

**Summer Training at
Indraprastha Apollo Hospital, New Delhi
(April-June 2014)**

- **VALIDATION OF DATA IN RESPECT OF ACCURACY LEVELS FOR 28 DEPARTMENTS**
- **IMPACT OF SHIFTING FROM PAPER BASED INCIDENT REPORTING TO AUTOMATED INCIDENT REPORTING SYSTEM**
- **HAZARD VULNERABILITY ANALYSIS FOR IT DEPARTMENT**

**By
Nidhi Sharma**

**Under the guidance of
Dr. Monika Choudhary**

**MBA Hospital and Health Management
2013-2015**



**Institute of Health Management Research,
Jaipur
2014**

**INSTITUTE OF HEALTH
MANAGEMENT RESEARCH**

1, Prabhu Dayal Marg

Sanganer Airport, JAIPUR - 302 029, INDIA

Tel. : 3924700, 2791431-32

Fax : 91-141-3924738

E-mail : iihmr@iihmr.org

URL : <http://www.iihmr.org>

Gram : HEALTHINST

CERTIFICATE

This is to certify that **Dr. Nidhi Sharma** has undergone her summer training at **Indraprastha ApolloHospital, Sarita Vihar, New Delhi** from **7th April 2014 to 6th June, 2014**. During this period she has completed required studies as a part of partial fulfillment of the course requirements, for MBA in Hospital and Health Management. Her approach towards the studies has been sincere, scientific and analytical.

The studies are as follows:-

1. Validation of data in respect of accuracy levels for 28 departments.
2. Impact of shifting from paper based Incident Reporting to Automated Incident Reporting System.
3. Hazard Vulnerability Analysis for IT Department.

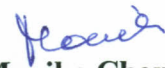
I wish her success in all her future endeavors.



Col. (Dr.) Ashok Kaushik

Dean (Academic & Students Affairs)

The IIHMR University, Jaipur



Ms. Monika Choudhary

Associate Professor

The IIHMR University, Jaipur

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Project 2: Validation of data in respect of accuracy levels at Indraprastha Apollo Hospital

Project 3: Hazard Vulnerability Analysis (HVA)

ACKNOWLEDGEMENT

It gives me an immense pleasure to show my gratitude to great many people who helped me and supported me during my internship at Indraprastha Apollo Hospitals.

My deepest thanks to my guide Ms. Yogamaya Nayak for her consistent assistance and expert guidance throughout my project work. I express my thanks to other team members of the quality department of IAH and my co-interns for their timely help and guidance.

Dr. Nidhi Sharma

ABSTRACT

To list down the advantages (Time and Cost) of ADOIRS over current paper based incident reporting procedure. The study is an in depth case study using semi-structured interviews with Nursing Director, Nurse In-charge (floor) wise, concerned House-keeping staff and concerned Hospital Manager (Quality Department). Also meetings were held with concerned Information Technology Department staff. The data collected were analyzed to give detailed advantages of ADOIRS over current paper based Incident Reporting at IAH. Results revealed significant merits of ADOIRS over paper based incident reporting system. It also revealed the gaps in ongoing reporting procedure.

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Introduction:

Problem Statement:

Impact of shifting from current paper based Incident Reporting to Automated Incident Reporting System.

Incident reporting is the primary action, which a hospital takes to improve Patient Safety, after an incident takes place. Incident reporting is also mandatory as per the JCI Accreditation Standards for Hospitals. [Standard QPS.2, Standard FMS.8.1]

In a healthcare facility such as a hospital or nursing home an incident report is a form that is filled out in order to record details of an unusual event that occurs at the facility, such as an injury to the patient. Its purpose is to document the exact details of the occurrence while they are fresh in the mind of witnesses and treating physician.

All the incidents are reported those with staff and patients.

Incidents reported in **IAH** come under either of the following categories: -

1. Blood Transfusion
2. Facility
3. Infection Related
4. Medical Errors
5. Near miss
6. Patient Safety
7. Product/Device
8. Sample Misplace
9. Staff Conduct
10. Staff Safety

Review of Literature:

1. The paper based record consists chiefly of unstructured or less- structured free text. The highly standardized “data abstract” component of Automated system provides structured elements and a controlled vocabulary.

The automated EPR documentation showed potential advantages in quality and quantity of procedure coding. [1]

2. Point of service data capture using real-time forms automation software reduces data entry time by as much as 67% and reduces data entry errors by as much as 50%.using forms automation software and Tablet PCs alleviates numerous paperwork pains by eliminating inaccuracies due to manual keying of forms data and preventing illogical, incomplete, or inconsistent form field entries. Automation software can increase accuracy and quality of data while reducing costs. [2]

Benefits of Automating Incident reporting as per various studies:-

- Streamline incident reporting and investigation workflow and build a consistent process across the hospital.
- Streamline multi-level incident approval processes by eliminating paper passing and storing all data electronically (no records lost).
- Improve and accelerate information sharing between medical staff, case managers, safety professionals, supervisors and managers.
- Quickly access complete, comprehensive and accurate reports and investigations – for any type of event or incident.
- Perform robust cause analysis, identify hazards and automatically implement and track actions that will prevent a similar incident from happening.

- Promote employee participation and kick start event tracking by linking self-reporting directly to your central database.
- Connect incident and risk information to gain insight into the incident and allow risk assessors to identify assessments needing improvement.
- Keep track of investigation process.
- Helps in tracking safety performance and identify root causes, risks, hazards and trends so you can prioritize efforts and make impactful changes. [3]

Need for Study/Rationale:

At present IAH is continuing with traditional incident reporting system. The technological advancements have created an unspoken and felt need for development of Web-based Systems.

Key objective of workflow automation is to increase the percentage of process time and resources dedicated to value-adding activities by reducing hand-off and manual activities and eliminating resource wastage, as resources wasted in paper based incident reporting procedure are time, energy and paper.

These resources could be optimally utilized in other important works of hospital. Moreover workflow automation helps in improving speed, flexibility and responsiveness of processes in any organization.

The Automated Incident Reporting Procedure improves efficiency significantly by automating processes and eliminating paper forms. AIRS has multiple advantages over paper based incident reporting

Present, paper based incident reporting involves multi-level incident approval processes involving consultant Team, Doctors, Nurse In-charge, Nursing Director.

Research Question:

“What are the advantages of ADOIRS over current paper based incident reporting in Indraprastha Apollo Hospital?”

Objectives of Study:

- To list down the advantages (Time and Cost) of ADOIRS over current paper based incident reporting procedure, by identifying gaps in implementation of ongoing paper based reporting system
- To provide suggestions for reducing the cost of incident reporting procedure
- To provide suggestions and recommendations for implementing ADOIRS.

- **Methodology**

Study Area- Indraprastha Apollo Hospital, Delhi.

Study Design- Exploratory type

Data Collection Technique- Secondary and Qualitative

- Total duration of data collection planned for 4 weeks.
- Data collection done with the help of Manager(Materials Department), Nurse Incharge, Nursing Director, Housekeeping boy and Member Information Technology Department.

Process of Data Collection:

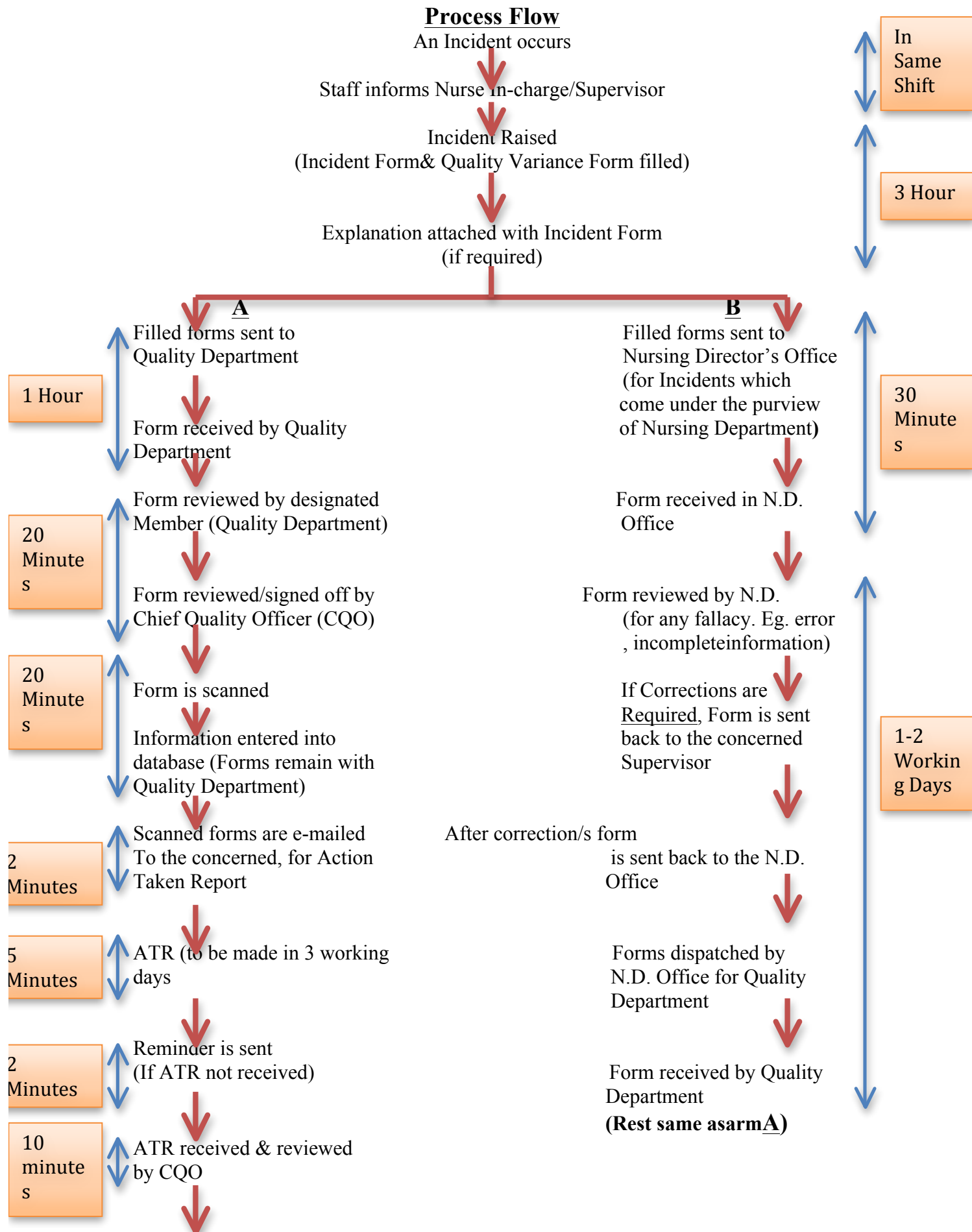
Meetings held with Manager (materials Department, IAH) to gather the information about present cost of Incident Forms(Patient/Employee) and Quality Variance Report Form.

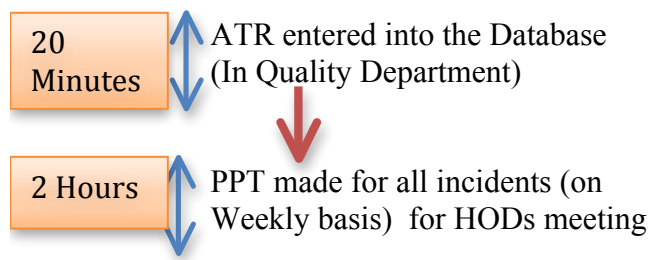
Form Cost Table 1

S. No.	Paper Form	Cost per Form (Rs.) (including 5% Tax)	Cost per Pack (1 pack contains 100 forms)
1.	Patient Incident Form	0.47	47
2.	Employee Incident Form	0.47	47
3.	Quality Variance Form	0.57	55

Interviews Held

Face to Face interviews were held with Floor Supervisors, Floor Nurse Incharge and The Nursing Director of IAH to know the Process Flow of Incident Reporting after an incident takes place.





On the basis of current process flow time taken from raising till closing of incident

Table 1

Maximum Time taken from raising 1 Incident form till entry of ATR into the database in Q.D. for arm A	Maximum Time taken from raising 1 Incident form till entry of ATR into the database in Q.D. for arm B
299 minutes	1769 minutes

Data for Time Taken to sent forms from Floors to Nursing Director's Office and to Quality Department (dierectly and Indirectly) was done by:-

1. Observing time taken in each step for all incidents
2. Following the person who carries the form to the concerned departments.

Person who carries-

1. Nurse Incharge/ Supervisor
2. House keeping Boy

Method- in the month of May 2014, 15 incidents took place. For each incident Nurse Incharge and assigned Housekeeping staff was being followed. Data Collected under particular headings. Given in Table below.

DATA TABULATION

Data Compilation Sheet (Table 2)

For ARM B of Process Flow

For forms which comes under the purview of Nursing Department

<u>S. No.</u>	<u>Date & Time of Incident</u>	<u>Location</u>	<u>Type of Incident</u>	<u>Time Taken from raising to closing of incident</u>	<u>Reason for Delay</u>
1.	1/05/14	NICU I	Medical Error (skin peeling)	1310 mins	NA
2.	1/5/14	CTVS ICU	Medical Error (skin peeling)	1500 mins	NA
3.	7/05/14	Physician Office	Patient Safety (patient fall)	297 mins	
4.	8/05/14	CCU	Medical Error (skin peeling)	1847 mins	1. Delay in sending form to NDO 2. H.K. staff occupied in routine work flow
5.	17/05/14	5T2 Bed- 3512	Patient Safety	240 mins	NA

6.	17/5/14	HDU	Medical Error (skin peeling)	1800 mins	1. H.K. staff not available 2. Nursing Director preoccupied in daily rounds
7.	23/5/14	NICU II	Medical Error (bed sore)	1600 mins	NA
8.	30/5/14	2T1 Bed-2235	Staff safety (Needle Stick Injury)	237 mins	NA

Table 3
For ARM A of Process Flow
(Forms which are dispatched directly to Quality Department)

<u>S. No.</u>	<u>Date & Time of Incident</u>	<u>Location</u>	<u>Type of Incident</u>	<u>Time Taken from raising to closing of incident</u>	<u>Reason for Delay</u>
1.	2/05/14	Biochemistry Lab	Staff Safety (HAZMATspill)	1488 mins	1. H.K. staff not available 2. ATR delayed
2.	6/05/14	Kitchen	Staff Safety (Injury in hand)	300 minutes	Concerned staff pre-occupied in routine workflow
3.	12/5/14	CTVS ICU	Staff Safety (Needle Stick Injury)	180 mins	NA
4.	15/5/14	4T3	Report Delay	247 mins	NA
5.	23/5/14	6T2	Staff Safety (Harrasment)	282 mins	1. Time consumed in ATR (sensitive issue) 2. ATR delayed (multiple departments involved)
6.	26/5/14	Bed-3243	Patient safety (Attendent Fall)	360 mins	H.K. staff occupied in routine work flow

7.	29/5/14	AHC	Medical Error (Wrong Blood Report)	1745 mins	ATR delayed (Multiple reports and approval involved)
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OPERATIONAL DEFINITIONS:

Incident- The clinical and non-clinical adverse event which takes place at a hospital, which can harm or has the potential to harm, either staff or patients or both.

Types of Incidents: -

- Blood Transfusion- ABO incompatibilities, administrative delays, product wastage, inappropriate transfusions, and the possible need for sample re-collection.
- Infection Related- VAP, HTI, HIV, SSI
- Medical Errors- Misdiagnosis, Unnecessary Treatment, Unnecessary tests and Procedures, Medication Mistakes, Uncoordinated Care, Discharge patients before they are ready
- Near miss- **A near miss** is an unplanned event that did not result in injury, illness, or damage – but had the potential to do so.
- Patient Safety- Patient Falls, Needle Stick Injury

DATA ANALYSIS

I. On the basis of data collected and compiled in Table 2

1. Out of 8 incidents reported 3 were delayed i.e. more than standard time was taken from filling of form to closing of incident.

2. Reasons for 3 delayed incidents:-

a. Un-availability of Housekeeping staff who carries incident forms to concerned departments of hospital

Reason for unavailability:-

- House keeping staff preoccupied in routine workflow.
- House keeping staff has too many other tasks to do in one shift.

b. Nursing Director preoccupied with floor rounds.

II. On the basis of data collected and compiled in Table 3

1. Out of 7 incidents reported 5 were delayed. i.e. more than standard time was taken from filling of form to closing of incident.

3. Reasons for 5 delayed incidents.

a. Out of 5 delayed incidents, 2 got delayed due to the unavailability of H.K. staff.

b. Out of 5 delayed incidents, 1 got delayed because concerned staff was pre-occupied in routine workflow.

c. Out of 5 delayed incidents, 3 got delayed because of delay

ETHICAL CONSIDERATIONS

1. Privacy of the documents must be maintained. Form information must not be shared outside n discussed with any hospital staff without the concerned Quality Staff.
2. Some incidents might come under the purview of Medico-Legal issues, thus must not be shared.

Inclusion Criteria

- All the incidents which took place and were reported for the month of May 2014.
- Incidents Reported by hospital staff.

Exclusion Criteria

- The complaints must not be confused with Incidents.

RESULTS

1. Gaps identified on the basis of data collected with respect to the time taken in each step of Incident reporting for a single incident.

- On the basis of average time taken (mentioned in table 2), a lot of time is wasted in the process of current paper based reporting procedure.
- Almost double the time, which is required, is wasted in filling the forms.
- Manual entry is done twice which can be avoided.
- Additional time is required and wasted in scanning the forms.
- Day to day work flow of staff gets disturbed in doing same work twice like, data entry done twice in the database, scanning done twice, pre and post ATR receiving.
- A lot of time is consumed in dispatching, carrying and receiving of Incident Forms by concerned staff (Housekeeping staff and Nurse In-charge).

2. On the basis of data collected with respect to the cost of Patient/Employee Incident form and Quality Variance Form. (mentioned in Table 1)

- In present paper based incident reporting procedure the Materials Department has to bear the cost of Incident Forms (includes Manufacturing cost + Tax)
- Paper based incident reporting procedure is NOT eco-friendly as it involves wastage of paper.

3. On the basis of data collected for Process flow.

- After scanning the Incident and Quality Variance form, they are disposed off after a certain storage period.

- Electricity is wasted in scanning the filled forms twice, which on other hand can completely be avoided.

4. With the support of Analysis mentioned result found is that ADOIRS stand meritorious in the 3 key areas. They are:-

Advantages of ADOIRS over paper based incident reporting procedure are:-

- ADOIRS will save the time and energy of double manual entry in database.
- The step of scanning the form can completely be avoided by automation of Incident Reporting
- Time consumed in dispatching, carrying, receiving process can completely be bypassed by implementing ADOIRS.

**Comparison between Paper Based Reporting Procedure and
ADOIRS for a single incident (on the basis of time taken)**

(Table 3)

Paper based Reporting System	ADOIRS	Total time saved
1. Incident form filling – 180 minutes 2. Forms sent to Q.D. –60 minutes 3. Form scanning & data entry- 20 minutes 4. Email to concerned department – 2 minutes 5. Action Taken Report – 5 minutes 6. Reminder sent, if ATR not received- 2 minutes (not always included) 7. Second receiving & reviewing of ATR- 10 minutes (not always included) 8. Second data entry – 20 minutes	1. Incident form filling- 60 minutes 2. Form reaches Q.D. – 1 minute 3. Form reviewed – 5 minutes 4. ATR reviewed – 10 minutes 5. Second review – 10 minutes (not always included)	
Total = 299 minutes/ *1769 minutes	Total= 88 minutes	211 minutes/*1681 minutes

(*)- form which comes from Nursing Directors' Office)

5. Cost of Forms

Advantages of ADOIRS over paper based Incident procedure are:-

- Purchase of blank incident forms and Quality Variance Forms can completely be avoided if ADOIRS is implemented.
- ADOIRS is a paper less procedure.
- ADOIRS is a eco-friendly procedure.
- In implementing ADOIRS at IAH, it will not involve any additional cost as IAH already has a well-advanced working MIS (Management Information System) named as “MEDMANTRA”.
- With a single click all the staff concerned will be able to access the information regarding Incidents very quickly.

Paper Cost Saving(Table 4)

S. No.	Paper Form	Cost per Form (Rs.) (including 5% Tax)	Forms Cost for a year (Rs)	Cost after implementation of ADOIRS (Rs)	Total cost Saving per yaer (Rs)
1.	Patient Incident Form	0.47	84.6	0.0	84.6
2.	Employee Incident Form	0.47	84.6	0.0	84.6
3.	Quality Variance Form	0.57	205.2	0.0	205.2

(Approximately 15 forms each for Patient Incident Form, Employee Incident Form and 30 Quality Variance Forms are used in 1 month)

6. ADOIRS will also help in Quick Data analysis Process for decision-making as it will help in saving a lot of time. (mentioned in Table 3)

CONCLUSION

It is clear therefore that automating the paper based Incident Reporting System at IAH Delhi, will not only save time and money but also help in reducing data entry errors.

Automation will help in filling the gaps in paper based incident reporting procedure identified by the study. Reduction in paper work will help in eliminating inaccuracies due to current process, which includes manual annotations due to multi step workflow. The study report concludes that automation of paper based incident reporting system will help in preventing illogical, incomplete or inconsistent form field entries.

Automation makes it easy for the concerned quality staff in quick pre defined category based data abstraction and data analysis, which finally aids in decision-making process.

RECOMMENDATIONS

Therefore, in order to minimize or eliminate the delays and errors, ADOIRS should be put together with MEDMANTRA (Management Information System, IAH) in a systematized manner.

Sample of a HTML based design of Automated Incident Form

(see Appendices Form 1)

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2. Dr. Clary Gregory J, Improving Forms Workflows through Point of Service Data Capture
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3. <http://www.slideshare.net/MedgateSoftware/8-benefits-of-automating-incident-management-process>

APPENDICES

Form 1



Indraprastha
Apollo
HOSPITALS
TOUCHING LIVES

INCIDENT FORM

(To be filled only by the AUTHORISED persons)

Choose the category ☐ Patient ☐ Employee

Patient/Employee Name Age

UHID/Clock NO. Bed No.

Date of INCIDENT Time of INCIDENT

Location of INCIDENT Overall Vulnerability Status

Observers: 1. Witness

2. Physician

Incident Category (Select one)

☐ 1. Blood Transfusion ☐ 2. Facility

☐ 3. Infection Related ☐ 4. Medical Errors

☐ 5. Near Miss ☐ 6. Patient Safety

☐ 7. Product/Device ☐ 8. Reporting Error

☐ 9. Sample Misplace ☐ 10. Staff Conduct

☐ 11. Staff Safety

Describe the Incident

Incident Raised By

Clock Number

Investigation & Treatment

Action Taken

(I hereby declare that all the informations filled by me are correct and best of my knowledge. In future if any information found incorrect than I will be the only responsible person for that.)

(To be clicked by the person who raises the incident)

(To be clicked by designated person of Quality Department)

(To be clicked by Quality Department, If TASK assigned not done and reported within 3 working days from the date of task assignment Automatic reminder will generate and sent to Concerned department.)

(To be clicked by the concerned person who has mentioned ATR/SIP)

(TO be clicked by concerned person of Quality Department)

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A Project Report

On

**“Validation of data in respect of accuracy levels at
Indraprastha Apollo Hospital”**

By

Dr. Nidhi Sharma

Under the Guidance of

Ms. Pritindira Sachdeva

Submitted to

**Dr. R. S. Uberoi
Chief Quality Officer**

**Mr. Anupam Srivastava
Manager (T&D)**

ACKNOWLEDGEMENT

It gives me an immense pleasure to show my gratitude to great many people who helped me and supported me during my internship at Indraprastha Apollo Hospitals.

My deepest thanks to my guide Ms. Pritindira Sachdeva for her consistent assistance and expert guidance throughout my project work. I express my thanks to other team members of the quality department of IAH and my co-interns for their timely help and guidance.

Dr. Nidhi Sharma

ABSTRACT

Every organization owns and produces a large amount of data. A good and quality data poses great value as it helps in evidence-based decision-making. To ensure that good and quality data have been collected, an internal Data Validation process was carried out at Indraprastha Apollo Hospital in various Clinical and Non-Clinical departments for various data sets collated for respective Quality Indicators. The Data Validation process was carried out on secondary data in 28 departments for the selected month January.

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Research Problem-

In spite of availability of skilled staff, rigorous training in data collection methodology, advanced hospital information system, each organization has to ensure that the data collected at each department level is accurate and of high quality.

INTRODUCTION:

Data is a value, extracted from information, either as Qualitative or Quantitative. In this report the data talked about will be raw data for various department level quality indicators. Screening and Verification of data, together is Data Validation.

Data Validation is the inspection of all the collected patient level clinical and non-clinical data for completeness, reasonableness and elimination of erroneous values. This data helps to formulate a trend; which further reflects the efficiency of the department.

Review of Literature

Various studies have been done on data validation, but only for one or two particular indicator or for a particular data set at a time.

Data quality has been recognised as an issue in the NHS and NHS organisations are implementing strategies to audit and improve the quality of data produced.

Data quality has been defined by dimensions or characteristics including accuracy, availability, completeness, relevance, reliability, timeliness and validity. In addition, some informatics experts define data quality as data that are 'fit for purpose'. [1]

Validation of surveillance data is necessary to:

1. Ensure its scientific credibility.
2. To identify methodological problems within the surveillance programme.
3. To help increase compliance and participation in the surveillance programme.
4. To identify data quality issues at local level. [2]

[1] <http://www.hqip.org.uk/assets/LQIT-uploads/Guide-to-ensuring-data-quality-in-clinical-audits-8-Sep-10.pdf>

[2] Moro Luisa Moro, Ricchizzi Enrico, Validation study, Annual HCAI & AMR meeting, Warsaw 2011

http://www.ecdc.europa.eu/en/activities/diseaseprogrammes/arhai/presentations2011warsaw/arhai-networks-meeting_parallel-session-three-8-maria-luisa-moro.pdf

RATIONALE:

Data Validation is a crucial step to maintain high rates of quality and useful data completeness. A complete, reasonable and error free data aids the decision/policy makers in making evidence based decisions. In the process of Data Validation, the person directly involved, becomes more familiar with work process of each department. This is an invaluable experience that cannot be appreciated solely by poring over monthly summary tables.

Data collected by respective departments helps in monitoring trends by comparing with previous trends, which further helps in monitoring quality outcomes of each department.

OBJECTIVES:

1. General - To identify problems in the methods of data aggregation, data collection and data compilation process, using appropriate tools.

2. Specific

2.1 To identify data quality issues by checking accuracy levels of aggregated, collected and compiled data by the staff of respective departments.

2.2 To help increase compliance and participation in data aggregation, data collection and compilation.

2.3 To present data, post Data Validation.

MATERIALS AND METHODS

Type of Study- Exploratory Study

Study Area- Indraprastha Apollo Hospital, Delhi

Type of Data- Secondary (Quantitative) data

Data Collection- Data was collected from 28 Departments (Clinical/Non-Clinical) for their respective Quality Indicators.

Tool- PerformaData Validation Form (Questionnaire)

Data was filled in Data Validation Form(*see Appendices Form 1*)

The Departments are:-

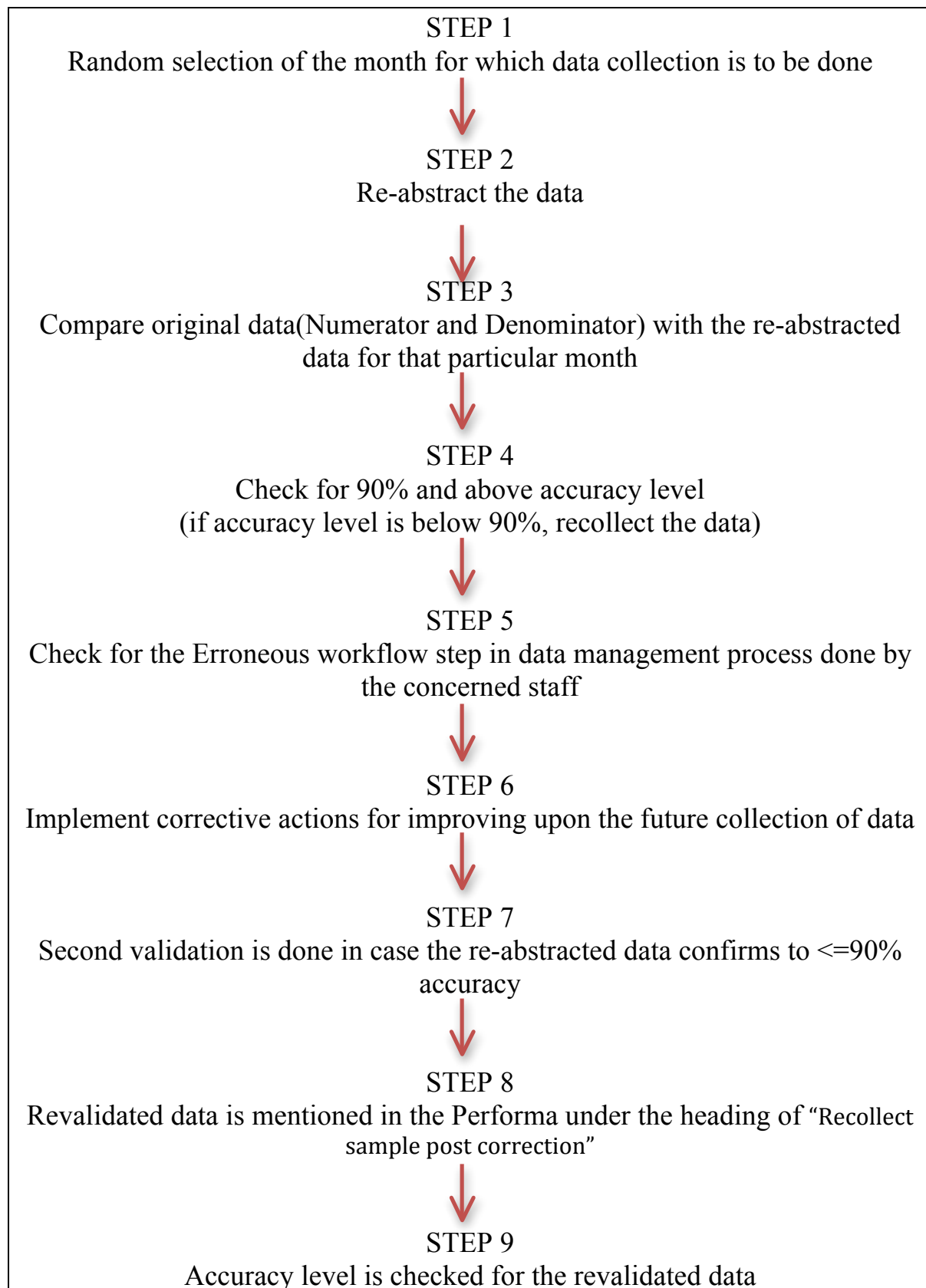
1. Admissions-
2. Apollo Health Check (AHC)
3. Biomedical
4. Blood Bank
5. Cosmetic Centre
6. Emergency
7. Engineering
8. Fetal Medicine
9. F & B and Dietetics
10. Housekeeping
11. Human Resource
12. Information Technology
13. Materials
14. Medical Services
15. Medical Records Department (MRD)
16. Neurology
17. Nuclear Medicine
18. Nursing
19. PET Suite
20. Pharmacy
21. Physiotherapy
22. Radiology
23. Radiotherapy
24. Security & Fire
25. Sleep Lab
26. Sugar Clinic
27. Telephone Exchange
28. Website

Triggers for Data Validation are:

Data Validation shall be **triggered** in the following instances

- I. A new measure is implemented.
- II. Data made public on hospital's website or in other way.
- III. Change in data source.
- IV. Change in existing measure/ data collection tools/ methodology abstractor.
- V. Unexplainable significant changes in the current trend of the measure.
- VI. Change in the subject of data collection (example new protocols, methodologies introduced, or changes in the average age of patients, co-morbidities).
- VII. Change has been made to an existing measure.
- VIII. A random sample of 25 is considered as the minimum to study the population represented through the indicator. However, 100% population is studied if the total population size is equal to or less than 25.

Process Flow/Methodology
for Data Validation and Data Collection



DATA TABULATION

Data Compilation Sheet Table 1
Data Validation

Department	Indicator	Data Elements Checked (N)	Data Elements Found Same (P)	Accuracy Level % (A.L.)	Error Found	Revalidation (for A.L. <90%)
1.Admissions	Indicator a.	1321	1321	100	NA	NA
	Indicator b.	6085	6085	100	NA	NA
2.AHC	Indicator a.	62	62	10	NA	NA
3.Biomed	Indicator a.	214	214	100	NA	NA
	Indicator b.	64800	64800	100	NA	NA
4. Cosmetic Centre	Indicator a.	9	9	100	NA	NA
	Indicator b.	9	9	100	NA	NA
5.Blood Bank	Indicator a.	1810	1810	100	NA	NA
	Indicator b.	17	17	100	NA	NA
6.Emergency	Indicator a.	2272	2272	100	NA	NA
	Indicator b.	92	92	100	NA	NA
7.Engineering	Indicator a.	5619	5619	100	NA	NA

Department	Indicator	Data Elements Checked (N)	Data Elements Found Same (P)	Accuracy Level % (A.L.)	Error Found	Revalidation (for A.L. <90%)
8. F & B and Dietetics	Indicator a.	167892	167892	100	NA	NA
		1395	1395	100	NA	NA
	Indicator b.	3100	3100	100	NA	NA
	Indicator c.					
9.Fetal Medicine	Indicator a.	216	216	100	NA	NA
10.Housekeeping	Indicator a.	100	88	88.0	Calculation Error	Yes
	Indicator b.	986	986	100	NA	NA
11.Human Resource	Indicator a.	84	84	100	NA	NA
	Indicator b.	39	39	100	NA	NA
12.Information Technology	Indicator a.	5856	5856	100	NA	NA
	Indicator b.	744	744	100	NA	NA
13.Materials	Indicator a.	31	31	100	NA	NA
	Indicator b.	654635	654635	100	NA	NA
14. Medical Services	Indicator a.	26	26	100	NA	NA
	Indicator b.	1085	1085	100	NA	NA

Department	Indicator	Data Elements Checked (N)	Data Elements Found Same (P)	Accuracy Level % (A.L.)	Error Found	Revalidation (for A.L. <90%)
15. MRD	Indicator a.	3329	3329	100	NA	NA
	Indicator b.	3251	3251	100	NA	NA
16. Neurology	Indicator a.	242	242	100	NA	NA
17. Nuclear Medicine	Indicator a.	1	1	100	NA	NA
	Indicator b.	32	32	100	NA	NA
18. Nursing	Indicator a.	36	36	100	NA	NA
	Indicator b.	2624	2624	100	NA	NA
19. PET Suite	Indicator a.	57	56	<u>98.2</u>	<u>Data Compilation</u>	NA
20. Pharmacy	Indicator a.	1200	1200	100	NA	NA
	Indicator b.	3440	3440	100	NA	NA
21. Physiotherapy	Indicator a.	433	433	100	NA	NA
	Indicator b.	10	10	100	NA	NA

Department	Indicator	Data Elements Checked (N)	Data Elements Found Same (P)	Accuracy Level % (A.L.)	Error Found	Revalidation (for A.L. <90%)
22. Radiology	Indicator a.	127163	127163	100	NA	NA
23. Radiotherapy	Indicator a.	74	74	100	NA	NA
24. Security and Fire	Indicator a.	1	1	100	NA	NA
	Indicator b.	92	92	100	NA	NA
25. Sleep Lab	Indicator a.	11	11	100	NA	NA
26. Apollo Sugar Clinic	Indicator a.	116	116	100	NA	NA
27. Telephone Exchange	Indicator a.	136884	136884	100	NA	NA
28. Website	Indicator a.	952	952	100	NA	NA

Formula for Calculation of Accuracy Level

$$AL = (N/P * 100)$$

Where, N – Data elements that were found to be same

P – Total data elements checked

Essential Elements of Data Validation: -

1. Data Re-abstraction should be done by a second person, not involved in the original data abstraction.
2. Validation should be done using a statistically valid sample of records, cases, and other data and if the sample size is very small, then 100% sample is required.
3. Calculating Accuracy Level 90% and above is Benchmark
4. If data elements are not found same, reasons are noted and corrected action is taken.
5. New sample is collected after all corrective actions have been implemented to ensure the actions

Inclusion Criteria-

- Data Validation is done for data collected only for Quality Indicators.
- Data Validation to be done only for the month of January 2014.

Exclusion Criteria-

- Data collated other than for Quality Indicators.
- Collated data other than for the month of January 2014.

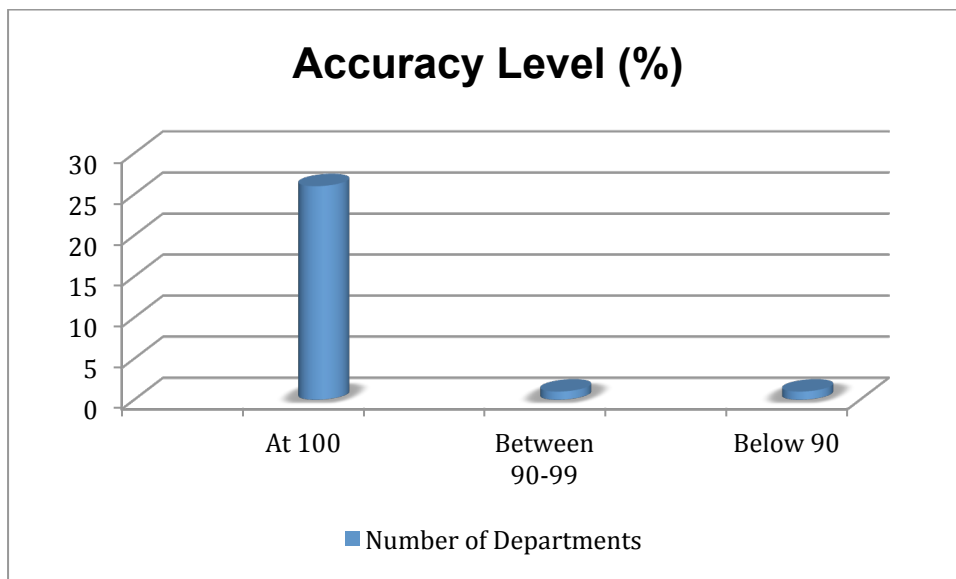
ETHICAL CONSIDERATIONS

1. The policies for Data Validation are to be kept into consideration.
2. Data collectors should be trained before starting to collect data in order to allow for testing the reliability of data collection and making adjustments to the process to resolve any problems.
3. Privacy of the original data is to be maintained. Original data information with respect to the data collected for data validation is not to be shared inside and outside the Hospital except with the concerned Quality Department staff.

DATA ANALYSIS

A. On the basis of calculated Accuracy level the departments can be classified into 3 categories-

1. Accuracy level – 100%
2. Accuracy level – between 90% - 99%
3. Accuracy level – below 90%



Accuracy Level (%)	Number of Indicators
100	45
Between 90-99	1
Below 90	1

INTERPRETATION

- 96% of total validated Indicators were found to have accuracy level of 100%
- 2% of total validated indicators were found to have accuracy level between 90-99%, which is an acceptable level.
- 2% of total validated indicators were found to have accuracy level below 90% i.e. 88% for indicator a. of Housekeeping Department.

B. On the basis of data Quality issues recorded during data Validation.

Two data quality issues were recorded:-

- Calculation error – for indicator a. of Housekeeping Department
- Data compilation error- for indicator a. of PET Suit.

INTERPRETATION

Housekeeping

- Quality Indicator- “Room turnaround time for single rooms with in 30 Minutes of discharge.”
- An error went unseen by the Manager (H.K.), during data aggregation step, which resulted in inaccurate total turnaround time for the sample size.
- During data re-abstraction it was found out that the error was done while totaling the sample size for the month of January 2014.

PET Suite

- Quality Indicator- “Percentage of daily equipment quality check passed (PET CT/MRI)
- Erroneous workflow step was during data compilation step by Senior Technologist.

RESULTS

The Data Validation methodology has been helpful in maintaining the quality data in the hospital departments, as post Data Validation it was found out that 98% of departments had Accuracy Level above 90%, which is the accepted level for a data set to be entitled as quality data.

The errors, which were observed for maximum number of times, are Calculation and Compilation errors. These errors were manual errors, i.e. when the concerned staff did calculation manually.

SUGGESTIONS

1. The process of Data Validation must be continued, in order to avoid errors and maintain Quality data and to prevent data loss.
2. Incorporating Automated System at all levels of data management can further minimize errors.
3. The hospital staff can be made more involved in this process, by briefing particular Department by the Head of the Department and sensitizing the staff about the value of quality data.

CONCLUSION

It is clear therefore, that data validation helps in checking the accurate accuracy level of data set collected and managed by the concerned departments. The errors were found out and reported to the designated staff, which helped in increasing the compliance and participation of the departmental staff.

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APPENDICES

Form 1

Performa for Data Validation

1. Data time line for which validation conducted:
2. Name of the member involved in DV
3. Name of the Indicator:
4. Data Source:
5. Department Concerned:
6. Validation number (1/2/3):
7. Metrics (unit of measure %, number, any other specify):
8. Reason for Validation:
9. Numerator Definition:
10. Numerator value for the month:
11. Denominator Definition:
12. Denominator value for the month:

13. List data sources that contribute to this data element:

14. List workflow steps involved for data collation by the department

15. Comments:.

16. Original Data value:

Re-collected Data value:

17. Data elements that were found to be same (N): _____ and were different (N1): _____

18. Total data elements checked (P): _____ (Indicate sample size)

19. Accuracy level: $((N/P)*100) =$ _____ (>90% accuracy level)

20. Deficiencies:

a) Unclear Definition:

b) Erroneous workflow step

20. Corrective action taken:

21. Recollect sample post correction:

Assignment
on
Hazard Vulnerability Analysis (HVA)

At
Indraprastha Apollo Hospital, Delhi

Submitted By
Dr. Nidhi Sharma

Under the Guidance of
Ms. Yogamaya Nayak

Submitted to
IIHMR JAIPUR

ACKNOWLEDGEMENT

It gives me an immense pleasure to show my gratitude to great many people who helped me and supported me during my internship at Indraprastha Apollo Hospitals.

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Dr. Nidhi Sharma

Introduction:

Vulnerability refers to the inability to withstand the effects of a hostile environment. The concept of vulnerability expresses the multi-dimensionality of disasters by focusing attention on the totality of relationships in a given social situation which constitute a condition that, in combination with environmental forces, produces a disaster.

Social vulnerability is one dimension of vulnerability to multiple stressors and shocks, including abuse, social exclusion and natural hazards. Social vulnerability refers to the inability of people, organizations, and societies to withstand adverse impacts from multiple stressors to which they are exposed. These impacts are due in part to characteristics inherent in social interactions, institutions, and systems of cultural values.

Hazard is a potential source of danger or adverse conditions. Most hazards are dormant or potential, with only a theoretical risk of harm; however, once a hazard becomes "active", it can create an emergency situation. A hazardous situation that has come to pass is called an incident. Hazard and possibility interact together to create risk.

Hazard identification

Types of Hazard

Hazards are generally labeled as one of five types:

- **Physical hazards** are conditions or situations that can cause the body physical harm or intense stress. Physical hazards can be both natural and human made elements.
- **Chemical hazards** are substances that can cause harm or damage to the body, property or the environment. Chemical hazards can be both natural or human made origin.
- **Biological hazards** are biological agents that can cause harm to the human body. These some biological agents can be viruses, parasite, bacteria, food, fungi, and foreign toxin.
- **Psychological hazards** are created during work related stress or a stressful environment.

- **Radiation hazards** are those which cause harm or damage to the human body by affecting the cell directly.

The Joint Commission on Accreditation of Healthcare Organizations has significantly revised the standard for emergency management (EC.1.4) in the 2001 edition of the Comprehensive Accreditation Manual for Hospitals. Although hospitals have always had to plan to respond to a “variety of disasters,” the 2001 standards continues to state that the hospital response plans must be “based on a **Hazard Vulnerability Analysis**, performed by the hospital.” The hazards that have occurred or could occur must be balanced against the populations that is t risk to determine the vulnerability to the given hazard. Formalizing the requirement the process within hospitals, and organizations should now be able to produce documentation to evidence the analysis. This document will serve to discuss the factors entering into the analysis and provide a tool that may be used by organizations to document it.[\[1\]](#)

HVA determines the facilities at risk and to what degree they might be affected, as well as how they might affect other surrounding structures.

Importance of HVA

- The HVA provides a systematic approach to recognizing hazards that may affect demand for the hospital services or its ability to provide those services. HVA serves as a needs assessment for the Emergency Management program.
- HVA helps to identify risks for build / natural environment.
- HVA helps in assessing the capability of Safety Committee and Disaster Management Team to respond/recover.
- To prioritize mitigation actions
- HVA helps in analysing the resulting costs of damages and costs avoided through mitigation

WHEN is HVA done ?

HVA is done on annual basis (in the beginning of the calender year.

HOW ?

Process Flow

Identify and Prioritize the likely hazards

(Identified by the Safety Committee and in-depth discussion
with every department of the hospital)



Estimate the probability occurrence



Analyse the impact

(Losses and damages)



Action Plan made for future occurrence

The identified hazards have been categorised as follows:-

Table 1

• FIRE
• BIOMEDICAL & INFORMATION TECHNOLOGY
• HUMAN EVENTS
• HAZARDOUS MATERIAL MANAGEMENT AND SAFETY
• ENGINEERING
• SECURITY MANAGEMENT
• EXTERNAL EVENTS
• UTILITIES

Analysis is done keeping 3 levels of risk in consideration:-

Table 2

▪ High Risk	
▪ Moderate Risk	
▪ Low Risk	

Areas analysed are:-

Table 3

1. Terrace	2. Patient Rooms
3. Patient Wards	4. HDU
5. OT complex(including Robotic Gynae OT)	6. ICUs
7. IVF	8. IT
9. Endoscopy	10. Fibroscan Lab
11. Cosmetic OT	12. Bronchoscopy
13. Sleep Lab	14. Cath Lab
15. Day Care	16. ER
17. Blood Bank	18. Radiology(CT/MRI/DSA)
19. Nuclear Medicine	20. Hyperbaric Unit
21. Dialysis	22. Lab Services
23. Sample Collection	24. Kitchen
25. Pharmacy	26. Physiotherapy
27. Radiotherapy	28. MRD
29. Laundry	30. House Keeping
31. Boiler Room	32. HVAC
33. LT Room	34. Pump Room
35. Receiving Store	36. HAZMAT Store
37. Gas manifold	38. Liquid Oxygen Storage
39. Scrap Yard	40. Basement Parking
41. Service Floor	42. Medical/Stationary Store
43. Administration Block	44. Telephone Exchange
45. Atrium	46. AHC
47. Physician Office	

TOOL used for HVA

The tool used by IAH for Hazard Vulnerability Tool, which has been developed by Kaiser Permanente. The tool is known as Kaiser Permanente HVA Tool.

In this tool the aspects which are assessed and measured in respect with the categories of hazards areas assessed are:

1. Preparedness- Preplanning

Issues to consider for Preparedness include, but not limited to:

- a. Status of current plans
- b. Frequency of drills
- c. Training status
- d. Insurance
- e. Availability of alternate sources for critical supplies/services

2. Probability- Likelihood this incident will occur

Issues to consider for Probability include, but are not limited to:

- a. Known risk
- b. Historical data
- c. Manufacturer/Vendor statistics

3. Internal Response- Time, effectiveness and Response

Response Impact- Issues to consider for Response include, but are not limited to:

- a. Time to marshal an on-scene response
- b. Scope of response capability
- c. Historical evaluation of response success

4. **Human Impact-** Human death and injury

Issues to consider for human impact include, but not limited to:

- a. Potential for staff death or injury
- b. Potential death or injury

5. **Property Impact-** Physical losses and damage

Issues to consider for Property impact, but not limited to:

- a. Cost to replace
- b. Cost to set up temporary replacement
- c. Cost to repair
- d. Time to repair

6. **Business Impact-** Interruption of services

Issues to consider for Business impact include, but not limited to:

- a. Business interruption
- b. Employees unable to report to work
- c. Customers unable to reach facility
- d. Company in violation of contractual agreements
- e. Imposition of fines and penalties or legal costs
- f. Interruption of critical supplies
- g. Interruption of product distribution
- h. Reputation and public image
- i. Financial impact/burden

7. **External Response-** Community/Mutual Aid staff

Issues to consider for external response include, but not limited to:

- a. Types of supplies on hand/will they meet need?
- b. Volume of supplies on hand/will they meet need?
- c. Staff availability
- d. Coordination with MOB's
- e. Availability of back-up systems
- f. Internal resources ability to withstand disasters/survivability
- g. Types of agreements with community agencies/drills?
- h. Coordination with local and state agencies
- i. Coordination with proximal health care facilities
- j. Coordination with treatment specific facilities
- k. Community resources

On the basis of above 7 aspects the hazards are given Score (keeping in mind the area where they occur)

SNAP SHOT of HVA tool

Figure 1.

HAZARD AND VULNERABILITY ASSESSMENT TOOL EXTERNAL EVENTS								
EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	Likelihood this will occur	Possibility of injury	Physical losses and damages	Interruption of services	Preplanning	Time, effectiveness, resources	Community Mutual Aid staff and	Relative threat*
SCORE	0 = N/A 1 = Low 2 = Moderate	0 = N/A 1 = Low 2 = Moderate	0 = N/A 1 = Low 2 = Moderate	0 = N/A 1 = Low 2 = Moderate	0 = N/A 1 = High 2 = Moderate	0 = N/A 1 = High 2 = Moderate	0 = N/A 1 = High 2 = Moderate	0 - 100%
Earthquake	1	1	2	1	1	1	1	13%
Severe Thunderstorm	1	0	1	1	1	1	1	9%
Mass Casualty Incident	1	1	0	1	1	1	1	9%
Extreme Temperatures	1	1	0	1	1	1	1	9%
Flood, External	1	0	1	1	1	1	1	9%
Fire, External	1	2	2	1	1	1	1	15%
Bomb Blast	1	2	2	1	1	1	1	15%
Rioting	1	1	1	0	1	1	1	9%
Road Traffic Accident	2	1	0	0	1	1	1	15%
Epidemic / Bio terrorism	1	2	0	1	1	1	1	11%
AVERAGE SCORE	1.10	1.10	0.90	0.80	1.00	1.00	1.00	11%
*Threat increases with percentage.								
RISK = PROBABILITY * SEVERITY								
0.11 0.37 0.33								

(Quality Department, Apollo Indraprastha, Delhi)

After each hazardous event is given score, Risk of Hazard is calculated

Steps are as follows:-

STEP 1

Magnitude and Mitigation is calculated

$$\text{Magnitude} = \text{HI} + \text{PI} + \text{BI}$$

$$\text{Mitigation} = \text{P} + \text{IR} + \text{ER}$$

STEP 2

Severity is calculated

$$\text{Severity} = \text{Magnitude} - \text{Mitigation}$$

STEP 3

Risk is calculated

$$\text{Risk \%} = \text{Avg Probability (of events)} * \text{Avg Severity (of events)} * 100$$

*Threat increases with increase in % of Risk

Hazard Vulnerability Analysis for FIRE & SAFETY in Information Technology Department

A. Areas which are vulnerable to Fire are identified and prioritized

B. HVA done with the help of “Kaiser Permanente HVA Analysis Tool”

Figure 2.

	A	B	C	D	E	F	G	H	I
2									
3									
4	HAZARD AND VULNERABILITY ASSESSMENT TOOL								
5	EVENTS IMPAIRING FIRE SAFETY								
6	EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
7			HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
8		Likelihood this will occur	Possibility of injury	Physical losses and damages	Interruption of services	Preplanning	Time, effectiveness, resources	Community/ Mutual Aid staff and supplies	Relative threat*
9	SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 - 100%
10	Damage to fire exit door	1	1	1	1	1	1	0	9%
11	Damage to fire smoke door in corridor	1	1	1	1	1	1	0	9%
12	Sprinkler Malfunction	1	1	2	1	1	1	1	13%
13	Fire alarm failure/ Smoke Detector malfunction	1	1	1	1	2	1	0	11%
14	Empty Fire Extinguisher	1	2	2	0	1	1	1	13%
15	Unsecured O2 cylinder	1	1	2	1	1	1	1	13%
16	Leakage from CNG Gas pipelines	1	2	1	0	1	1	1	11%
17	Fire Internal	1	2	2	2	1	1	1	17%
18	Fire in the gas plant	1	1	1	1	1	1	2	13%
19	Fire in the diesel tank	1	1	2	1	1	1	1	13%
20	Cluttered fire exits	1	1	1	1	1	1	1	11%
21	Improper storage of inflammable substances/ Accumulation of flammable substances in the area	1	1	1	1	1	1	1	11%
22	Spillage of inflammable substance	1	1	2	1	1	1	1	13%
23	Fire in IT datacentre	1	0	3	2	1	1	1	15%
24	*Threat increases with percentage.								
25	RISK = PROBABILITY * SEVERITY								
26	0.12 0.33 0.37								

C. Action Plan Made for those events which have High Risk occurrence

For effective loss prevention from fire persons, goods and property **measures** are listed below. Structural, system-relevant and organisational measures shall be coordinated so that the defined protection aims for the IT facility are achieved.

1. For High Risk Event of FIRE following General measures must be pre planned and implemnted.

- Fire Hydrant Points
- Sprinkler System
- Smoke Thermal Detectors
- Big extinguishers placed to handle crises
- Evacuation Plan Display
- Fire Exit Singes
- Fire Exit Door with magnetic Lock
- Smoke Door.

Specific MeasuresTable 4)

Structural Building and Planning Measures	System-Relevant Measures	Organisational Measures
• Sufficient structural separation against fire • Protection of wire or duct penetrations against fire and smoke, with fireproofed bulkheads • Use of non-	✓ Fire detection and fire alarm system (FDFAS) ✓ Fire extinguishing system (FES) {FM200} ✓ Smoke exhaust ventilation	• Fire safety regulations • Fire protection plan • Rescue route plan, operating instructions • Emergency signage/markings • Avoid unnecessary fire loads • Smoking ban • Permits: – fire-hazardous works – instruction of contractors • Training Practices

flammable materials • Sufficient static design of, • For example, mountings etc.	system (SHEV) ✓ Wall hydrants/fire extinguishers ✓ Protection against lightning and overload etc.	
--	---	--

2. Fire Safety is everyone's responsibility. Fire Safety Committee comprising of senior officials from the hospitals' various departments controls the overall management of the fire safety measures. All employees should know how to prevent and respond to fire. Responsibilities and duties in care of FIRE, must be pre-decided and informed in advance to all the employees by Fire Safety committee.

For better understanding of Prevention of Fire and what to be done if Fire takes place, Fire Training & Staff Education must be conducted at regular time periods.

HVA has helped IAH in efficient and effective management of hazardous event whenever they have occurred. L1 this has been possible for IAH because of well assessed areas which can be affected, beforehand and well made Action Plan.

CONCLUSION

It is therefore clear that HVA helps the hospital in taking effective and accurate measures in an efficient manner, if and when any hazardous event occurs.

