SUMMER INTERNSHIP REPORT

AT

RAJIV GANDHI CANCER INSTITUTE AND RESEARCH CENTRE, NEW DELHI

Rajiv Gandhi Cancer Institute and Research Centre

(April 18th to June 17th, 2022)

A Report on

Adoption of Clinical Workflow and Chemo Protocol Ordering

In Information Technology Department

By

Avinash Kaur Sodhi

PGDM (Hospital and Health Management)

2021-2023

IIHMR DELHI

International Institute of Health Management Research, New Delhi

ACKNOWLEDGEMENT

I'm grateful for the chance to complete my summer training at the Rajiv Gandhi Cancer Institute and Research Centre at Delhi in information technology department. First of all, I would like to thank Dr. Sumesh Kumar for his unwavering support and counsel, which were invaluable in helping us complete the report.

I am grateful to thanks MR. JP Dwivedi (CIO) for giving me this opportunity to learn hands on practice on HIS system of RGCI as an intern, Rohini and involving me in the project. I would also express my thanks to Mr. Deepak Rathore (AGM), Mr. Virendra Sharma (Senior Manager), Mrs. Sarita Kumari (Programmer), Mr. Himanshu Saini (software developer) for helping me and guiding me throughout my internship. I want to express my gratitude to Dr. Juhi Tayal for helping me to comprehend how the LIMS software works.

I would really like to express my gratitude towards my parents, seniors, for their kind cooperation and encouragement and constant guidance which help in completion of this project.

Thank you

Avinash Kaur Sodhi

CERTIFICATE

Rajiv Gandhi Cancer Institute and Research Centre

Ref: HR/22 **20/06/2022**

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Avinash Kaur Sodhi**, from IIHMR Delhi, has completed her internship on the topic of **'Adoption of Clinical Workflow and Chemo Protocol Ordering'** in the department of **Information Technology** from **18th April 2022 to 18th June 2022.**

During the above period, her performance was good.

We wish her all the best for her future endeavor.

Jeevan Singh
Manager -HR

J.P Dwivedi
Chief Information Officer

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FEEDBACK FORM

FEEDBACK FORM

(Organization Supervisor)

Name of the Student: Avinash Kaur Sodhi

Summer Internship Institution: Rajiv Gandhi Cancer Institute & Research Centre

Area of Summer Internship: IT

Attendance: 98%

Objectives met: Yes

Deliverables: Took the part in various activities of running Projects. Learned the workflow, processes, and application features. Actively involved in support for IT issues and requirements.

Strengths: quick learner, soft spoken, IT savvy, positive attitude, ability to deliver the assigned task on time.

Suggestions for Improvement: There is always a scope for improvement for every professional person, my suggestion would be She should take initiatives and confidently showcase her skills.

Signature of the Officer-in-Charge (Internship)

17/6/22

Date: 17/June/2022
Place: Rohini, Delhi

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ABBREVIATIONS AND KEYWORDS

- **HIS**- Hospital Information System
- **HMIS**- Hospital Information Management System
- **EMR**- Electronic Medical Record
- **CPRS**- Computerized Patient Record System
- **IP**- In Patient
- **OP**- Out Patient
- **LIS**- Lab Information System
- **HBCR**- Hospital based cancer registry
- **LIMS**- Laboratory Information management system
- **AN**- Antineoplastic medicine

ABOUT THE ORGANISATION

Rajiv Gandhi Cancer Institute & Research Center (RGCIRC)

RGCIRC is based in Rohini, Delhi. This is a non-profit medical and research institute. This hospital is specialized in Cancer treatment and its research. It offers tertiary care services in surgical, medical and radiation oncology. The Specialists in RGCIRC performs Organ specific multi-disciplinary practice for diagnosis of cancer and its treatment, tumor board acting as a second opinion clinic for those cases that are much more critical the others.

The RGCIRC has a current bed capacity of 500 and is spread out over an area of about 2 lakh square feet. Three levels and 57 consultation rooms comprise the RGCIRC's outpatient services, which also include a well-constructed radiation therapy area. It contains a surgical ICU with 51 beds and a medical ICU with 21 beds. It has a separate Thyroid Ward as well as a Leukemia Ward. Additionally, it offers a bone marrow transplant service that is independent and is recognized as the first MUD transplant. The RGCIRC offers supportive services like EBUS and endoscopic ultrasound as well as renal replacement treatment.

This hospital is dedicated to providing its patients with significant advantages of cutting-edge technology. In addition to whole-body robotic surgery, intraoperative brachytherapy, true beam radiation therapy, high frequency ultrasound, Tom synthesis, the first 3D mammography machine, nucleic acid testing (for the safest blood possible), and advanced diagnostic & imaging techniques like PET CT, circulating tumour cell testing, and next-generation sequencing, RGCIRC offers the best techniques available. For use in clinical and scientific settings, the institute has established a tissue bank.

KEY LEARNING DURING INTERNSHIP

- Understanding the Flow of Work in RGCI&RC.
- Understanding the Workflow of different Projects running in the Institute.
- Understanding how to "implement" the changing requirements of changing generation in the system.
- Understanding the work of a Tester
- How the live issues are faced by the end users and how these are fixed
- Understand about HBCR and onco collect how they help in clinical research
- Learn about US based software LIMS and its working in biorepository lab
- Help the doctors in adaption of clinical workflow in systems.

VISION MISSION AND VALUES

VISSION

To prevent and treat cancer by providing affordable oncology care of international standards in India.

MISSION

To continue ranking among India's top two charitable cancer hospitals.

Offering all-inclusive services at a fair price, from prevention through palliation.

Based on the essential ideals of excellence, compassion, ethics, and universal respect.

VALUES

Patients who have undergone diagnostic and therapeutic treatment are always held in the highest regard at the Rajiv Gandhi Cancer Institute & Research Centre. The management, consultants, resident's physician, medical and paramedical personnel, and employees of the supported services are all encouraged to work together, respect one another, and have confidence in one another. Transparency, accurate diagnosis, appropriate treatment, and appropriate patient advice.

INTRODUCTION

An effective Electronic Health Record (EHR) system provides an integrated patient- centric care delivery system Rajiv Gandhi Cancer Institute and Research Centre in Delhi successfully implemented and is currently working on HER, Hospital Information System (HIS), Picture Archiving and Communication System (PACS), Laboratory Information Management System (LIMS), and a few other software programmes in accordance with the needs of various departments.

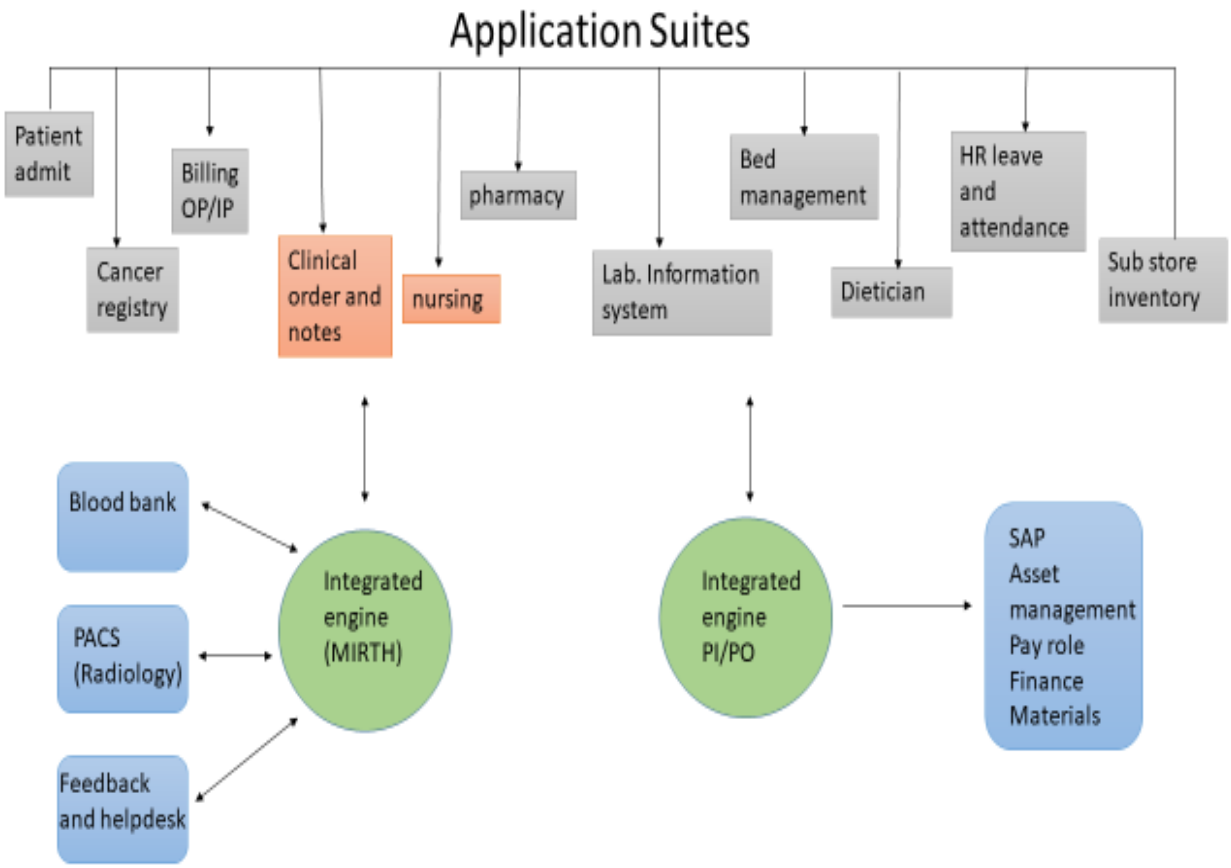
RGCI use the PARAS software which is implemented by Srishti Software Application pvt. Ltd. Banglore. A patient-centered, comprehensive, and integrated healthcare delivery platform, PARAS complies with the best operational and clinical procedures. Through the use of completely integrated enterprise-class technologies, PARAS provides all aspects of patient care. All different types of healthcare providers, such as hospitals, clinics, laboratories, daycare facilities, and diagnostics, can use it. This aids in building a hospital that is entirely paperless and filmless, can operate profitably, and can compete in the market.

During summer training I got the opportunity to work with IT department of RGCI, Rohini with the objective to learn how IT supports various processes of different deartment with main main focus on chemo flow and chemo protocol creation along with that I understand the different parts of HIS module such as patient registration, appointment booking, laboratory information system, Nurse module, Dite module, Discharge summary etc. which works at different level from entry to exit of the patient and how it contribute in the paperless work of the hospital. Got the opportunity to improve marketing skills by giving the demonstration to newly joined doctors about Clinical workflow how they can entered paperless prescription on system.

Also worked on two softwares HBCR and onco collect which help in the systamatic collection of the malignant cases and consolidate the data which further help in the epidemiological and clinical based research in Cancer.

Learn about the LIMS (Laboratory Information Management System) it is an US based software which help to reduce manual activities in order to increase lab productivity, quality control, and accuracy.

SERVICES PROVIDED AT RGCI



OBJECTIVE OF THE STUDY:

To study the role of HIS in providing paperless clinical work.

To study and understand process of chemo flow process in RGCI -RC.

To analyze the steps involved in chemo protocol creation and how it created through backend.

PURPOSE OF THE STUDY:

The purpose of the study is to find the answers to the questions through application of paras for chemo flow. The main aim of the study is to find out the problems with the chemoprotocol creation through paras and how to solve that problem.

SCOPE OF THE STUDY:

The scope of this project was to analyze the steps involved in the chemo flow and creation of chemo protocol from I.T department of RGCI-RC, errors involved and how to rectify those errors.

METHODOLOGY

Study Area: Rajiv Gandhi Cancer Institute & Research center , Rohini

Study Design: observational

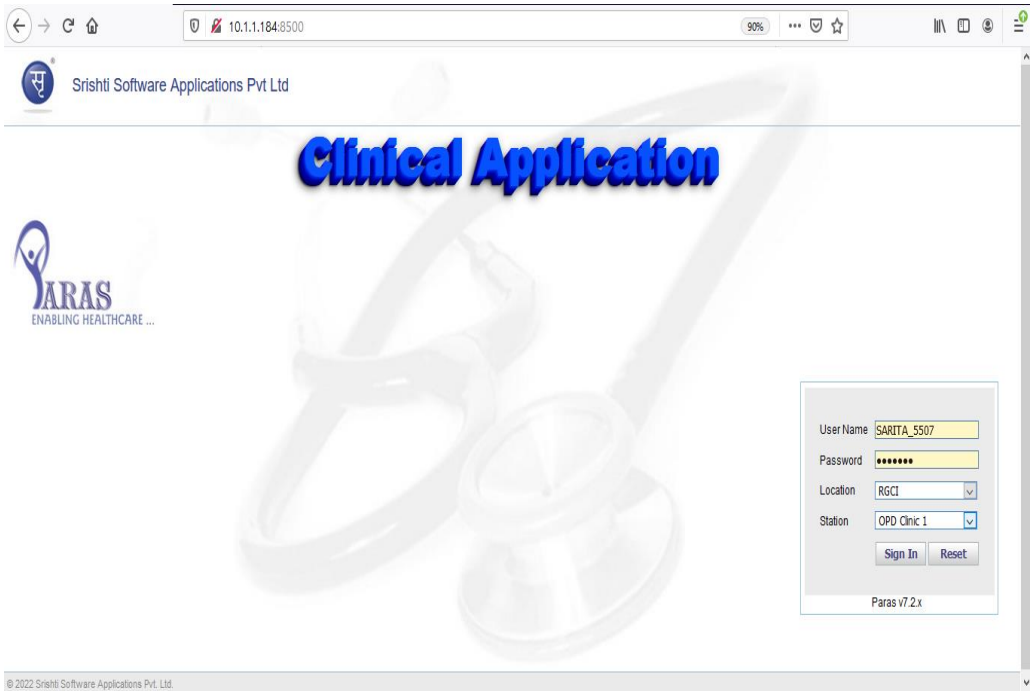
Observation was done during the beginning of the internship along with practical hands on experience was gained while working on the PARAS application to understand the complete process. The working of the application was explained by AGM I.T Department and followed working of system.

Period of Study: 8 weeks

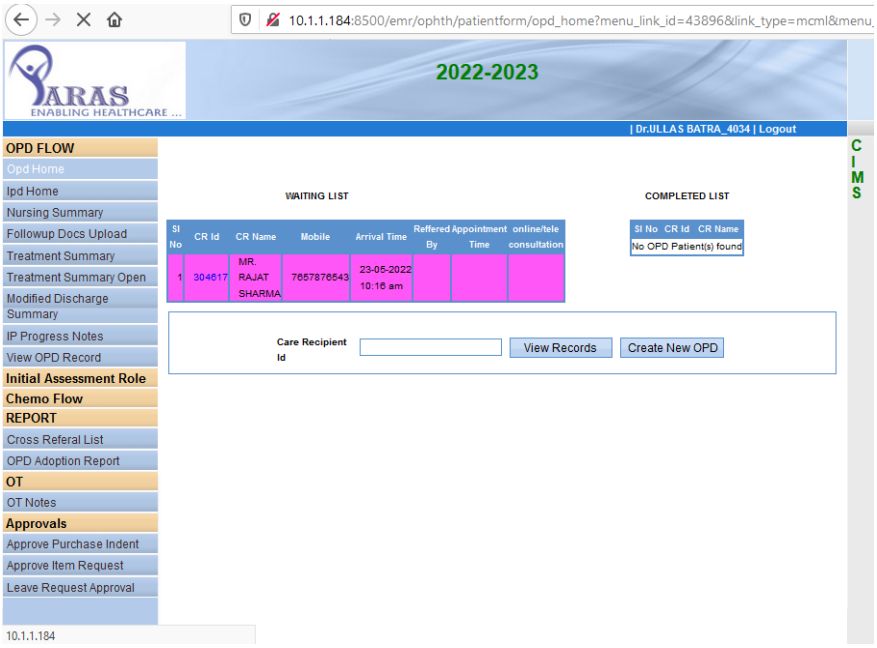
CLINICAL WORKFLOW

Clinical-Level Workflow: is the workflow of electronic or paper information related to the patient's healthcare, within a clinical practice, or in general the workflow between professionals as nurses, doctors and patients as well. It is basically an online summary of a patient's medical history and key health information, that gives doctors access to medicines prescriptions, diagnostic imaging reports, allergies, pathology reports, previous medical history and surgeries of a given patient. All information is accessible in a safe and secure way and is interconnected so that every clinic, pharmacy, physician, and emergency room can timely and promptly access what is needed.

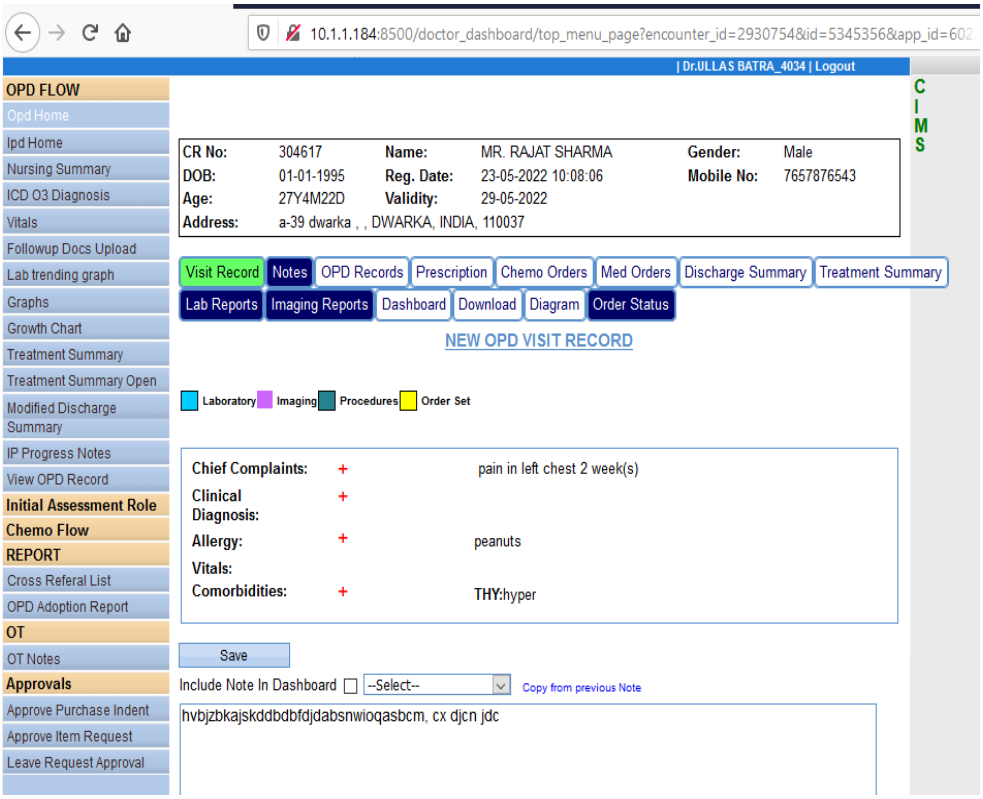
1. **Patient registration**- At first the user will do New Registration of the patient. If the patient is follow-up, then registration and booking step will be skipped. After registration.
   Patient have to pay Doctor consulting fee
   A CR number is generated for the new patient and after that user will do the appointment scheduling according to the vacant slot for a particular doctor.
   All the waiting patient booking list will appear on the doctor's clinical screen.
2. **Doctor's Role-** Now the doctor entered the patient's CR number on the clinical screen here a screen will be shown on which doctor can add vitals, allergy, diagnostic type, comorbidities, clinical note, chemo orders, diagram to indicate or highlight pain, tumour site, Doctor can access lab reports etc.
3. **Patient's prescription is** ready now doctor will save and sign and command for print prescription



1. **Clinical login screen at Doctor's end**



2. Patient's waiting list appear on screen



3. screen where doctor feed patient's vitals and prescription

CHEMO MODULE

chemo process-

1. **Patient registration**- At first the user will do New Registration of the patient. If the patient is follow-up, then registration and booking step will be skipped. After registration, booking of the patient will be done, in OPD Consultation.

   An **OPD Card** of the patient is generated. Now with that OPD card the patient will visits the doctor.

2. **Visit to the doctor**- After consulting to the Doctor, based on observations prescription will be done for starting up treatment, as per that Billing of the patient is done i.e., whether the **OP Billing** will be done or IP Billing the patient is required to be done.

   For Chemo treatment, the patient needs to get admitted.

   So**, New Admission** of the patient will be done.

3. **Doctor's Role-** Now the doctor will process **Chemo order care plan** to the patient for the particular Protocol.

4. **Nursing Role**-senior nurse station in charge will release medicine by conforming with doctor after that nurse will give indent,

5. Pharmacist will do **Drug Dose strength mapping**- In Drug Dose Mapping, Strength of the drugs are mapped with available strength, stock in pharmacy.

   After **Strength Validation**, Nurse precede indent for the medicines to the resp. pharmacy and approve the same to send.

6. **Pharmacy Role**- Now the Pharmacy will process chemo medicine process.

   Chemo medicine process includes

   Chemo batch validation (where pharmacy will validate batch of medicine with the batch of pharmacy).

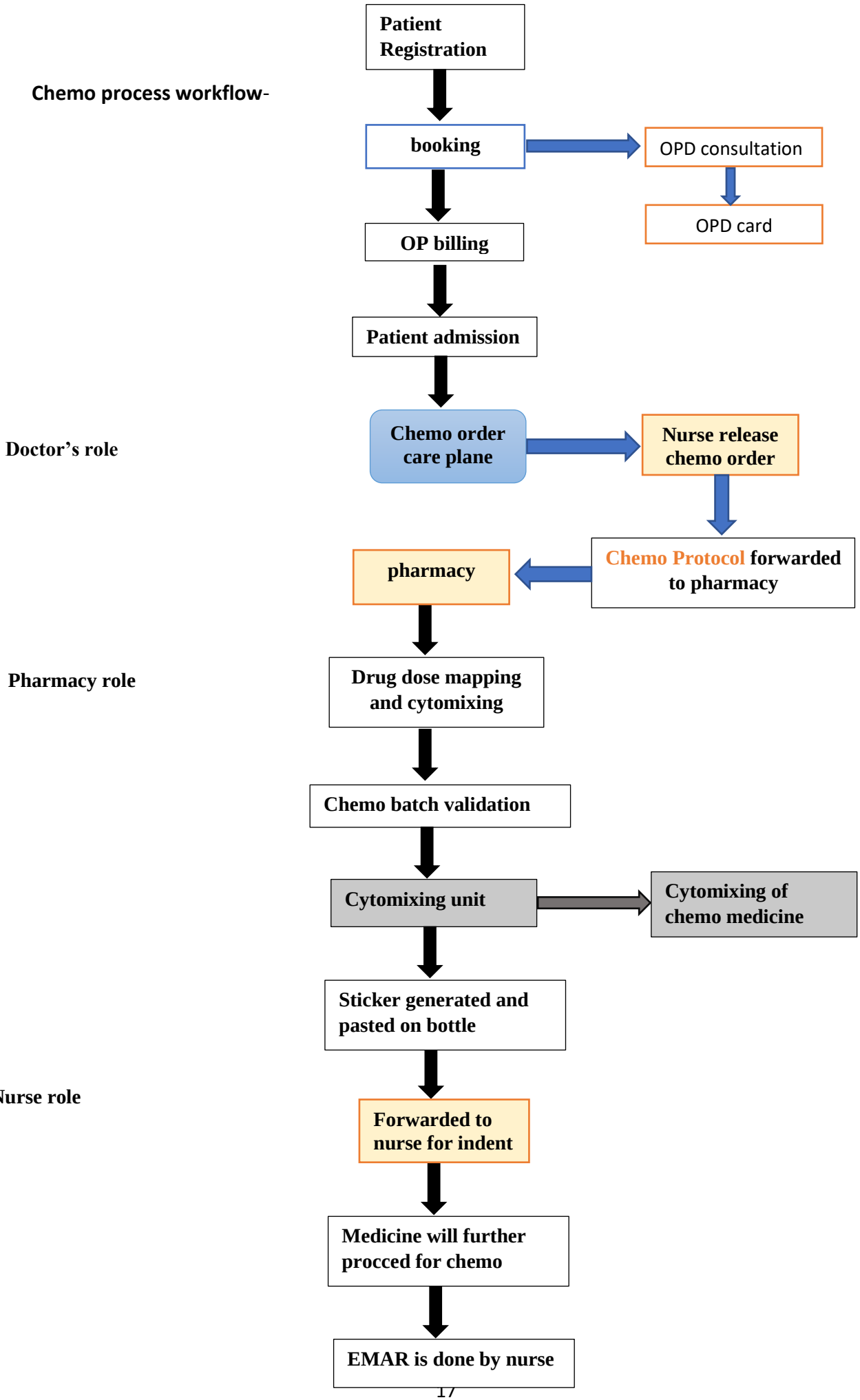
   After that process, **Cytomixing** process starts. Here the Cytomixing staff decides and feeds the volume of medicines to be mixed as described in the protocol, which will be given to the patient during the treatment.

   After that **Cytomixing signing** is done. **Sticker** will be generated, which will be pasted on the medicine bottles

7. Now the Nurse will start **EMAR treatment.**

   EMAR- Electronic Medication Administration record- In EMAR, details of the dosage which will be given to patient is written. At the time nurse started the chemo medicine infusion will note down the timing of medicine infusion, duration for medicine and stopping up time. If any complication gets happened to the patient and medicine need to be halted or stopped completely then those timings are also noted by the nurse. On the basis of these noted timing **TAT** will be calculated for the protocol

Chemo process workflow-



CREATION OF CHEMO PROTOCOLS

Defining the medications to be used, their dosage, the frequency and length of treatments, and other factors, a chemotherapy protocol is a regimen for chemotherapy. It is required to treat a certain type of cancer.

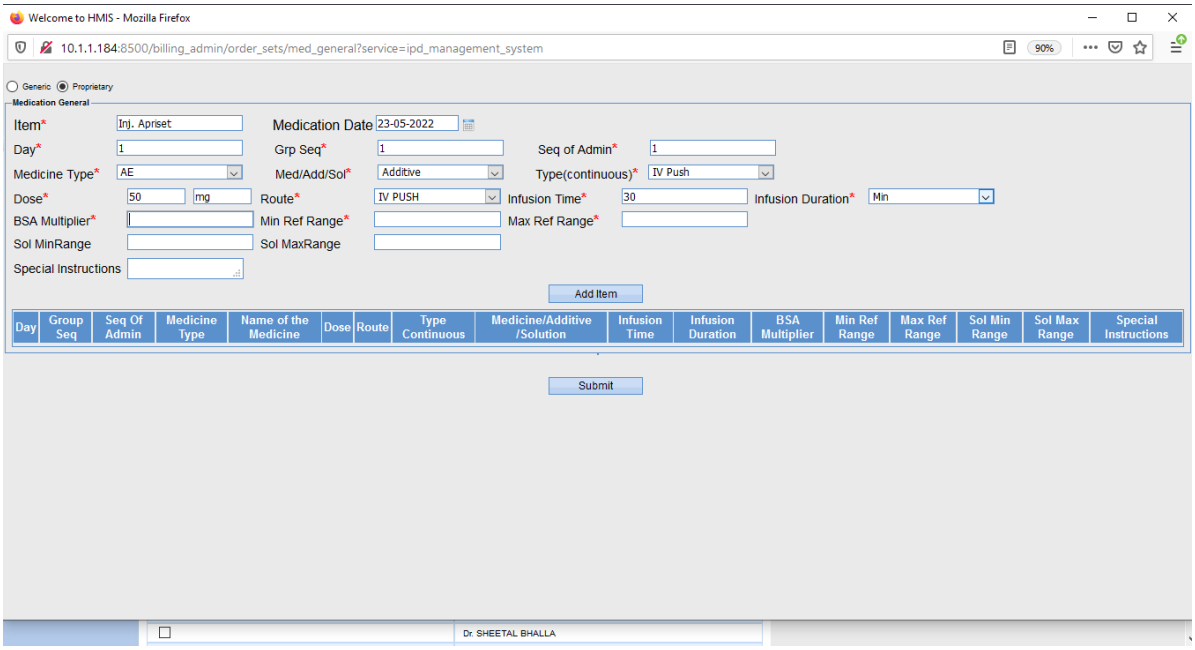
Chemo protocols generated manually in a system through backend which reduce the chances of error

Process of chemo protocol creation in system-

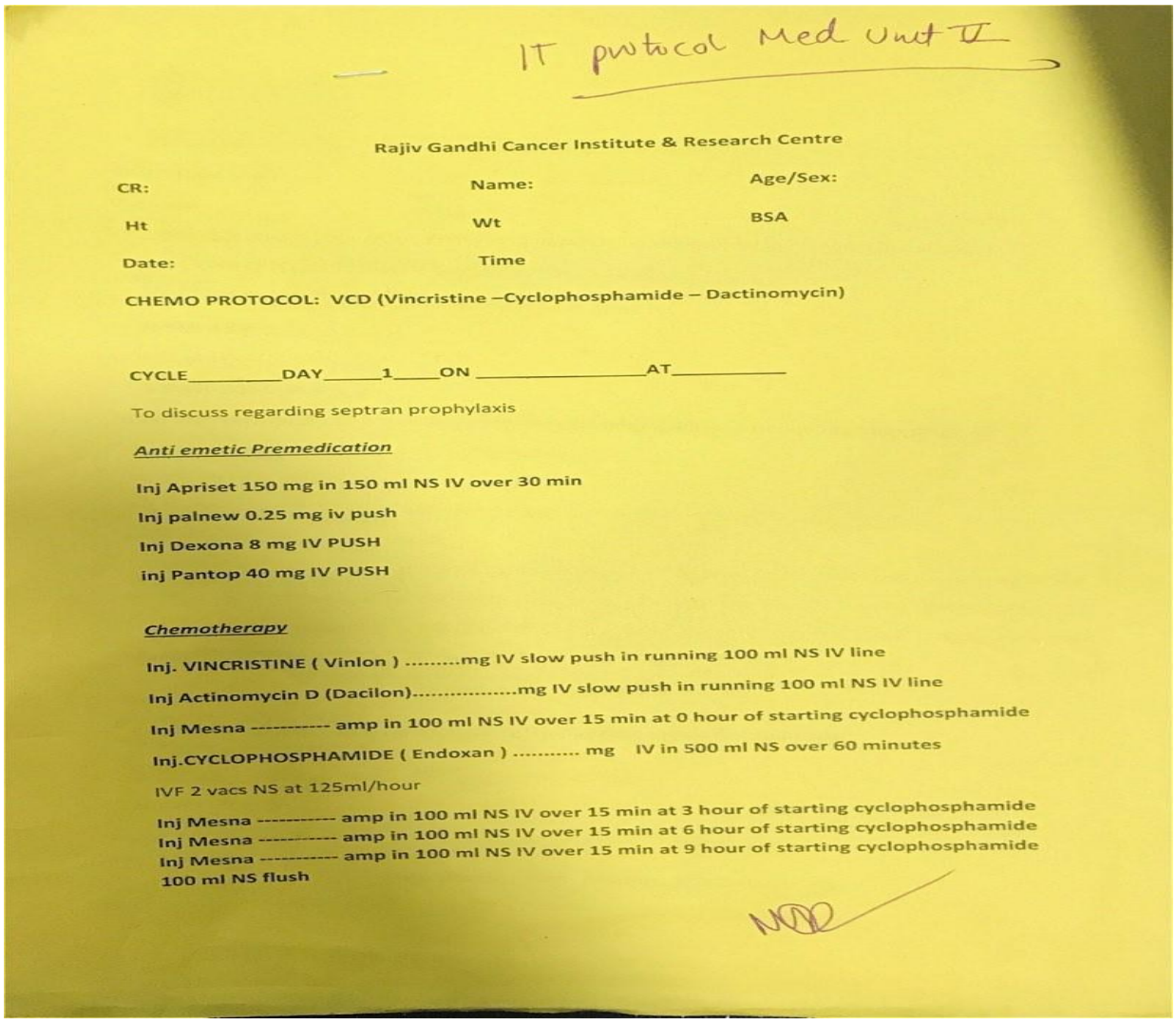
Chemo Protocol Masters

1. In protocol masters, there is a provision to create a protocol (list of items) with chemo day, chemo group sequence, sequence of administration etc. which help in reduce the chance of error.
2. After creating a protocol, that protocol can be made as clinician specific.
3. Upon editing the protocol, authorization is given only for particular users to edit the ranges. (minimum reference range, maximum reference range, bsa multiplier, solution minimum range and solution maximum range).
4. Based on height and weight entered BSA will calculate automatically based on below formula
   BSA Calculation – sqr (Height[cm] * Weight[kg] / 3600)
   There is a button “Dose Calculation”. "Antineoplastic medicine (AN) dose is based on BSA. For AN type medicine dose will be calculated as (bsa-multiplier * BSA), which will be used to calculate the dose during chemo order.

5. chemo protocol is generated from back end in the system, a prior protocol is given by senior doctors through which we generated a new protocol in system.
6. On the screen we have to added injection or tablet name, day sequence, medicine type (AE, AN, pre, post), route (intravenous), infusion time, dosage, special instructions etc.
7. After that click on the add items, similarly all chemo medicine will be added.
8. Then click on the submit button
9. Select the doctor name from which protocol is ordered and finally save it.
10. Now this protocol is saved on the system and doctor can prescribe this chemo protocol to the patient from their clinical screen.



1. **Protocol creation screen**



2. **Raw Protocol which form by doctor's end and send at IT dept.**

Protocol Name: A FOLFOX - 6(Med-5)
CYCLE 1 DAY 1 ON 13-03-2019 12:24

View C
Record

1. Cap. Aprecap.(Cap Aprepitant) 125mg oral

2. Inj. Emeset(Inj Ondansetron) 8mg + Inj. Dexona(Inj. Dexamethasone) 8mg in NS(Sod. Chloride) 100ml intravenous over 30Min

3. Inj. Bevatas(Inj Bevacizumab) mg in NS(Sod. Chloride) 100ml intravenous over 40Min

4. Inj. Oxiplat(Inj Oxaliplatin) mg in 5 Pct Dextrose(Dextrose 5%) 500ml intravenous over 120Min via CLAVE CONNECTOR

5. Inj. Biovorin(Inj. Leucovorin Calcium) mg in NS(Sod. Chloride) 500ml intravenous over 120Min via CLAVE CONNECTOR

6. Inj. Fluracil(Inj 5-Fluorouracil) mg in NS(Sod. Chloride) 100ml intravenous over 30Min

7. Inj. Fluracil(Inj 5-Fluorouracil) mg in NS(Sod. Chloride) 1000ml intravenous over 24Hrs

8. Inj. Fluracil(Inj 5-Fluorouracil) mg in NS(Sod. Chloride) 1000ml intravenous over 22Hrs

9. NS(Sod. Chloride) 100ml intravenous over 30Min

CYCLE 1 DAY 2 ON 14-03-2019 12:24

1. Cap. Aprecap.(Cap Aprepitant) 80mg oral

Remarks:

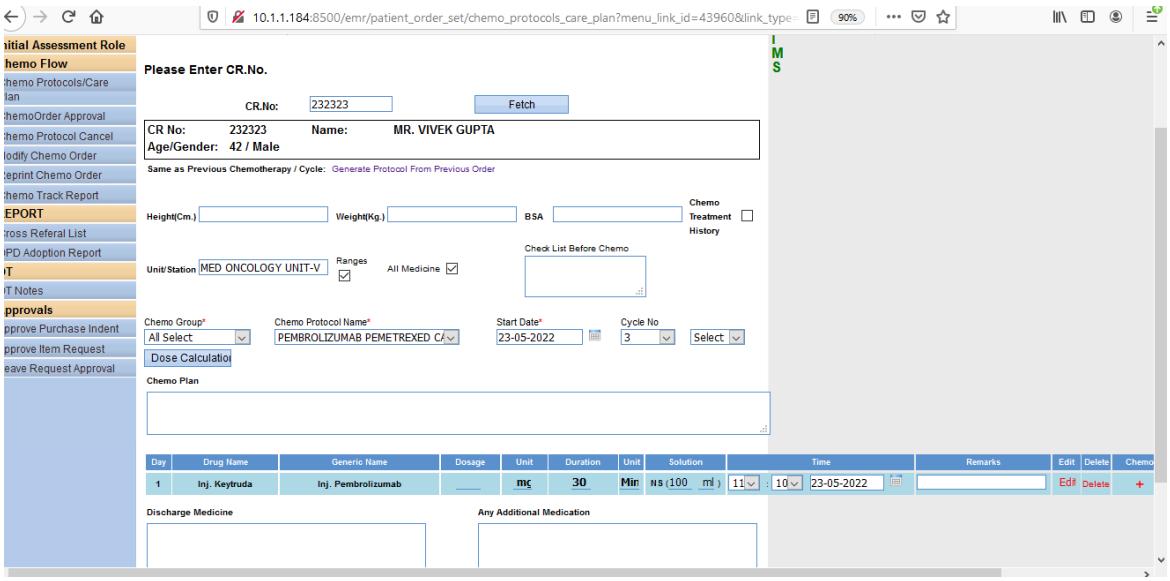
Prepared By:**AKDEWAN_7124**

Signed By:

Activ
Go to

Edit Order | Sign | Reject Order

3. Protocol generated in the system



4. Doctor can access and command for specific chemo protocol from their clinical screen.

GENERAL FINDINGS

MAJOR FACTORS AFFECTING THE FUNCTIONING OF THE PROGRAMME:

Although electronic records have the potential to change the health care system from one that relies primarily on paper to one that makes use of clinical and other types of information to aid physicians in providing patients with a larger volume of treatment.

Financial concerns, including as adoption and implementation costs, ongoing maintenance expenses, revenue losses linked to temporary productivity losses, and revenue decreases, create a barrier for hospitals. Investing in and setting up hardware and software, converting paper charts to electronic ones, and instructing end users are all included in the adoption and implementation expenses.

disruption of medical providers' and staff's work processes, which will cause momentary productivity losses. Because end users are still getting used to the new system, there will be a decrease in productivity, which could result in revenue losses.

There are frequently fewer duplicates and inaccuracies in electronic records.

Due to the growing amount of health information transferred electronically, patient privacy violations are another possible negative of electronic records. To allay some of these worries, regulators have taken steps to safeguard the safety and privacy of patient data.

errors brought on by poor end-user instruction.

IMPLICATIONS FOR CLINICAL PRACTICE AND RESEARCH

A chemotherapy plan recognition method can have several clinical uses. Within clinical systems at point of care, the output of this method can assist providers the clinical task of treatment plan abstraction by providing a summary of the patient's treatment history .

This could also be used for outcomes databases and comparative effectiveness research by providing information on the therapies and transitions in therapies for a patient population.

LIMITATIONS

Though data driven approach has its advantages, it does not come without its limitations. To recognize a plan, this method relies on repetition of pattern – be it a single drug (for simple plan) of a group of drugs (for compound or complex plans). For compound plans (where a sequenced group of drugs itself repeats temporarily), if a group of drugs occurred only once, the pattern did not recognize the group as a single plan. Due to this and a few data-errors the method did not detect majority of the complex plans, especially in the smaller sets.

CONCLUSION

New chemotherapy protocols continue to be developed and evaluated everyday requiring a flexible and easy extensible method for chemotherapy plan recognition. existing flowsheet methods of presenting chemotherapy data in the EHR do not sufficiently provide an abstract representation of the patient's treatment history. We believe an automated data -driven method for chemotherapy plan recognition could provide useful output for both clinical and clinical research uses.

SUGGESTIONS FOR IMPROVEMENT

Preserving the data privacy of patients. imposing severe, zero-tolerance sanctions on staff members who improperly access files.

End users need to receive thorough training, and periodic refresher sessions are necessary.

REFERENCES

https://www.rgcirc.org/about-rgcirc/

Manuals from the I.T department

Manuals from Srishti Software, Banglore