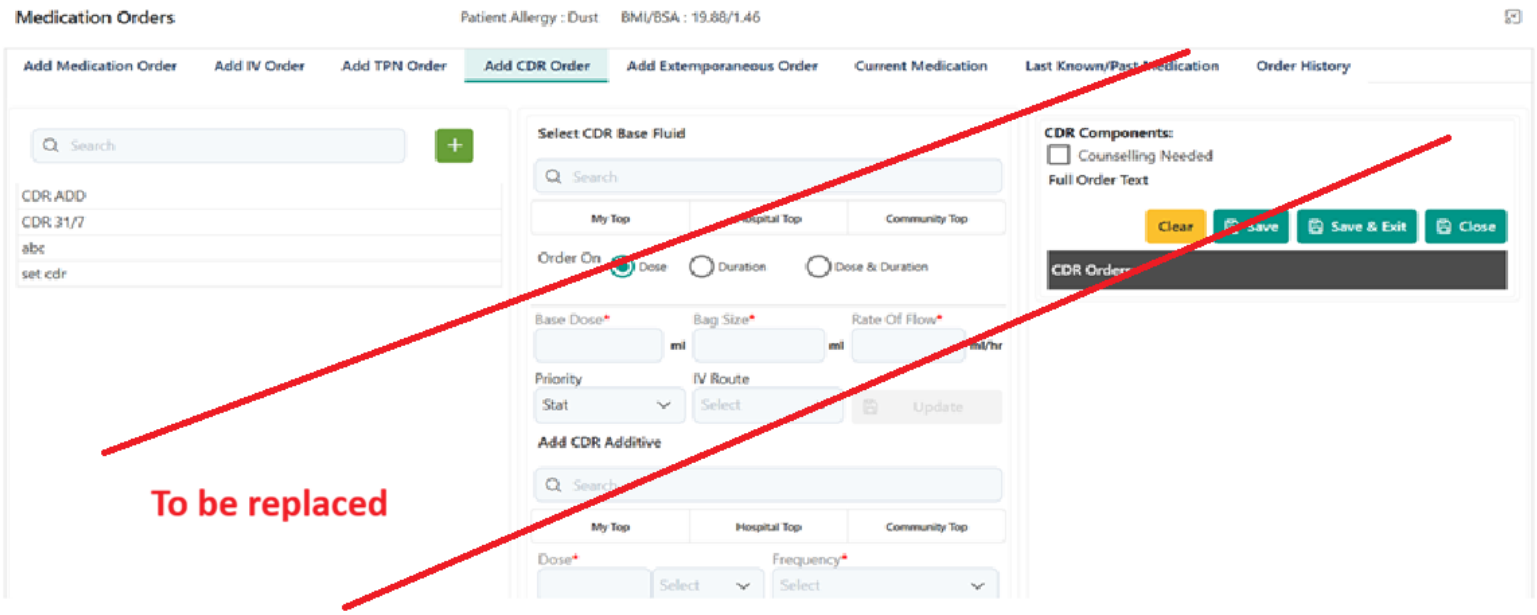
Wireframes for CDR (Cytotoxic Drug Reconstitution)

Introduction

"The Current Order Screen for CDR in CliniCare has not been developed according to the specified requirements. As a result, it is not functional and must be redeveloped."

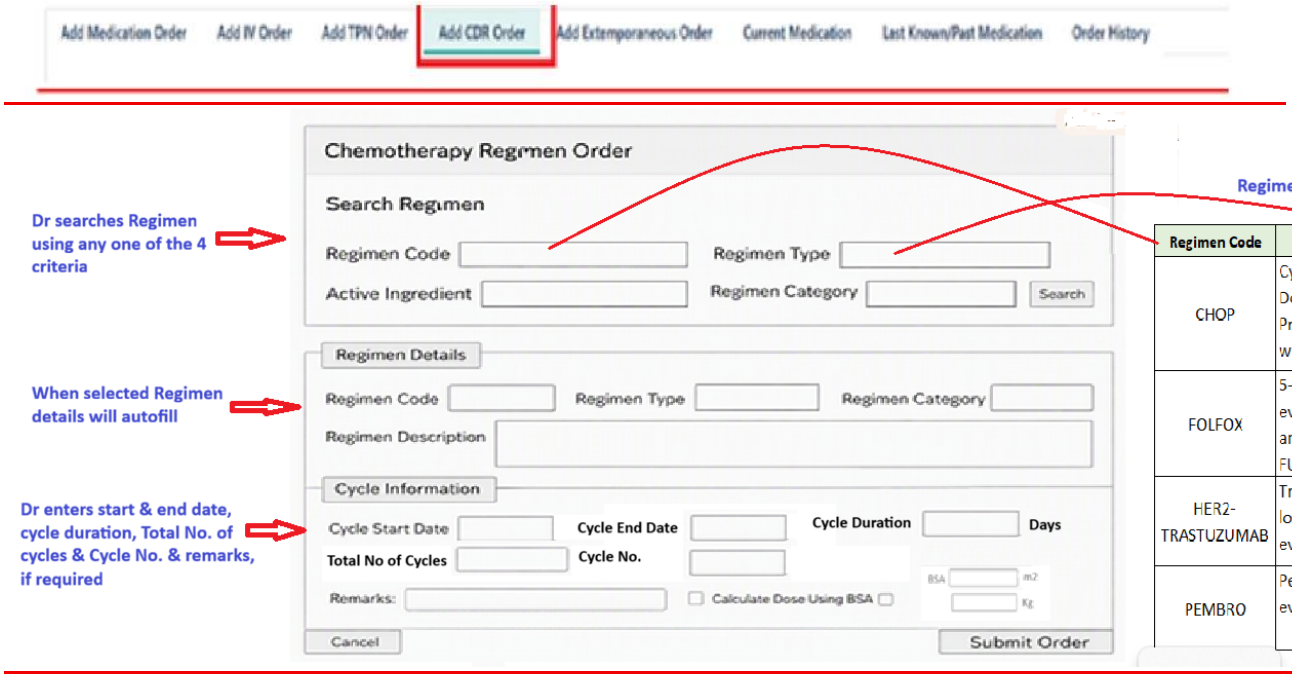


How CDR Is Ordered

1. Clinician (Dr) enters chemotherapy (CDR) prescription order in CliniCare
2. Pharmacist verifies and validates the order in MedCare.
3. Pharmacist then prepares the cytotoxic drugs according to strict safety protocols before dispensing.

Suggested New Order Screen for CDR.

Wireframe 1 (CliniCare)



Regimen for Dr to select, when any of the search criteria is selected

Regimen Code	Regimen Description	Regimen Type	Regimen Category	Select
CHOP	Cyclophosphamide + Doxorubicin + Vincristine + Prednisone, every 21 days, with prednisone taken orally	Combination Chemotherapy	Curative	
FOLFOX	5-FU, Leucovorin, Oxaliplatin every 2 weeks, with both bolus and continuous infusion of 5-FU	Combination Chemotherapy	Adjuvant	
HER2-TRASTUZUMAB	Trastuzumab 8 mg /kg IV loading dose, then 6mg/kg IV every 3 weeks for 1 year	Targeted Therapy	Adjuvant	
PEMBRO	Pembrolizumab 200mg IV every 3 weeks	Immunotherapy	Palliative	

CDR Regimen Dropdown for selection – must enable user to set up various regimen.

Regimen Code	Regimen Description	Regimen Type	Regimen Category	Select
CHOP	Cyclophosphamide + Doxorubicin + Vincristine + Prednisone, every 21 days, with prednisone taken orally for 5 days	Combination Chemotherapy	Curative	☐
FOLFOX	5-FU, Leucovorin, Oxaliplatin every 2 weeks, with both bolus and continuous infusion of 5-FU	Combination Chemotherapy	Adjuvant	☐
HER2-TRASTUZUMAB	Trastuzumab 8 mg /kg IV loading dose, then 6mg/kg IV every 3 weeks for 1 year	Targeted Therapy	Adjuvant	☐
PEMBRO	Pembrolizumab 200mg IV every 3 weeks	Immunotherapy	Palliative	☐

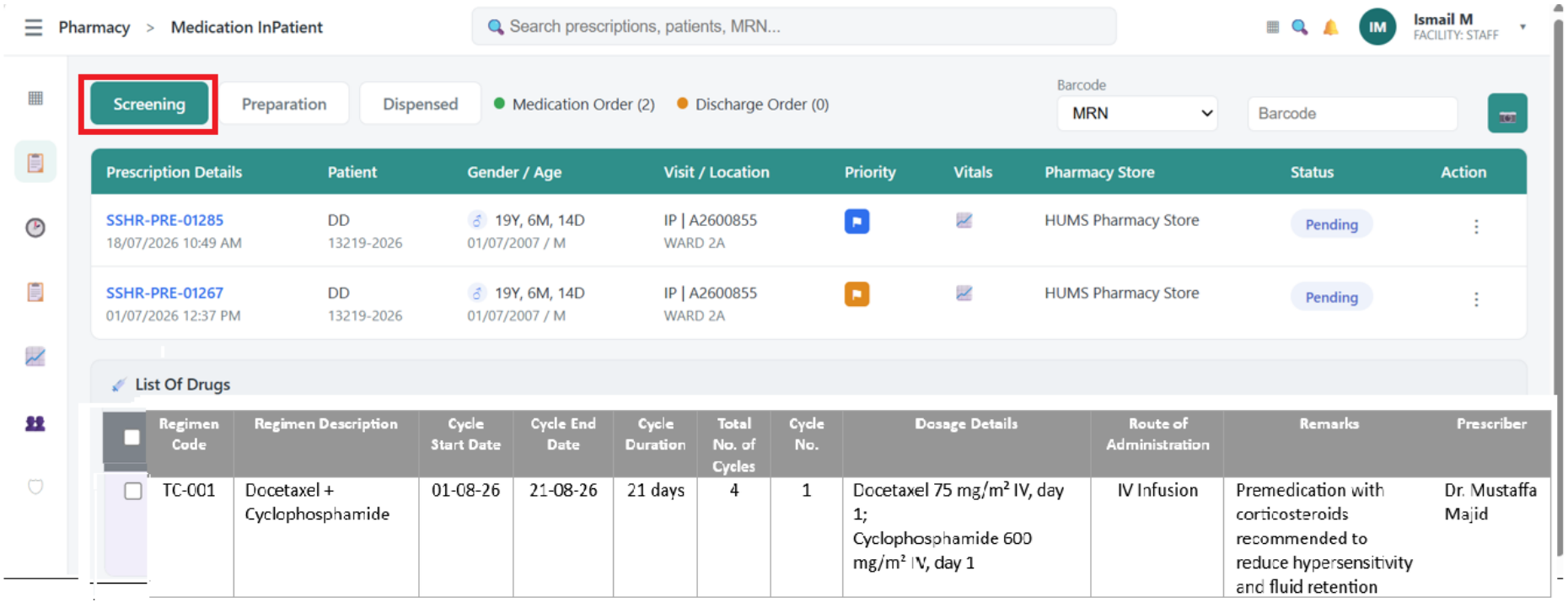
Use case:

1. Dr. clicks on “Add CRD Order” Tab
2. Dr. “Search Regimen” by clicking on any of the search criteria, such as “Active Ingredient, Regimen Category, Regimen Type, or Regimen Code”
3. A dropdown list will be available for selecting the required Regimen.
4. Once the required Regimen is selected, relevant details will auto-fill the**: Regimen Order Details.**
5. Dr enters Cycle Start & Cycle End Date
6. Dr enters Cycle Duration
7. Dr enters Total number of Cycles & Cycle Number

8. Dr. save (submit) order & exit
9. Ordered item will flow to Pharmacy module.

Wireframe 2 (MedCare)

At the Pharmacy: Screening



Use case (MedCare):

1. Pharmacist receives order from doctor (CliniCare Medication Order → MedCare Screening)
2. Pharmacist clicks on "**Screening**" Tab to **verify** the order to ensure patient safety & treatment accuracy.
   The pharmacist would require access to the patient's case notes.
   Pharmacist Verification:
   - The prescribed chemo regimen is reflected in the MedCare Pharmacy Module.
   - The Clinical Pharmacist reviews the order for accuracy, appropriateness, and patient safety.
   - Checks include:
     - Confirm regimen code and description match the physician's order.
     - Check cycle number, start/end dates, and total cycles against the treatment plan.
     - **Patient-Specific Checks -** Verify patient identifiers (name, MRN, age, weight, height).
     - Review allergies, comorbidities, and concurrent medications.
     - **Dosage validation:** Correct drug and dose based on body surface area (BSA).
       Pharmacist must ensure each drug dose is appropriate for the patient's BSA/renal/hepatic function.
     - Compatibility with other medications.
     - Timing and cycle of chemotherapy - Confirm cycle duration and interval (e.g., 14-day, 21-day).
       Check includes sufficient recovery time from prior cycle (blood counts, organ function).
   - If discrepancies are found, the pharmacist contacts the prescriber for clarification.

3. **Preparation (Reconstitution)**
   - Once verified, the pharmacist approves the order. The order is assigned to the **CDR preparation workstation** for aseptic preparation.
   - The patient's demographic details and drug regimen name should auto-fill the CDR worksheet.
   - The required labels are subsequently printed.

   NOTES:
   - Cytotoxic drugs are reconstituted in a **controlled environment (biosafety cabinet/sterile room)**.
   - Strict **aseptic technique** and **personal protective equipment (PPE)** are mandatory for the pharmacist who prepares the medication.

4. **Dispensing**
    - The prepared drugs are **labelled with patient details, drug info, and handling instructions**.
    - Then the drugs are dispensed (supplied) to the oncology ward or clinic for administration.
    - Documentation must be completed in the PhIS (Pharmacy Information System) for traceability and compliance with oncology treatment standards.

Work Process: Prescription -> Screening -> Preparation -> Dispensing of CDR

1. Doctor prescribes CDR regimen ->
2. Pharmacist screens (verifies) the prescription →
3. Pharmacist calculates dose based on patient's BSA (e.g., 1.8 m^2 → 1350 mg) →
4. Pharmacist checks/validates the following for patient safety:
    - Allergy history.
    - Drug dose is appropriate for the patient's BSA/renal/hepatic function (if normal, no adjustment is needed) →
    - Compatibility with other medications.
    - Timing and cycle of chemotherapy
    - Cycle duration and interval (e.g., 14-day, 21-day).
5. Pharmacist assigns CDR order to workstation.
6. Pharmacist (usually a clinical pharmacist) prepares the medication
7. Pharmacist labels the prepared the CDR medication
8. Pharmacist dispense (release) the CDR medication to the Oncology Ward for administration.
9. Pharmacist documents the completion of the task.

System requirement:

There should be a Master Setting in the system (to be visible in both CliniCare & MedCare PhIS) to set up the CDR Regimen for

Dr's selection during ordering

S/No.	Regimen Code	Active Ingredient (Cytotoxic Drugs)	Cycle Frequency	Route of Administration	No. of Cycles	Duration	Indication	Remarks
1	FOLFOX-6	Oxaliplatin, Leucovorin, 5-Fluorouracil	Every 2 weeks	Intravenous	12 cycles (may vary between 8–12 depending on patient tolerance)	16–24 weeks (≈4–6 months)	Colorectal Cancer	Duration depends on tolerance and response
2	CHOP	Cyclophosphamide, Doxorubicin, Vincristine, Prednisone	Every 21 days	Intravenous	6–8 cycles (depends on stage and response)	18–24 weeks (≈4.5–6 months)	Non-Hodgkin's lymphoma	Cycle count adjusted based on disease stage
3	TC	Docetaxel + Cyclophosphamide	Every 21 days	Intravenous	4–6 cycles (depends on stage, tolerance, and physician decision)	12–18 weeks (≈3–4.5 months)	Breast Cancer	Supportive care often required (e.g., steroids)

Dropdown for Active Ingredient, Regimen Category, Regimen Type, Regimen Code & Regimen Description

No	Subject	Definitions	Requirement / Master / Remarks
1	Active Ingredient	• Refers to the **specific cytotoxic drug** (e.g., cyclophosphamide, doxorubicin, cisplatin) that is being reconstituted. • It is the pharmacologically active chemical substance responsible for the therapeutic effect.	**Provide a search function for the specific cytotoxic drug**
2	Regimen Category	• A **broad classification** of the treatment regimen. • Examples: *Curative*, *Palliative*, *Adjuvant*, *Neoadjuvant*. • Indicates the **clinical intent** of the therapy (e.g., aiming to cure, control, or relieve symptoms).	**Provide a dropdown list for Selection** • Curative • Palliative • Adjuvant • Neoadjuvant
3	Regimen Type	• A more **specific grouping** within the category. • Examples: *Single-agent chemotherapy*, *Combination chemotherapy*, *Targeted therapy*, *Immunotherapy*. • Defines the **nature of the regimen** in terms of drug composition and therapeutic approach.	**Provide a dropdown list for Selection** • Single-agent chemotherapy • Combination chemotherapy • Targeted therapy • Immunotherapy

4	Regimen Code	• Refers to a **unique identifier** (often alphanumeric) assigned to a regimen for standardization and easy reference. • Example: *CHOP* (Cyclophosphamide, Doxorubicin, Vincristine, Prednisone) or *FOLFOX* (5-FU, Leucovorin, Oxaliplatin). • Used in hospital pharmacy systems and oncology protocols to avoid ambiguity.	• **Provide a search function to look for regimen code with hyperlink to regimen details** Example: CHOP (when clicked on hyperlink, clinician will see drug details such as, Cyclophosphamide, Doxorubicin, Vincristine, Prednisone
5	Regimen Description	• A **detailed explanation** of the regimen, including: ○ Drug names and doses ○ Schedule (e.g., Day 1, Day 8, every 3 weeks) ○ Route of administration (IV, oral, etc.)	• **To auto-populate from the Regimen Code,** as the code is the unique identifier that links to a predefined treatment protocol.

Verification Checklist:

Verification Checklist for CDR Orders:

S/No.	Item	Description	Check (√)
1	Verify patient details	• Confirm patient identity (name, MRN, age, weight, height).	☐
		• Ensure body surface area (BSA) calculation is correct.	☐
2	Check for prescription accuracy	• Verify drug name, dose, route, and schedule against the prescribed regimen.	☐
		• Confirm the order matches the intended chemotherapy protocol.	☐
3	Recalculate and validate dose	• Recalculate dose based on BSA or weight.	☐
		• Compare with standard dosing guidelines.	☐
		• Flag if dose exceeds maximum safe limits.	☐
4	Assess drug compatibility	• Screen for drug–drug interactions	☐
		• Check compatibility with diluents and infusion solutions.	☐
		• Ensure correct sequence if multiple drugs are ordered.	☐
5	**Confirm timing and cycle**	• Verify cycle number and treatment day	☐
		• Ensure dosing intervals align with the protocol.	☐

6	**Perform safety checks**	• Review allergy history	☐
		• Confirm renal/hepatic function is within safe limits	☐
		• Adjust dose if necessary for organ impairment	☐
7	**Review preparation instructions**	• Check reconstitution fluid, dilution volume, and infusion time	☐
		• Verify stability and storage requirements.	☐
8	**Document verification**	• Record pharmacist approval in PhIS.	☐
		• Note clarifications or adjustments discussed with prescriber	☐

This checklist provides pharmacists with a structured workflow to ensure chemotherapy orders are **accurate, safe, and compliant before preparation and administration.**

CDR Worksheet

1. **This worksheet should be hard-coded**
2. **The Prescription should auto-flow to the top portion of this worksheet after Screening for reference during preparatio**

CDR Prescription

Regimen Code	Regimen Description	Cycle Start Date	Cycle End Date	Cycle Duration	Cycle Count	Cycle No.	Cycle Frequency	Dosage Details	Route of Administration	Prescriber
TC-001	Docetaxel + Cyclophosphamide	01-08-26	21-08-26	21 days	4	1	21 days	Docetaxel 75 mg/m² IV, day 1; Cyclophosphamide 600 mg/m² IV, day 1	IV Infusion	Dr. Mustaffa Majid

Date of Preparation: 01-08-2026 **CDR Worksheet** **Worksheet No:** CDR 181/2026

Patient Details: James Bun / Male / 50 Y 10M 8D
NRIC No: 761005059811
MRN: HPUMS1882-2026

Prescription No: CDR 181

Order Location: Oncology Ward 3A
Bed No. 28
Ordered By: Dr Mustaffa Majid
Order Date: 30-07-2026

Preparation Name Drug/Diluent	Dose	Duration	Frequency	Route of Admin.	Material Used		
					Vol/Qty	Batch N	Expiry Date
Docetaxel +	75mg/m2	21 days	Once every 3 weeks	IV Infusion	75 mg	6822	12-10-2028
Cyclophosphamide	600mg/m2				600mg	4514	15-06-2029
Sodium Chloride 0.9% Inj.	250ml				250ml	2246	30-02-2027

Remarks: Store under Room Temperature

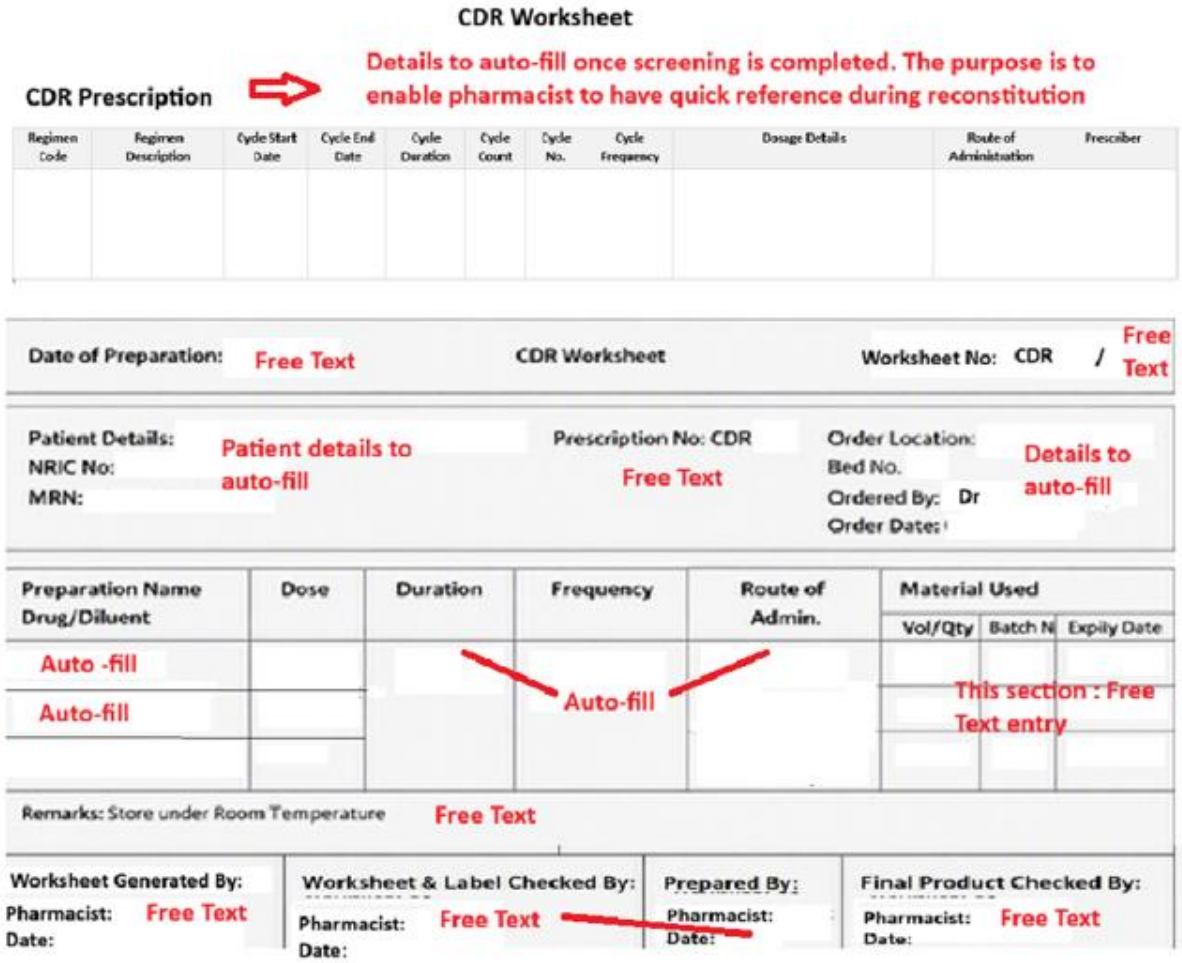
Worksheet Generated By:
Jennifer Lo,
Clinical Pharmacist
01-08-2026

Worksheet & Label Checked By:
Ali Baba,
Senior Pharmacist
01-08-2026

Prepared By:
Jennifer Lo,
Clinical Pharmacist
01-08-2026

Final Product Checked By:
Ali Baba,
Senior Pharmacist
01-08-2026

Blank CDR Worksheet



Sample CDR Label - The client may, however, specify their preferred size & design format for the label.

CDR Label

XYZ SPECIALIST HOSPITAL
28 Jln Raja Muda, Kuala Lumpur
Tel: 03-1188 2288

PatientName: James Bun
MRN: XYZSH10224-2026
Ward: Oncology Ward 3A
Bed No: 28

Cytotoxic Drug Reconstitution

Docetaxel 80mg Injection
Cyclophosphamide 600mg Injection
Sodium Chloride 0.9% Injection

To be infused over 1 hour

Storage:
Protect from light. Store in a cool and dry place
Date: 01-08-2026 **Time:** 11.30AM

Prepared By: Jennifer Lo, Clinical Pharmacist
Checked By: Ali Baba, Senior Pharmacist

Sample CDR Report

The report shall be submitted on a monthly basis.

MONTHLY CYTOTOXIC DRUG RECONSTITUTION (CDR) REPORT BY DIAGNOSIS, REGIMEN AND PRESCRIBER									
S.No.	**MRN**	**Name**	**Age**	**Gender**	**Ethnicity**	**Diagnosis**	**Regimen Code**	**Components**	**Prescribed By**
1	XYZSH10224-2026	Fatimah Idris	45	F	M	CA Left Breast	TC	Docetaxel + Cyclophosphamide	Dr. Arumugam
2	XYZSH10262-2026	Chee King Kong	44	M	C	Hodgkin's Lymphoma	ABVD	Doxorubicin (Adriamycin), Bleomycin, Vinblastine, Dacarbazine	Dr. Amy Tan
3	XYZSH10300-2026	Anjali Peters	52	F	I	CA Breast	TC	Docetaxel + Cyclophosphamide	Dr. Arumugam
4	XYZSH10311-2026	Mohamad Darus	70	M	M	CA Stomach	FAM	5-Fluorouracil (5-FU), *Adriamycin (Doxorubicin)*, and *Mitomycin-C*.	Dr. Mustafa Majid
5	XYZSH10318-2026	Leela Balakrishnan	70	F	I	Colorectal CA	FOLFOX	Folinic acid (Leucovorin) + 5-Fluorouracil (5-FU) + Oxaliplatin	Dr. Mustafa Majid

CP Chan
2026-07-06