

To Assess the Mortality Data Using HER Integrated Morality
Dashboard in the U.S. Hospital: Strengthening the Evidence
for Policy Makers

By

Neha Trivedi

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Neha Trivedi**, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Allscripts India Pvt Limited** from **4th Feb 2019** to **4th May 2019**.

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

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

A handwritten signature in blue ink, appearing to read 'Ashok'.

Dr. Ashok Kaushik
Dean, Academics and Student Affairs
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16 May 2019.

A handwritten signature in blue ink, appearing to read 'Sandesh'.

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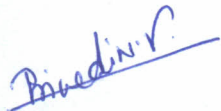
PROJECT COMPLETION CERTIFICATE

This is to certify that **Ms. Neha Trivedi**, employee code 831872, is a bonafide employee of Allscripts (India) LLP and is working with us since **February 04, 2019**. She has completed below project from **04 Feb 2019** to **04 May 2019**.

Project Name	A Study to Assess the Mortality Data Within the US Hospital Using EHR integrated Morality Dashboard
Platform / Area	EHR
Technology / Domain	Healthcare

We wish great success for future endeavors.

For Allscripts (India) LLP,



Nilesh Trivedi
MS Associate Manager Managed Services

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **To Assess the Mortality Data Using EHR Integrated Morality Dashboard in the U.S Hospital** and submitted by **Dr. Neha Trivedi** Enrollment No **0607** under the supervision of **Dr.Sandesh Kumar Sharma** for award of MBA in Hospital and Health Management in Health and Hospitals of the University carried out during the period from **04th Feb 2019** to **04th May 2019** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

ABSTRACT

TITLE: A Study to Assess the Mortality Data Within Using EHR integrated Morality Dashboard in the US Hospital. Strengthening the Evidence for Policy Makers

AUTHOR: Dr. Neha Trivedi

BACKGROUND: The study attempts to find out that in what way the implementation of a Mortality Dashboard within the Electronic Health Record software will lead to the ease of recording the number of deaths within the hospital over the period. The study tries to find out the how the mortality dash board will help in establishing the various causes of the deaths and how the quality care of the hospital can be improved tries to recognize the main and affective features of the dashboard that will help the government to get the statistical data on one go for new improved policies that will lead to the betterment of the nation.

OBJECTIVES:

- To Convey the usefulness of Mortality Dashboard.
- To help in determining the underlying various causes of death to brighten the loopholes for the government and hospital to improve the healthcare facilities.

METHOD:

It is a Description Cross-Sectional study.” Primary data was put together through the Sunrise Clinical manager EHR software where in all the patients from emergency department and inpatient department were mapped.

CONCLUSION:

This newly established Mortality Dashboard provides systematic exercise to review the distinct case records using a planned or controlled methodology to recognize the problems and to draw knowledge to inform any additional action that is needed to progress within a hospital setting and to offer government to take suitable measures for improvement of the quality in the healthcare system.

KEYWORDS: EHR, Mortality Dashboard, Data Mapping.

CONTENTS

1: Organization Profile	
○ Introduction.....	1
○ Departments.....	2
○ Products	3
○ Services.....	4
○ Learnings at Allscripts.....	5
2: Introduction	
○ Aim.....	6
○ Objectives.....	6
○ Significance.....	6
3: Literature Review.....	8-9
4: Research Method.....	10
○ 4.1 Research Question	10
○ 4.2: Study Design.....	10
○ 4.3: Study Setting.....	10
○ 4.4: Duration of the Study.....	10
○ 4.5: Sample Collection	10
○ 4.6 Data collection Methods.....	11
○ 4.7: Data Analysis	11
○ 4.8: Data Collection Tool.....	11
5: Outlook of the Mortality Dashboard.....	12-15
6: Results and Interpretation.....	16-22
7: Conclusion.....	23
8: References	24

List of Tables:

Table 1.....	Drill down KPI's
Table 2.....	Factors causing mortality
Table 3.....	Determinants of mortality

List of Figures

Fig 1.....	EMR Architect
Fig 2.....	Mapping of the data
Fig 3.....	Mortality Measure Performance Indicator.
Fig 4.....	HIPAA Violation by Type
Fig 5.....	Outlook of mortality
Fig 6.....	Types of filters
Fig 7.....	Visit type
Fig 8.....	Details dropdown
Fig 9.....	Discharge diagnosis

2: INTRODUCTION:

EMR (Electronic Medical Record)/ EHR (Electronic Health Record) gives a real way to solve the difficulty of managing clinical data. EMR partakes the fact that has been playing a small role in the industry for many years but has yet to be executed successfully because of many recognized sprints has encountered these type of privacy concerns, and lack of technology. Tremendous progress has been made in the past year in terms of lawmaking, technology and innovation in the same which has removed these hurdles. With recent innovations in Information Technology, robotic software, progressive processors, high-speed networks and apparently storage capacities have all revolutionized the industry.

The information in a from a hospital's office was and is usually gathered in the form of charts and forms using papers, leading to collect the loads of papers, which are difficult to manage and create a chaos in utilizing these records. Electronic records can also be easily portable and can be accessed anytime anywhere. It is rathe easy to transfer these records to several different places at a time. With the widespread development in technology it is now possible to maintain the data in electronic format and these data can be utilized for analysis of business and making physician presentation and for various other researches. EMR/ EHR is a prime step towards a better healthcare where all the procedures that are clinical will be automatic and well-structured helping the patients to get better health care, allowing the physicians to get all timely information and thus leading in the improvement of overall therapeutic system. Due to its many compensations.



Fig:1

MORTALITY DASHBOARD: A new aged integrated dashboard to record, map and analyze the total number deaths taken over the defined period in a hospital using this EHR integrated with mortality dashboard.

So, the question arises, what is the purpose of having the dashboard?

A dashboard summarizes “the events with easy-to-understand and to provide real-time results by removing and combining the value from all the collected data, otherwise known as your key performance indicators (KPIs). It abridges the data into more easily producing visual information that tells you whether you are on the right path or whether you need to improvement

If properly utilized, dashboards can be widely used in helping you to make decisions that are well informed, and which dramatically impact business performance – which in turn effects your attainable needs.

Mortality Dashboard is a type of Analytical Dashboards – Usage of info from the past to identify trends that can impact future choice-making. Operators should be able to interrelate with the information on a logical dashboard, so many of them join pivot tables and drilldowns. The ideal spectators for viewing logical consoles are database analysts, as they typically require a level of sympathetic that a characteristic business user may not possess.

- ✓ **Information transparency**
- ✓ **Admittance to data**
- ✓ **Improved choice production**
- ✓ **Liability**
- ✓ **Interactivity**
- ✓ **Gamification**

This dashboard is an instrument to aid the methodical recording of deaths and provide earning from the care providing by the hospital and the care providers. Hospitals and Govern may use this to greatest relevant incidents of mortality, deaths reviewed, and teachings learnt to encourage future knowledge and the development of care.

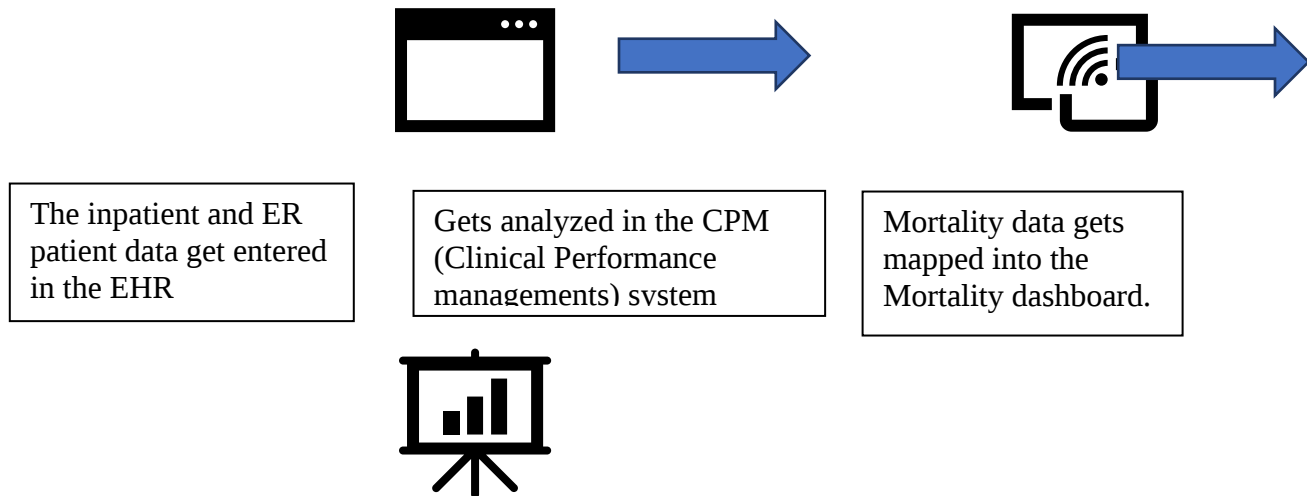


Fig: 2

Mortality Measure Performance Categories				
Category	Better than the national rate	No different than the national rate	Worse than the national rate	The number of cases is too small
Criterion	The entire 95% interval estimate surrounding the hospital's rate is lower than the national rate.	The 95% interval estimate surrounding the hospital's rate includes the national rate.	The entire 95% interval estimate surrounding the hospital's rate is higher than the national rate.	Fewer than 25 cases

Fig: 3

CMS/CDC/WHO Guidelines:

As per the CMS and Medicare "Death rates are to be measured within 30 days, because deaths after a longer duration may have less factors pertaining the care the hospital provided and more to do with other complicating illnesses, patient's own behavior, or other care services patients received after they leave the hospital.

So, keeping in mind, the Mortality dashboard was made as a solution to the hospitals.

2.1: AIM

Study aims to access and analyses the mortality data using EMR integrated Motility Dashboard in the US hospital to identify the main causes of mortality.

2.2: OBJECTIVES

- To Convey the usefulness of Mortality Dashboard.
- To help in determining the underlying various causes of death to brighten the loopholes for the government and hospital to improve the healthcare facilities.

The information the mortality dashboard will give have been presented in the table below.

TYPE	KEY KPI's	Drill DOWN KPI's	HOW DOES IT HELPS
CLINICAL .These have high impact on the outcome and result making	Date rate	No. of death occurred due to number of factors such as geographical factors, medication errors , gender anaysis of death	Nation and state wide mortality rate are usually published by the governmnet . The mortality dashboard can benchmark the performance of the hospital and sees how it has performed against the national and state averages and also against its competition.
	Death due to Medication error	Wrong medication , wrong patient, wrong dosage	This technological option with the usage of the Computerised Physicain Order Entry (CPOE) and other decision support system will help us to tract the death due to medication error and fatal causes due to it , which will help in estiamting the loopholes and bulid the patient trust and satisfasation .
	Genderwise death , leading causes	Reason for the death, factors causing death	The Solution can provide the distribution of major cause of deaths. 15 leading causes of deaths – For all ages and separately for children. Provide CDRs (Crude deaths rates) gender wise for the selected data which we can analyse with annual rate of population growth- Country specific.

Table:1

2.4: OUTLINE OF THE STUDY:

The study contains an EHR newly integrated morality dashboard. The mortality data from the inpatient and emergency department from a hospital in the US (Hospital name cannot be mentioned as it would be a violation to HIPPA) was then mapped in the mortality death board. This data was mapped based on various factors such as:

- ✓ Age Specific mortality
- ✓ Average length of stay (LOS) of deceased patient by age group.
- ✓ Crude Death Rate (CRD) based on hospital visit.
- ✓ Age Specific mortality rate
- ✓ Mortality based on visit time – Inpatient or ER patient
- ✓ Child Mortality Rate
- ✓ Death Count by Race Wise
- ✓ Admitting diagnosis of the deceased patient
- ✓ Top 10 causes of death

Table:2

2.4: LIMITATIONS OF THE STUDY:

As the company is US based and follows strict HIPPA rules, the information about the patients such as the MRN, Patient ID, Patients Name etc. cannot be shared. The name of the study hospital and the government province cannot be shared. Any type of personal information sharing would violate HIPPA and in turn can be legal issue.

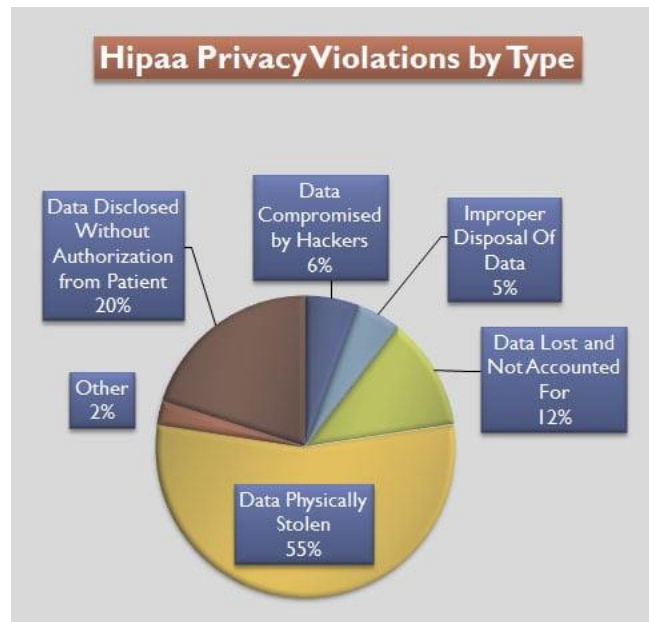


Fig:4

3: LITERATUE REVIEW:

1 : J Crofts, Moyo, W Ndebele, S Mhlanga, T Draycott, T Sibanda (2014) in their paper On Implementation and Adaptation of Local Maternity Dashboards at Zimbabwean Hospital To Drive Improved Clinical Data stated that : The Information Commission and Answerability for Women's and Children's Health of the World Health Organization (WHO) stated that question was always on national health outcome data and “not real time enough to be practically used by health planners and administrators”. Delayed reporting leads to the foundation of the front-line staff to identify the problem and make immense improvement.

locally accessible information is the source of Clinical Dashboard that offer source of accurate and real time information. A dashboard is a computerized data tool that offer a health facility's clinical data explicitly using a traffic-light coding system to alert front-line staff about changes in the frequency of scientific consequences. It delivers rapid feedback on local results in an accessible form and enables problems to be detected early. Till today, dashboards were used only in high-resource departments.

The Royal College of Obstetricians and Gynecologists, lately invented a prototype, set of intrapartum scientific outcomes which can be measured and altered by best practice. However, pointers, like maternal death, were not added because of their infrequency in developed countries.

Authors, Thabani Sibanda, a medical and obstetrician statistician having experience in with the maternity dashboards have worked in at Mpilo Central Hospital with the local reproductive health officer (a midwife), and doctors for the devising of a set of clinical indicators for maternity dashboards that focused on both that met both local and Zimbabwean national reporting requirements. Excel was used to produce 2 maternity Dashboard. The dashboard was user-friendly and all embedded were the statistical formulae within it.

2: “Sandra C. Buttigieg, Adriana Pace, Cheryl Rathert (2017) VOL 31 ISSUE 3 STATED :The available literature review was analyzed on this paper on hospital performance dashboards that highlighted the items that assist the governments to examines, monitor and manage performance and managers of the hospital to make numerous decisions that steer organization’s performance. This literature is disjointed as it reports the use of different types of dashboards, namely strategic, tactical and operational, as separate tools.

3: “WHO, The University of Queensland Health Info. Systems Knowledge Hub and Health Metrics Network (financial support) developed an ANACoD Analysing Mortality Levels & Cause-of-Death data prepare. Which help straightforward deaths tabulation of the death by sex, age and cause of death, crude death rates reviewed, reviewed the age spreading of death, review child mortality rates, review the distribution of major causes of death, review major causes of death off patterns evaluation principal causes of death, Review ratio of non-communicable to communicable disease deaths.”

This instrument is publicly available for use . The tool is intended to help in building the capacity for analytical assessment to enhance their value in informing health policies and programmers.

1.Input the data.

basic sheet in which the users will have to paste population and mortality data and also let the user select the desired features of the data: ICD-10, year, data used. The tool will then calculate and yield all the boards and graphs.

II. Mortality Levels

The tool compiles and formats the raw data to enable the calculation of crude death rates, age-specific mortality rates, life expectancy at birth and child mortality. Steps 2-5 focus on simple steps to assess the plausibility of the mortality levels

II. Causes of death

Evidence on the levels and outlines of mortality among different population groups is essential for public health authorities and for the actual provision of resources to health care. Steps 6-10 focus on simple stages to evaluate the plausibility of data on causes of death. However, a fully operative civil registration and vital statistics system should not only register deaths by age and sex but should also collaborate with the health sector to implement mechanisms for conveying the cause of demise according to global standards as articulated.

4: RESEARCH METHODOLOGY:

4.1: RESEARCH QUESTIONS:

- 1: How the Mortality dashboard help to map the causes of death in hospitals in the United States?
- 2: Will adopting the mortality dashboard help the hospital and government to improve and enhance the health policies and better health services?

4.2: STUDY DESIGN

- It is a Descriptive Cross-Sectional study. Data was collected through the Sunrise Clinical manager EHR software where in all the patients from emergency department and inpatient department in a hospital in the US for 6 months i.e Jan 2018 to July 2018.

4.3 STUDY SETTING

- A hospital in the Texas, United States was selected for the study undertaken (Name of the hospital cannot be disclosed due to HIPPA privacy and policies that Allscripts abides by)

4.4 DURATION OF THE STUDY:

Three months (February 2019-May 2019)

4.5: SAMPLE COLLECTION:

The sample will consist of all the deceased patients in the year 2018 in a Tertiary care hospital in the United States of America. The deceased patients are the one who were the inpatients department or who came in the emergency department. These two departments were chosen because these two departments need the utmost patient care and safety and loop holes which lead to the poor patient care can be mapped to improve the quality of the hospital.

4.6: DATA COLLECTION PROCEDURE:

“The study emphasizes on principal data collection, for qualitative data, the mortality dashboard was made and the data from year 2018 was pulled out from Sunrise Clinical Manager.”

To measure the factors leading to deaths of the patients, the following determinants were taken into consideration.

- ✓ Age Specific mortality
- ✓ Average length of stay (LOS) of deceased patient by age group.
- ✓ Crude Death Rate (CRD) based on hospital visits.
- ✓ Age Specific mortality rate
- ✓ Mortality based on visit time – Inpatient or ER patient
- ✓ Child Mortality Rate
- ✓ Death Count by Race Wise
- ✓ Admitting diagnosis of the deceased patient
- ✓ Top 10 causes of death

Table:3

4.7: DATA ANALYSIS:

MS Excel will be used to do the data analysis. It will be covered due to its analytical abilities to cover wide range of graphical and statistical data analysis.”

4.8: DATA COLLECTION TOOL:

Data will be collected in the EHR integrated Mortality Dashboard.

5: OUTLOOK OF THE MORTALITY DASHBOARD



Fig: 5

The figure above shows the Mortality Dashboard as the user enters the dashboard. This dashboard shows analytical mortality data on the defined grounds. The dashboard displays the number of deceased patients and the average span of their stay in the hospital.

IN THE RIGHT SIDE: The dashboard shows the criteria selection for which the data is being shown.

IN THE LEFT SIDE: It has the filter option, where we can choose the criteria for which the data has to be reflected.

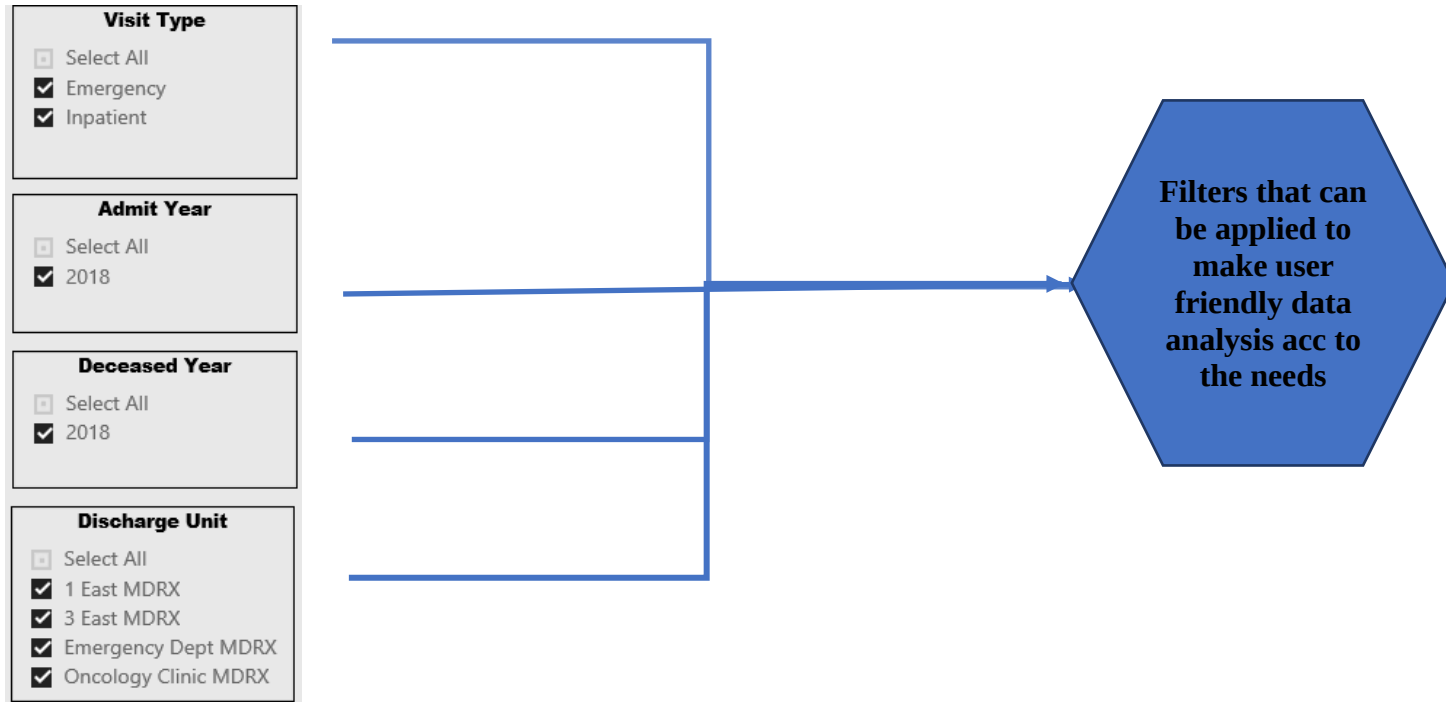


Fig: 6

The filters that can be used are

1: Visit type : The user can select the visit type for which they want the data to be displayed.

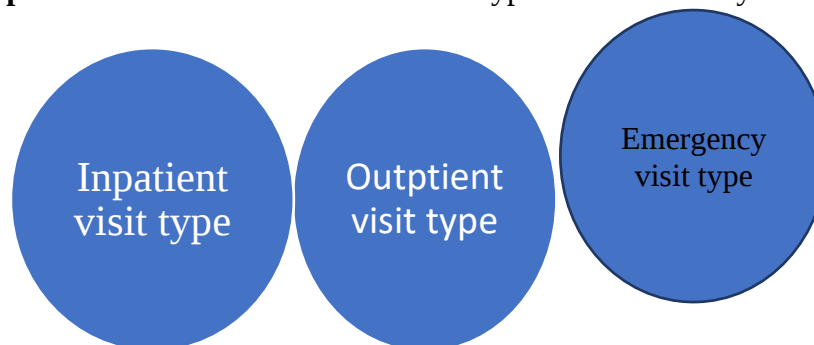


Fig:7

2: Admit year: The year of the admit patient can be selected

3: Deceased year: the year for which the deceased patient is to be analyzed can be selected

4: Discharge unit: the unit in the hospital from where the patients are to be analyzed can be selected. e.g. oncology dept, pediatric dept. cardiology department



Fig: 8

The figure above shows that the analyzed data can be sorted into the described way to make it convenient for the user to be able to study the data and the result

1: Show data: This allows the user to see the internal details of all the patients studied or considered in this graph names, patients MRN, patients age, hospital id etc.

2: Export data: This will allow the user to export data to any other software like M.S excel or another, if the user wants to make the separate analysis.

3: Spot time: Allows the user to see only the graph they want to study and grey-out all the other graphs.

4: Sorting: The user can sort the data, how they want the graph to appear e.g., data can be sorted into ascending order, descending order, by age group and by population

The graph change its visual appearance according to the sorting options selected.

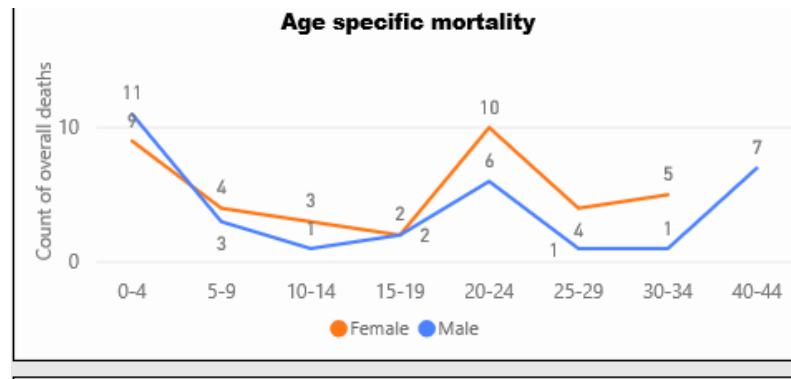
- ☐ Select All
- ☒ (Blank)
- ☒ Alzheimer disease type 4
- ☒ Alzheimer disease without neurofibrillary tangles
- ☒ Cerebral infarction
- ☒ Diabetes insipidus, nephrogenic
- ☒ Diabetes, bronzed
- ☒ Fever
- ☒ Gastrointestinal hemorrhage
- ☒ Gestational diabetes insipidus
- ☒ Gestational diabetes mellitus (GDM) in first trimester controlled on oral hypoglycemic drug
- ☒ Herpesviral vesicular dermatitis
- ☒ Kidney atrophy
- ☒ Kidney, aplastic
- ☒ Neutropenia
- ☒ Poisoning by alcohol deterrents, accidental or unintentional, sequela
- ☒ Suicide and self-inflicted injury by other and unspecified firearm
- ☒ Suicide attempt

Fig:9

The figure above shows that the user can select the diagnosis for which they want to study the data. By choosing the discharge diagnosis, the user can make sure to study the underlining cause behind the mortality and can help the government in policy making.

6: RESULT AND INTERPRETATION:

6.1: Age Specific Mortality:



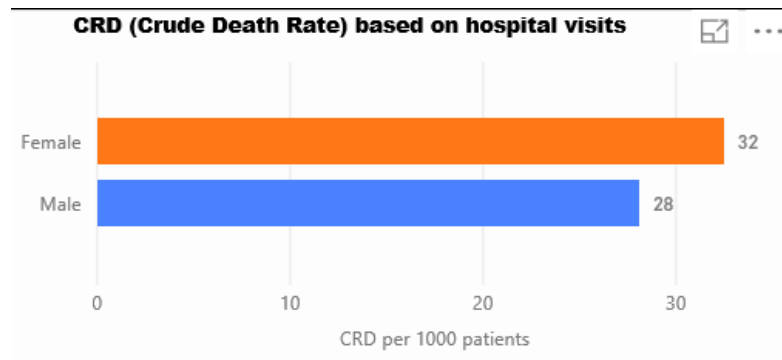
Graph 1: Age Specific Mortality

Interpretation:

The graph depicts the Age specific mortality amongst the male and female population out of 69 deaths the mortality amongst 0-4 age group is high in males than females, but at the age group of 20-24 mortality is high amongst female than males. There can be many justifiable reasons that can be explained.

Gender	Female		Male	
Age-group(yrs)	population	%GT Median of SrNo	population	%GT Median of SrNo
0-4	9	40.00%	11	40.00%
5-9	4	60.00%	3	60.00%
10-14	3	80.00%	1	80.00%
15-19	2	100.00%	2	100.00%
20-24	10	120.00%	6	120.00%
25-29	4	140.00%	1	140.00%
30-34	5	160.00%	1	160.00%
40-44			7	200.00%

6.2: Crude Death Rate (Mortality study with CDR)



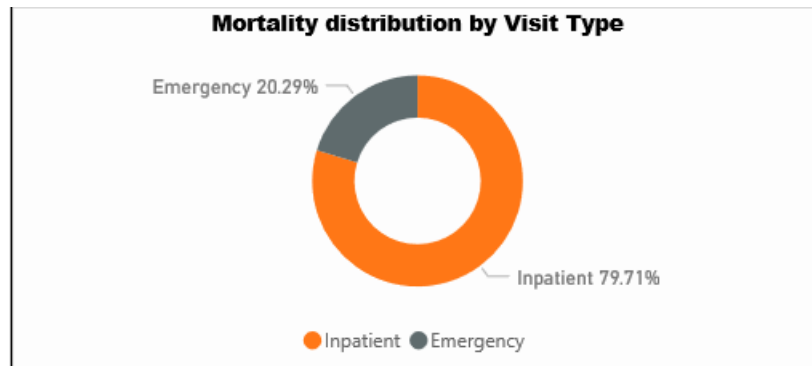
Graph 2: Crude Death Rate

Interpretation:

The graph depicts the CDR based on the per 1000 patients. Female and Male were studied and CRD was depicted as 32 females died in the year 2018 per 1000 population, and 28 males died in the year 2018 per 1000 population.

Gender	CRD
Female	32.46
Male	28.07

6.3: Mortality Distribution by Visit Type:



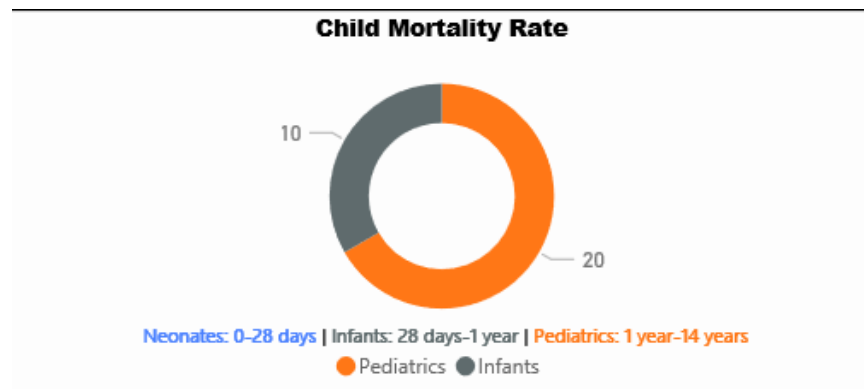
Graph 3: Mortality distribution by Visit Type

Interpretation:

The above graph depicts that 79.71% of the mortality took place in the inpatient department, wherein 20.29% took place in emergency department. This may help the users in finding the loopholes as high mortality rate in Inpatient department shows that changes are needed to be made for betterment.

VisitType	%GT population
Inpatient	79.71%
Emergency	20.29%

6.4: Child Mortality Rate:



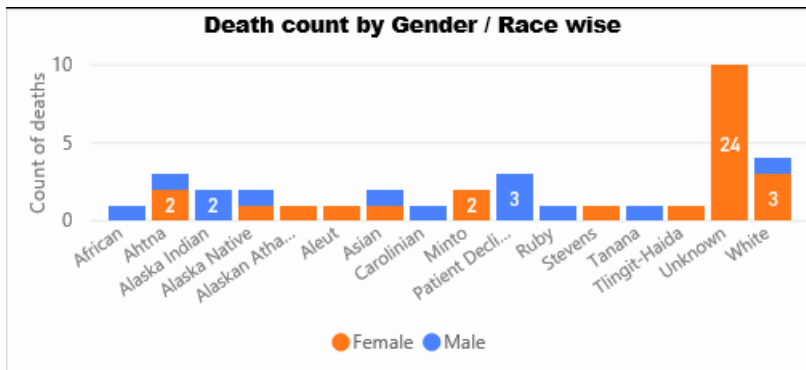
Graph 4: Child Mortality Rate

Interpretation:

The above graph depicts, out of 69, 20 mortality were of pediatric patients (1 – 14 year) wherein, 10 mortality were of infants (28 days – 1 year).

Child_Group	population
Pediatrics	20
Infants	10

6.5: Death count by Gender/Race wise:

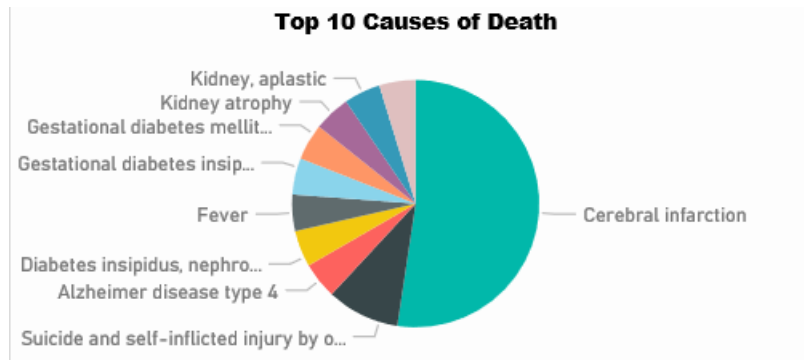


Interpretation:

Out of 69 mortality, majority were of unknown race.

race	Female	Male
African		1
Ahtna	2	1
Alaska Indian		2
Alaska Native	1	1
Alaskan Athabaskan	1	
Aleut	1	
Asian	1	1
Carolinian		1
Minto	2	
Patient Declined		3
Ruby		1
Stevens	1	
Tanana		1
Tlingit-Haida	1	
Unknown	24	19
White	3	1

6.6: Top 10 causes of Death:

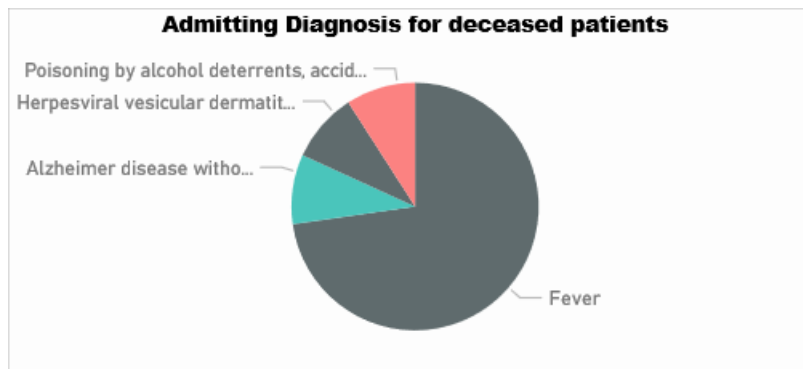


Interpretation:

The above graph depicts the causes of mortality amongst which Cerebral Infarction that count to 11 patients and was the prime reason for death amongst the population, followed by suicide, self-injury count to 2 patient and fever count to 1.

diagshort	Death Count
Cerebral infarction	11
Suicide and self-inflicted injury by other and unspecified firearm	2
Alzheimer disease type 4	1
Diabetes insipidus, nephrogenic	1
Fever	1
Gestational diabetes insipidus	1
Gestational diabetes mellitus (GDM) in first trimester controlled on oral hypoglycemic drug	1
Kidney atrophy	1
Kidney, aplastic	1
Neutropenia	1

6.7: Admitting Diagnosis for Deceased patients:



Interpretation:

The above graph depicts the admitting diagnosis for deceased patient where fever was the most common diagnosis amongst all.

diagshort	Death Count
Fever	8
Alzheimer disease without neurofibrillary tangles	1
Herpesviral vesicular dermatitis	1
Poisoning by alcohol deterrents, accidental or unintentional, sequela	1

Suggestions:

- As per the analysis, Mortality is higher for the Inpatient Department, which suggest the hospital to have an efficient quality department for analysis and to reach out to the root causes of the scenario.
- As the Age specific mortality suggest the government to have reformed policies to reduce the female child death at 0-4 years of age.
- Having the top 10 causes defined, the government could help the population by inviting new treatment and medical modalities for the diagnosed patients.
- As the death amongst the races are analyzed, regional hospital and government can collaborate and make new policies as per the geography and race residing on it.

7: CONCLUSION:

Major conclusion we can draw from the report.

- 1: All the Mortality Dashboard has analytical ability to define data into more easy way to understand.
- 2: Mortality Dashboard provide the data can help in embossing the loopholes within the hospital so that quality betterment can be achieved.
- 3: The Mortality Dashboard shows that a greater number of females died than males in the year 2018 in the hospital in the U.S.
- 4: Out of 100% ,79 % of the inpatient patient died in the year 2018, pointing towards the changes and quality improvement needed in the hospital.
- 5: Cerebral infraction being the top cause for the death, helps the care providers and government to focus discovering the new medication and care against it

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