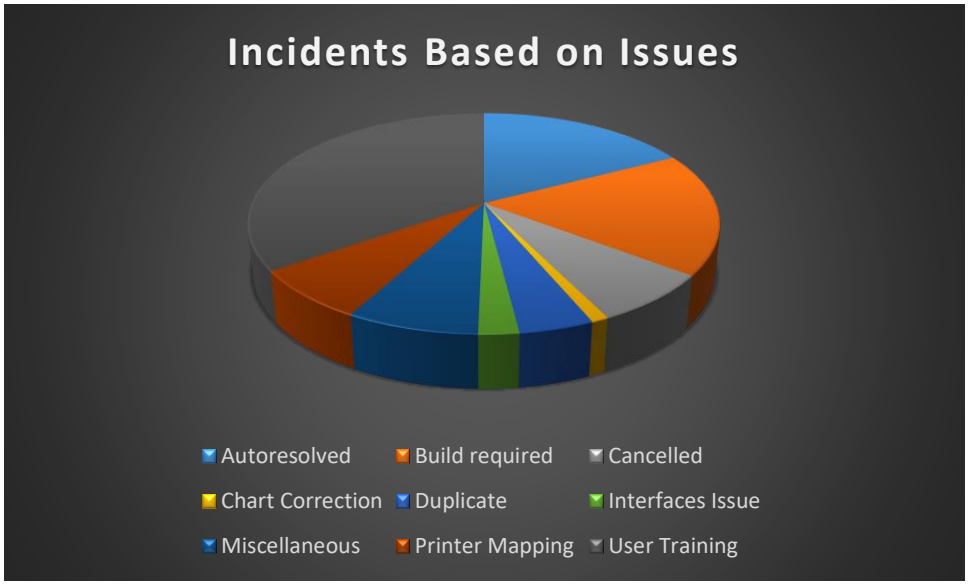

Figure 5 – Distribution of Incidents based on Issues found

Issue found	Number of incidents
User training	104
Build Required	54
Cancelled	22
Auto Resolved	52
Miscellaneous	23
Duplicate	13
Printer Mapping	22
Interfaces	7

Chart Correction	3
Total	**300**

INFERENCES

After analyzing the data of issue incidents for three months, it was found that these incidents occurred because of some other important reasons. These reasons were user training, build required, chart correction, interface, workstation not mapped to printer and some unidentified issues. These were the reasons which led to issue incidents.

It can be clearly seen that 34.66% of incidents occurred because of user training issue. User training issue contributed majorly towards these incidents. Build issues led to 18% of incidents, chart correction contributes to 1% of incidents. Some issues remained unidentified because of lack of proper documentation. They led to 7.6% of incidents. Interface issue was found to cause 2.33 % of incidents. Lastly, mapping issue caused 7.33% of incidents.

Thus these were found while analyzing the data obtained. Further, in-depth analysis was done on found using Pareto Analysis technique so that more efforts could be put in to solve major issues and prevent their recurrence in future.

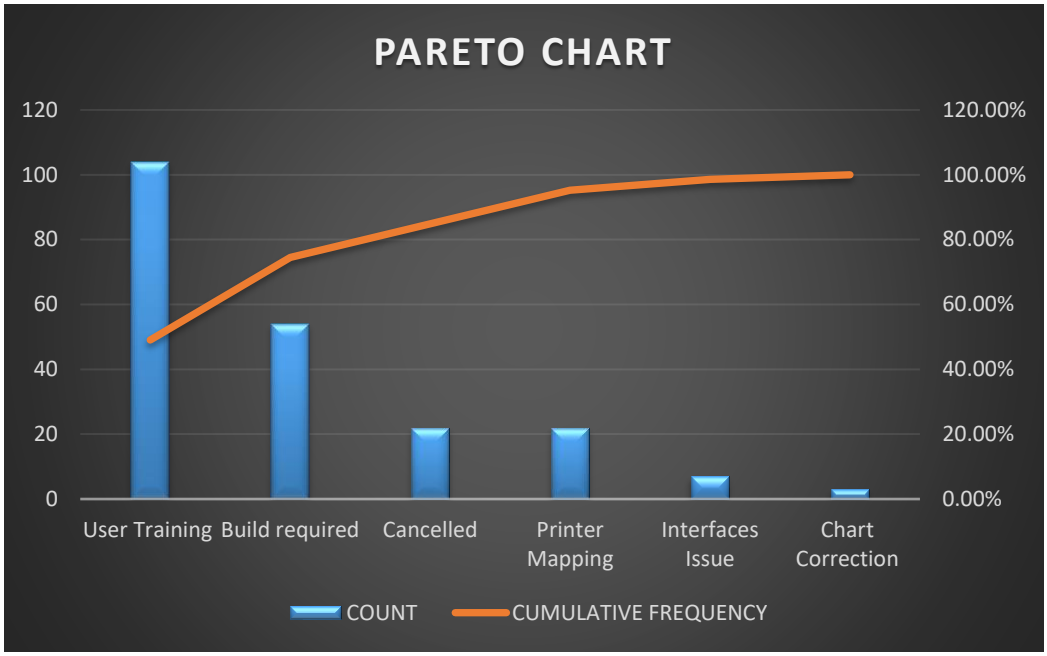

Figure 8 – Pareto Chart

Issue found	Number of incidents	Cumulative number	Cumulative percentage
User training	104	104	49.05
Build Required	54	158	74.52
Cancelled	22	180	84.90
Printing Mapping	22	202	95.28
Interface Issue	7	209	98.58
Chart Correction	3	212	100

INFERENCE

Pareto analysis technique had been used to identify major issues that causearound 80% of issue incidents so that they could be more focused and resolved first.

After carrying out Pareto analysis technique, it was found that user training issue and Build required issue were two major problem areas that were leadingaround 80% of issue incidents. So, around 80% of total issue incidents were led by 33% of issuesrealized. So it was clear that these two issues required more attention. They were given first priority.

Pareto analysis technique makes it clear for an individual as where more efforts are required. It prevents an individual from putting efforts on low priority issues.

There could be many areas where user training issue might be found. Focus was to figure out those areas. Thus, solutions were recommended regarding the same.

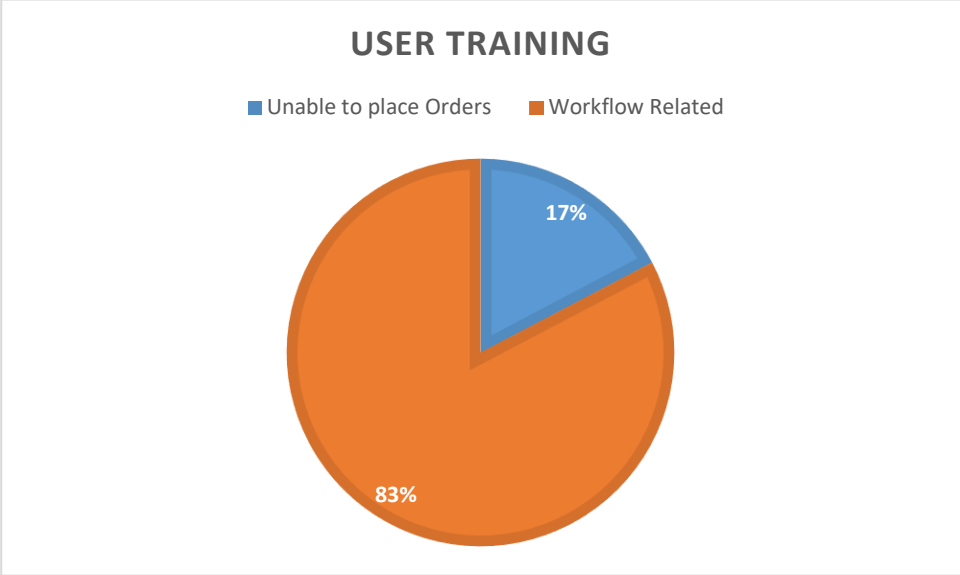

Figure 9 – Distribution of User training related incidents

Issues	No. Of Incidents
Workflow Related	86
Unable to Place Orders	18
User Training	104

INFERENCE

After carrying out Pareto analysis, it was found that user training issue was one of the major issue causing majority of incidents for end users. Further in-depth analysis was done to find the root cause of the issue.

As it is clear from the above graph that many user training related incidents were because of placing a procedure order. 83% user trainingrelated incidents were because of this workflow. Users were found to be not aware of exact workflow as how to place a

procedure order. They were found to skip some steps while placing an order. Cancellation of an order also led to many incidents. Users were not aware of how to cancel an order and when to cancel an order. Users were not aware of the process of releasing future orders. They lack the knowledge as to when to release future orders and how to release them. Some of them are also not aware of how to place a future order. Reconciliation of orders is another workflow where users lack training. Sometimes users were logged into wrong department. So they were not able to do what they were supposed to.

There were some other incidents because of assigning an account to the patient, co-sign an order/note, crossing an order, order set, updates about any change, printing, placing a medication order, wrenching the report etc. which led to many user trainingrelated incidents. Users were not aware of the exact workflows due to which they were facing problems. It was found that sometimes, users were stuck at one step and were not able to proceed further. Sometimes, they were logging around wrong department and thus, were not able to pull up the right order. Users were lacking training as to when notes/orders can be edited and how.

Sometimes, users are not aware of some change made in the EMR Application. So they face issue regarding the same. If some EMR functionality has been updated or changed, they don't understand the change and raise an incident.

So it can be said that user training regarding EMR Application plays a very important role in smooth functioning of the process. Complete knowledge about all important workflows would help reducing the occurrence of these user trainingrelated incidents.

There have been so many issues where the users were not able to perform their roles Either due to unawareness about a particular functionality or wrong way of performing and

they raised the issue without knowing that there

was no fault in the application. Such issues can be avoided if timely refresher training are given to the end user and all the developments are communicated to the end users about a new workflow.

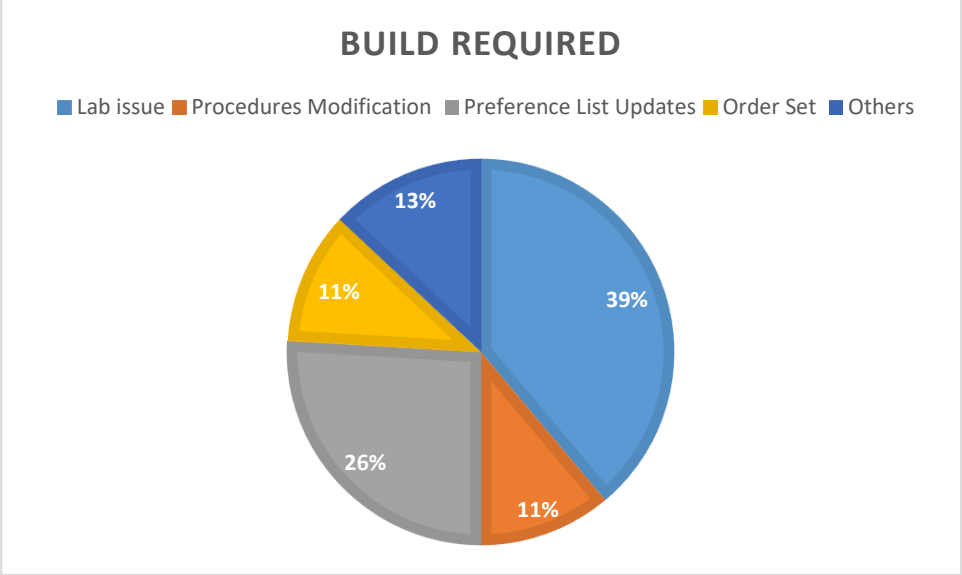

Figure 10 - Distribution of Build Required

Issue	Number of device related incidents
Lab	21
Procedure Modifications	6
Preference List Updates	14
Order Sets	6
Others	7
Total	**54**

INFERENCE

After carrying out Pareto analysis. It was found that in addition to user trainingissue, Build Issue was another major issue which caused many incidents. Further in-depth analysis was done to find the root cause of this issue.

As it is clear from the above graph, Build issue was related majorly toLab related and Preference Lists build. Lab issues led to 38% of Build requiredincidents whereas Preference lists Updates to 27% of Build required incidents.

Incorrect build issues: there are number of functionalities that the end user can perform as part of their scope of work in the Inpatient EHR. If any of these functionalities is not working for a particular user or a bunch of users with the same or different scope of work, that implies that there is something wrong with the backend configuration. In such a scenario the application support personnel has to navigate in the application, try to replicate the issue. If the personnel are also confident that there is a break in the backend configuration, they make the required changes in the backend.

RECOMMENDATIONS

- Training can be imparted again to end users regarding various workflows
- It was seen that user training issue was due to lack of knowledge about various workflows. To avoid this, a proper document of workflow can be prepared and forwarded to all end users
- The word document should contain every detail about that particular workflow like when and how to follow that workflow and under which conditions
- A checklist can be prepared containing all the required steps regarding placing a procedure order. If an end user feels some difficulty while placing a procedure order, he/she can refer that checklist and can analyze what wrong he did and what he/she is actually supposed to do
- Whenever any analyst makes some changes to the EMR functionality, then those changes should be communicated to the end users through tip sheets in timely manner. This keeps end users updated about the changes

CONCLUSION

In many studies, it was proved that CPOE was an effective method to reduce and solve the incidents for end users which facilitated to reduce the medical errors and to increase the work efficiency. The entire study was based on 300issue incidents related to an EMR Application. The issues which contributed towards these incidents were:

- User training issue
- Interface issue
- Printer Mapping
- Build Required
- Chart Correction
- Miscellaneous

Further, in-depth analysis was done on user training issue and build required issues to find the root cause of these issues. Solutions were recommended for the same to prevent their recurrence.

Thus from this study, it can be concluded that user training issue and Build required issue caused majority of incidents. Users didn't have required knowledge regarding exact workflows which made them face problems during patient care. Sometimes, incidents related to system build which further caused problems for end users. More Appropriate and feasible solutions could be recommended for the same.

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