

SAFE NCD CARE ACROSS CLINICAL PATHWAYS: ADDRESSING CO-MORBIDITIES

BUILDING A SAFER ONCOLOGY ECOSYSTEM

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Background and Context

70% fatality



Low - and Middle - Income
Countries (LMICs) including India

High Burden



Northeast states, including Assam
has high burden of cancer

Assam



Two Government treatment
centres against 34 million
population and is often
overburdened

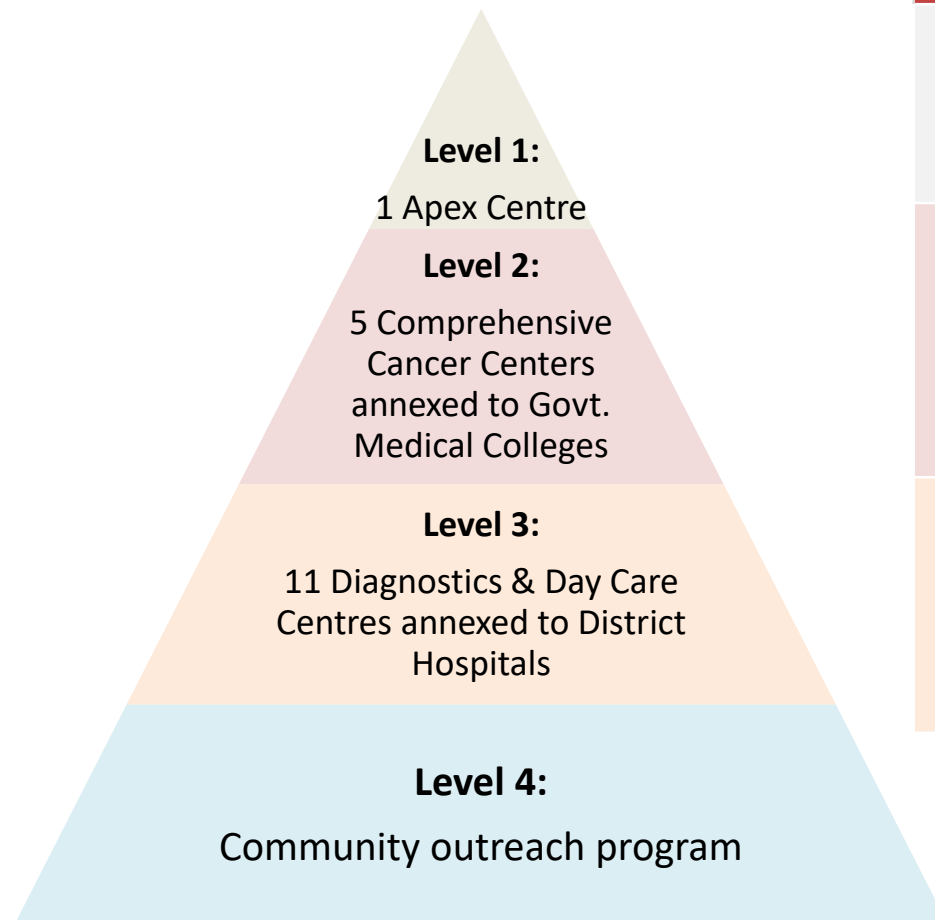
- Large number of people travel outside the state to metro cities
- Huge out-of-pocket-expenses
- Late diagnosis and treatment



To address these issues, Tata Trusts, a philanthropic organization, in collaboration with Government of Assam, established Assam Cancer Care Foundation (ACCF) and developed a four-level Distributed Cancer Care Model (DCCM) to provide quality and affordable cancer care.

Distributed Cancer Care Model (DCCM)

A tiered service delivery model to ensure availability of cancer care at every level

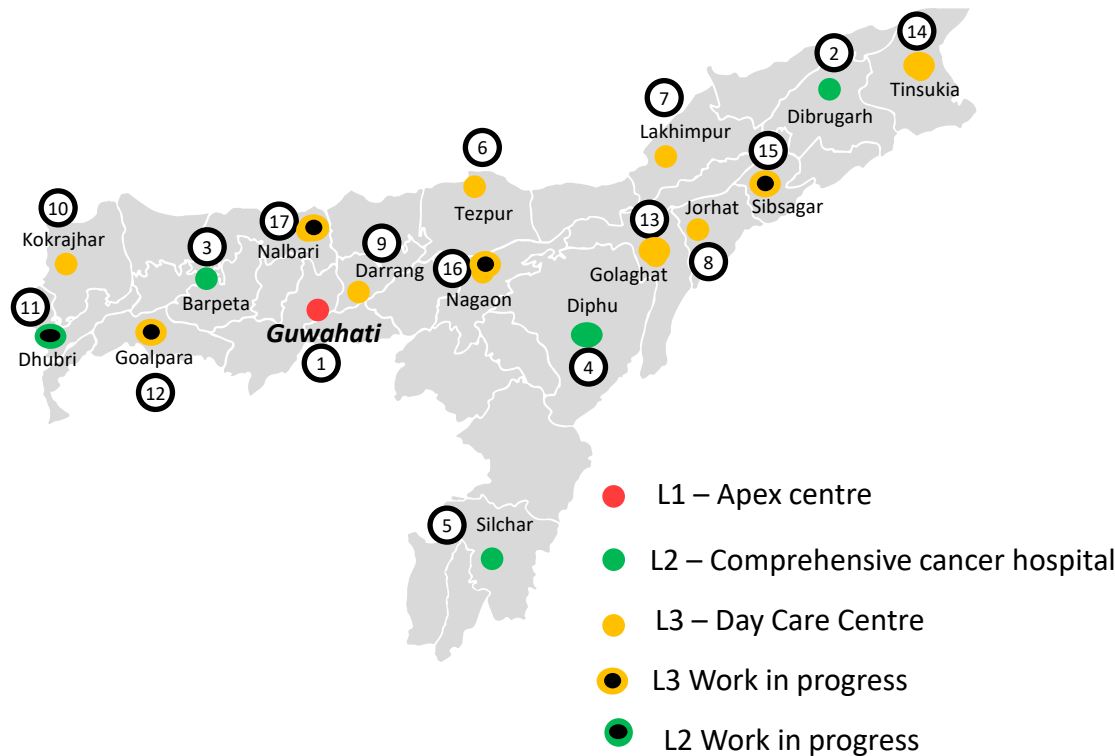


Oncology Services			Allied Facilities			
Radiation	Medical	Surgical	Nuclear Medicine	Lab Services	Research/ Academics	Community Outreach
✓	✓	✓	✓	✓ High end	✓	✓
✓	✓	✓	✓	✓ Advanced	✗	✓
✓	✓	✗	✗	✓ Basic	✗	✓

Awareness, Prevention & Early Detection of Cancers through Health & Wellness Centers in partnership with NHM Assam.

Home based palliative care as part of continuum of care.

ACCF Cancer Hospitals | 17 locations



No.	Location	Configuration	Status
1	SCI Guwahati	L1	Operational
2	Dibrugarh	L2	Operational
3	Barpeta	L2	Operational
4	Diphu	L2	Operational
5	Silchar	L2	Operational
6	Tezpur	L3	Operational
7	Lakhimpur	L3	Operational
8	Jorhat	L3	Operational
9	Darrang	L3	Operational
10	Kokrajhar	L3	Operational
11	Dhubri	L2	Works in progress
12	Goalpara	L3	Works in progress
13	Golaghat	L3	Operational
14	Tinsukia	L3	Operational
15	Sibsagar	L3	Works in progress
16	Nagaon	L3	Works in progress
17	Nalbari	L3	Works in progress

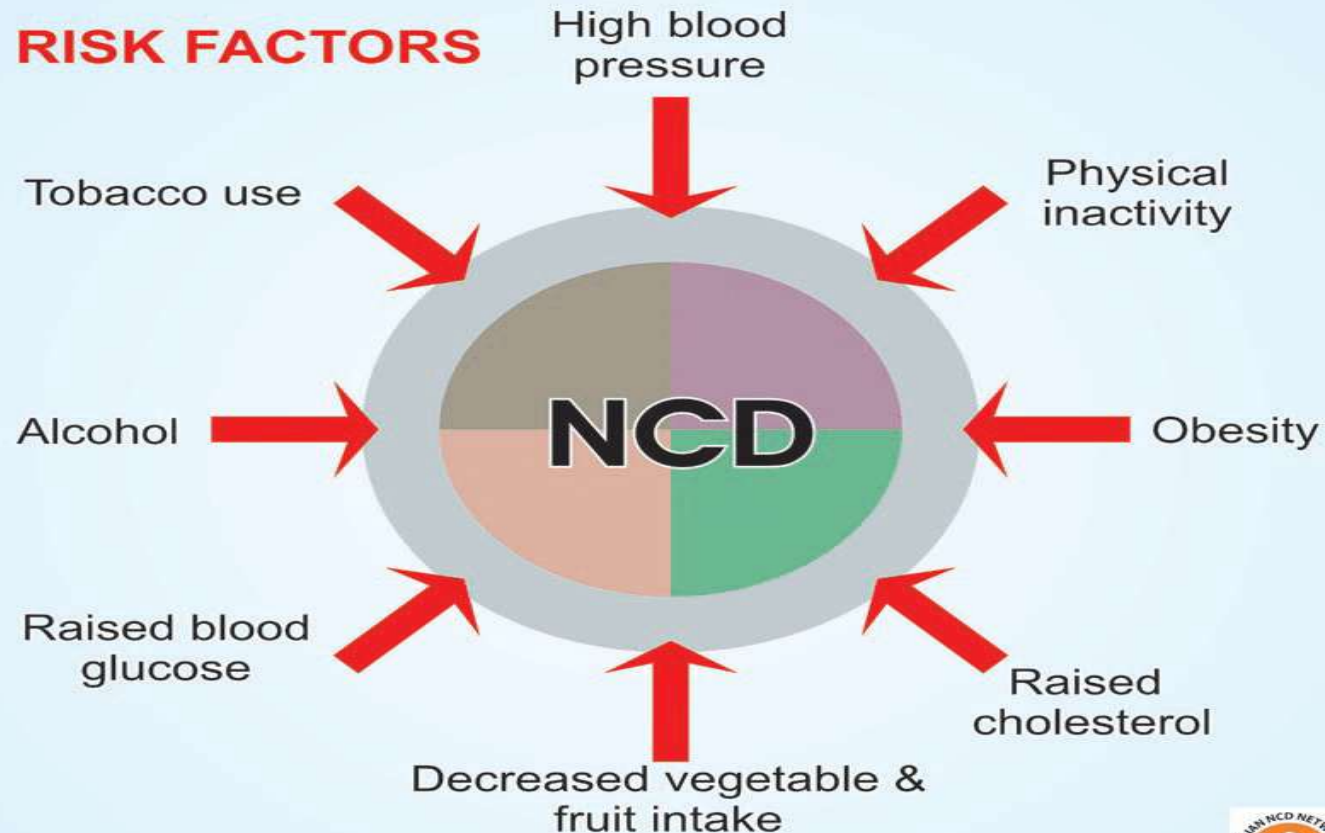
12 operational hospitals

NON COMMUNICABLE DISEASES (NCDs)

NON COMMUNICABLE DISEASES INCLUDE

- Cardiovascular disease (CVD)
- Diabetes Mellitus (DM)
- Chronic obstructive pulmonary disease (COPD)
- Cancer

RISK FACTORS



*Noncommunicable diseases (NCDs), also known as chronic diseases, tend to be of **long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors.** Often associated with **older age groups***

*When **NCDs** converges with **Oncology**, the conversation shifts from individual biological battles to a massive, systemic global health mission*

Why NCD Safety Matters Now

Global Burden

NCDs account for the **majority of deaths globally** – long-term, complex, repeated interactions with the health system.

Every Transition Is a Risk

Screening → Diagnosis → Treatment
→ Follow-up → Self-care. Each handoff creates an **opportunity for harm**.

Multimorbidity Amplifies Vulnerability

People living with multiple NCDs are particularly exposed to **fragmented, unsafe care**.

"The longer the patient's journey, the greater the need for coordinated and safe care."

Patient safety must be **built into the entire NCD pathway** – not retrofitted at the point of crisis.

The Therapeutic Paradox

When aging and oncology meet, the primary challenge changes from how aggressively can we treat the cancer? to how do we maximize quality of life?



From the Oncologist's Chair: The Patient Is Not a Diagnosis



A cancer patient rarely arrives with cancer alone. The clinical reality is **layered**:

Cancer treatment can **destabilise pre-existing conditions**. **Co-morbidities influence treatment choices, toxicity, and outcomes.**

A patient does not experience our health system as departments. The patient experiences one journey."

Diabetes

Hypertension

CVD

CKD

Frailty

Mental Health

Non-Communicable Diseases



Cardiovascular



Diabetes



Chronic Respiratory



Cancer

The Oncology Patient Is Often a Multimorbidity Patient

Consider a representative patient, age 60, presenting to a tertiary cancer centre:



Primary Condition

Cancer – the presenting diagnosis



Co-morbidities

Diabetes · Hypertension · CKD · Cardiovascular risk · Frailty · Psychological distress



Clinical Reality

Multiple specialists · Multiple medications · Repeated investigations · Multiple treatment modalities · Frequent transitions



Safety Question: Who owns the patient's overall safety when care crosses departments?

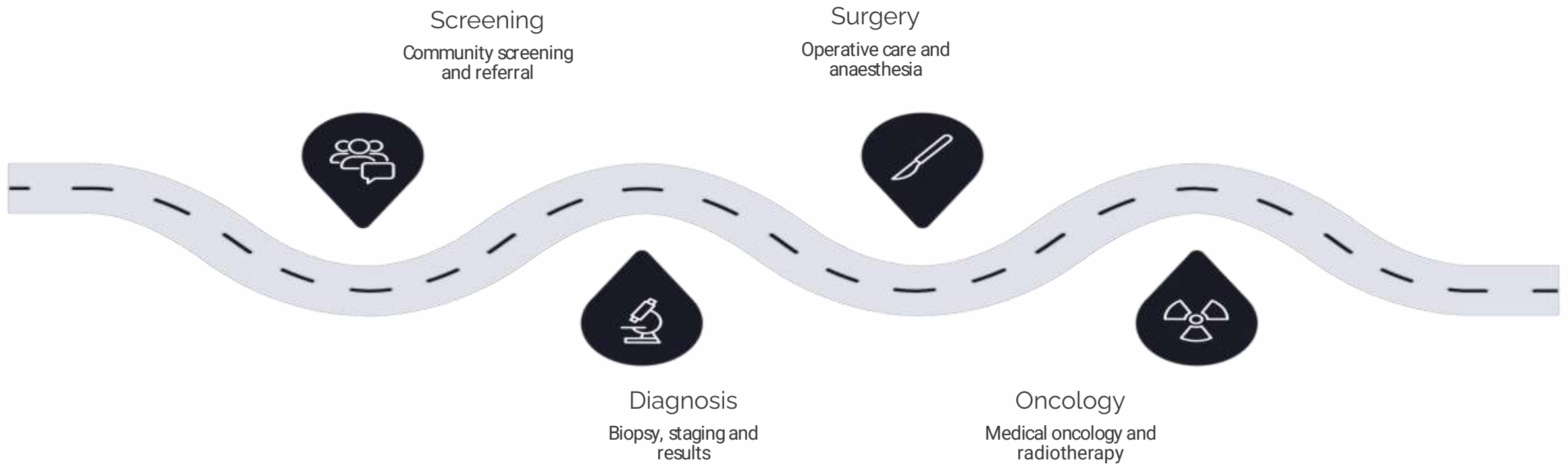
Fragmented ownership is not a clinical inconvenience – it is a patient safety hazard. The answer must be **systemic, not individual**.

While the ownership is collective, the Care is customized.

Cancer Care is moving towards Precision Or Personalized Medicine



A Day in the Life: Patient Journey Through a Tertiary Cancer Centre



Every transition is a potential safety checkpoint. Cancer care teaches us that safety cannot be confined to a single department —
it must span the entire continuum from community to survivorship.



When Cancer Treatment Meets Co-morbidity

Clinical Scenario	Patient Safety Implication
Systemic therapy + Cardiovascular disease	Requires cardiovascular risk assessment and close monitoring
Steroid regimens + Diabetes	Glycaemic control may deteriorate significantly during treatment
Nephrotoxic therapies + CKD	Renal function alters treatment safety and vulnerability
Anticoagulation + Bleeding/thrombotic risk	Coordinated risk assessment across teams is essential
Polypharmacy + Multiple chronic diseases	Drug–drug and drug–disease interactions may be missed

Co-morbidity management is not an add-on to cancer care. It is part of safe cancer care."

Each intersection between an oncology intervention and a pre-existing condition is a **structured safety risk** – it demands anticipation, not reaction.



Where Can Safety Break Down?



Prevention & Screening

Missed risk factors, delayed referral, poor follow-up after abnormal findings.



Diagnosis

Diagnostic delay, incomplete clinical information, abnormal results not closed-loop.



Treatment

Medication errors, drug interactions, unrecognised organ dysfunction, treatment-related complications.



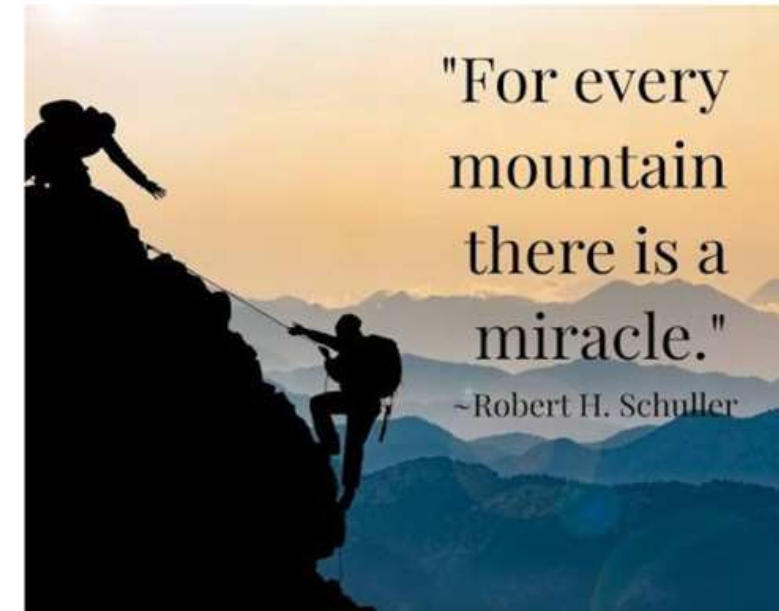
Transitions

Poor discharge communication, duplicated investigations, lost referrals.



Long-term Care

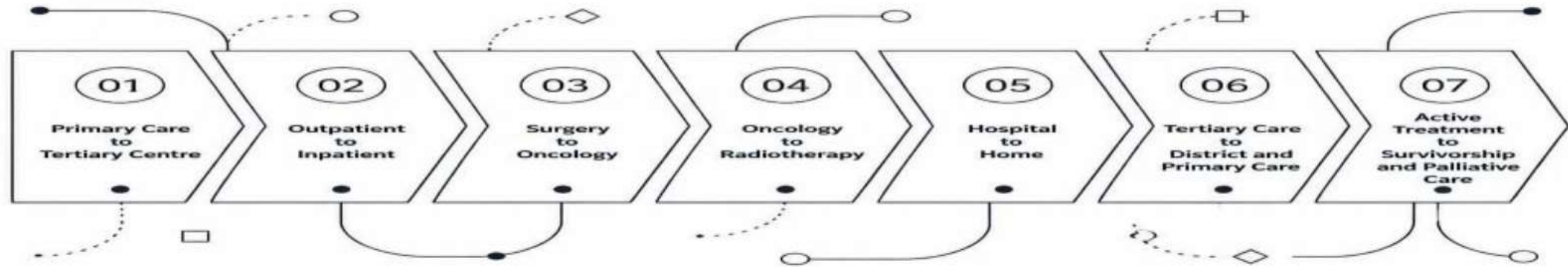
Fragmented follow-up, uncontrolled co-morbidities, poor survivorship coordination.



"For every mountain there is a miracle."

~Robert H. Schuller

Transitions of Care: Where Patients Fall Through the Gaps



Every Transition demands:

- Standardized referrals
- Medication reconciliation
- Closed loop referral tracking
- Clear responsibility at every handoff
- Clear communication with pt & family

Safety at transitions is not a courtesy — it is a clinical and system obligation

The SAFETY framework

Six questions, asked in order — each paired with a validated instrument where one exists

S

Select

the right patient & the right intent

A

Assess

baseline risk

CARG-TT

F

Forecast

toxicity

MASCC · HFA-ICOS

E

Evaluate

nutrition

GLIM

T

Treat

comorbidities & interactions

Y

Your system

must be safe

ASCO/ONS · NABH



Select the right patient — and the right intent

Before: “Which chemotherapy?”
all?”

Ask instead: “Should this patient receive systemic therapy at

- Curative vs adjuvant vs neoadjuvant
- First-line vs subsequent line
- Patient goals & preferences
- Definitive vs palliative
- Expected absolute benefit & alternatives
- Performance status, life expectancy, frailty, comorbidities

At State Cancer Institute, elderly patients are directed to “Geriatric Oncology Assessment Clinic” for Assessing various domains which includes comorbidities under the CGA



Assess baseline risk

Patient-level risk factors

- Age & ECOG
- Nutritional status
- Cardiac & pulmonary disease
- Infection risk
- Polypharmacy
- Frailty / geriatric assessment
- Renal & hepatic function
- Diabetes & hypertension
- Prior chemo / radiotherapy
- Cognitive function & social support

At SCI, Guwahati, we have a Geriatric Oncology Assessment Clinic where elderly patients above 65 years undergo a detailed evaluation of CGA across various domains.

CARG -TT Chemotherapy Toxicity Score

Please circle the applicable risk factors

Risk Factor	Score
Age ≥ 72	2
GI or GU Cancer	2
Standard dose chemo	2
>1 chemo drug	2
Hb <110 (male) or <100 (female)	3
Creatinine Clearance <34 mL/min	3
Hearing, fair or worse	2
1 or more falls in past 6 months	3
Needs help with taking meds	1
Walking 1 block somewhat limited	2
Decreased social activity due to health	1

Total = _____

a

Low Risk	Intermediate Risk	High Risk
0-5 30%	6-9 52%	10-19 83%



Forecast toxicity

Instead of: *“This regimen causes febrile neutropenia.”* **Ask:** *“What is this patient's individual probability?”*

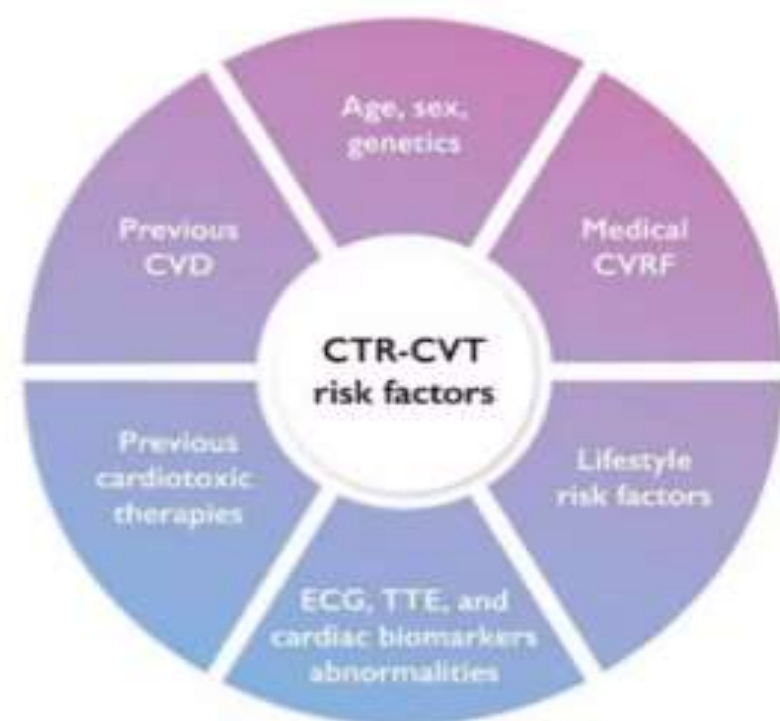
Anthracyclines	Cisplatin	Oxaliplatin	Immune checkpoint inhibitors
Cardiotoxicity risk by cumulative dose, baseline LVEF, age, hypertension, diabetes, prior chest RT, existing CV disease	AKI, electrolyte disturbance, ototoxicity, neuropathy	Cumulative neuropathy, cold-induced symptoms	Risk by autoimmune background, organ reserve, baseline endocrine function, prior immune toxicity

Key concept: toxicity prevention should begin before the first cycle — and can be quantified.

MASCC RISK INDEX SCORE

Prognostic factor	Weight
Burden of illness	
No or mild symptoms	5
Moderate symptoms	3
No hypotension (systolic blood pressure >90 mm Hg)	5
No chronic obstructive pulmonary disease	4
Solid tumour or no previous fungal infection	4
No dehydration requiring parenteral fluids	3
Outpatient status	3
Age <60 years	2
MASCC Risk Index score ≥ 21 indicates that the patient is at a low risk of complications and mortality, classified as low-risk febrile neutropenia.	

1- Baseline CV toxicity risk assessment checklist



Clinical assessment

- Cancer treatment history
- CV history
- CVRF
- Physical examination
- Vital signs measurement *

Complementary tests

- BNP or NT-proBNP^a
- cTn^b
- ECG
- Fasting plasma glucose / HbA1c
- Kidney function / eGFR
- Lipid profile
- TTE^c

HFA-ICOS risk assessment tools

- Anthracycline chemotherapy
- HER2-targeted cancer therapies
- VEGF inhibitors
- BCR-ABL tyrosine kinase inhibitors
- Multiple myeloma therapies
- RAF and MEK inhibitors
- Androgen deprivation therapies

Score	Risk of future cardiotoxicity
Low	<2%
Med	2-9%
High	10-19%
Very high	> 20%

Risk factor	Score	Level of evidence
Previous CVD		
MI or cardiomyopathy	Very high	B
Stroke (MI)	High	C
Myocardial infarction	High	C
Coronary artery disease (CAD) or CABG	High	C
Stroke (MI)	High	C
Cardiac imaging		
Baseline LVEF < 50%	High	B
Baseline LVEF 50-54%	Product	C
Cardiac biomarkers (before treatment)		
Elevated baseline troponin ^a	Product	C
Elevated baseline BNP or NT-proBNP ^a	Product	C
Demographic and CVD		
Age < 50 years	High	B
Age 55-74 years	Product	B
Hypertension ^a	Product	B
DM ^a	Product	C
Chronic kidney disease ^a	Product	C
Previous cardiovascular cancer treatment		
Previous anthracycline exposure	High	B
Previous RT to chest wall or mediastinum	High	C
Previous low anthracycline dose	Product	C
Lifestyle risk factors		
Current smoker or significant	Product	C
Smoking history	Product	C
Obesity (BMI > 30 kg/m ²)	Product	C

E Evaluate nutrition

Screen → Assess → Intervene

- Weight loss, reduced intake, sarcopenia, functional decline
- Dietary counselling → oral/enteral/parenteral support, refeeding-risk & symptom control

The GLIM criteria — a global consensus diagnosis

3 PHENOTYPIC CRITERIA

- Non-volitional weight loss (>5% in 6 mo, or >10% beyond)
- Low BMI (age- and region-adjusted thresholds)
- Reduced muscle mass

2 ETIOLOGIC CRITERIA

- Reduced food intake or assimilation (<50% of needs >1 week, or any reduction >2 weeks, or GI condition impairing absorption)
- Disease burden / inflammation (acute or chronic)

Diagnosis of malnutrition requires ≥1 phenotypic AND ≥1 etiologic criterion — then severity is graded (Stage 1 moderate / Stage 2 severe) from the phenotypic finding.



ESPEM FACT SHEETS

GLIM criteria

for the diagnosis of malnutrition

A consensus report from the global clinical nutrition community*

WHAT IS GLIM?

The Global Leadership Initiative on Malnutrition (GLIM) focuses on building a global consensus around **core diagnostic criteria for malnutrition in adults in clinical settings.**

2-STEPS

DIAGNOSIS OF MALNUTRITION

1. SCREENING



Perform nutrition screening by any **validated screening tool** to identify patients **"at risk for malnutrition"**

2. DIAGNOSIS - APPLY GLIM CRITERIA



Assessment for diagnosis using GLIM criteria then **grade the severity of malnutrition**

GRADE SEVERITY OF MALNUTRITION
based on phenotypic criteria

STAGE 1 MODERATE MALNUTRITION
requires 1 criterion

STAGE 2 SEVERE MALNUTRITION
requires 1 criterion



>5-10% in 6 months or
>10-20% in more than 6 months

>10% in 6 months or
>20% in more than 6 months



<20 if <70 years or
<22 if >70 years

<18.5 if <70 years or
<20 if >70 years



Mild to moderate deficit (per validated assessment methods)

Severe deficit (per validated assessment methods)

GLIM DIAGNOSTIC CRITERIA

Malnutrition diagnosis requires the fulfillment of at least 1 phenotypic and 1 etiologic criterion

Phenotypic Criteria



>5% within past 6 months or
>10% beyond 6 months



<20 if <70 years or
<22 if >70 years
Asia: <18.5 if <70 years or
<20 if >70 years



Reduced by validated body composition measuring techniques

Etiologic Criteria



Of <50% of ER >1 week, or any reduction for 2 weeks, or any chronic GI condition that adversely impacts food assimilation or absorption



Acute disease/injury or chronic disease-related

T Treat co-morbidities & interactions

Cancer plus...

Cardiovascular disease

Chronic kidney disease

Diabetes

Liver disease

Infection

Polypharmacy

Drug–drug interactions to screen

- Anticoagulants
- Anticonvulsants
- Proton-pump inhibitors
- Antiarrhythmics
- Antifungals
- Macrolides
- Herbal medications
- Oral anticancer drugs

Why this matters more with oral anticancer agents

Many kinase inhibitors are metabolised by CYP3A4 and are highly sensitive to enzyme inducers/inhibitors (azole antifungals, macrolides, anticonvulsants, St John's Wort) and to acid-suppressing drugs that alter solubility-dependent absorption (PPIs, H2-blockers). The ASCO/ONS 2024 standards extend safety verification explicitly to home and oral regimens for this reason.

A medication reconciliation checklist is a genuine safety intervention — not paperwork.



Your system- SAFE

FROM PATIENT SAFETY TO SYSTEM SAFETY



- Home & oral administration
- Social determinants of health



Hazardous Drug Handling Standards add: hazardous-drug lists, engineering controls, competent personnel, safe work practices, PPE, and waste disposal.

Key Safety Protocols in Cancer Administration

1) Medication Management

- **Double-verification systems**
- High-alert chemotherapy drugs are administered safely
- Look-Alike Sound-Alike (**LASA**) drugs are carefully **double verified**

2) Infection Control

- Swab verification and fumigation control

3) Standardized Order Sets

- Chemotherapy prescriptions include the patient's exact Height, Weight, Body Surface Area (BSA), absolute drug dose, specific diluent, and precise rate/duration of infusion. – with standard protocols which are **double verified** by 2 doctors (including a consultant)

4) Written informed consent taken

-

Sterile preparation and compounding and safe administration

- Dedicated clean rooms
- **Biosafety cabinets** with laminar air flow, HEPA filters
- Strict labeling
- **Patient identifiers – hospital ID and tag**
- Oncology trained staff
- PPE
- Vascular access verification with labeling
- Extravasation management
- ADR protocols
- Hazard and Waste management
- Spill management with spill kits
- Nursing checklist



**BIOSAFETY CABINET
(FOR SAFE
CHEMOTHERAPY
PREPARATION)**



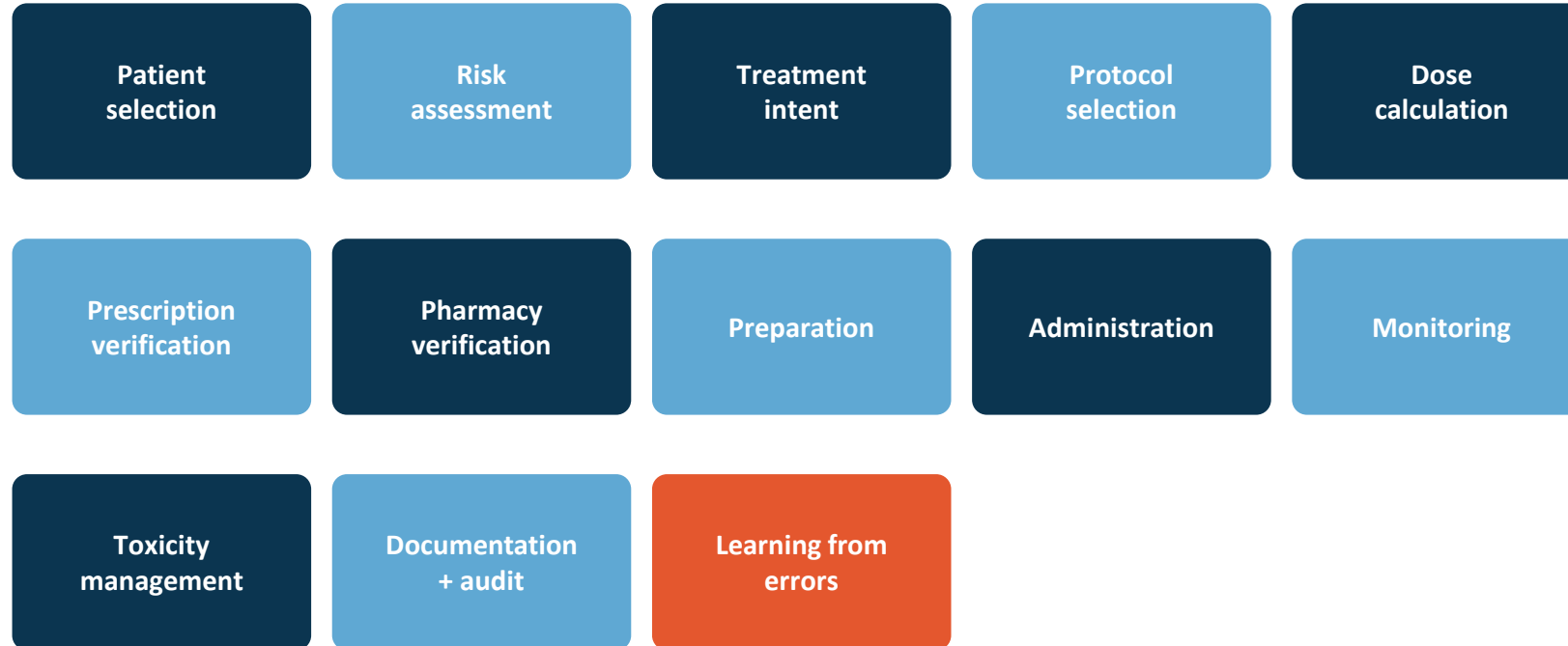
PATIENT IDENTIFICATION BAND

SCI DAY CARE



The safe chemotherapy ecosystem

One continuous pathway — not a series of isolated steps



Steps 2 (Risk assessment) and 11 (Toxicity management) are exactly where CARG-TT, MASCC, HFA-ICOS, and GLIM plug in.

The Radiotherapy ecosystem

One continuous pathway — not a series of isolated steps

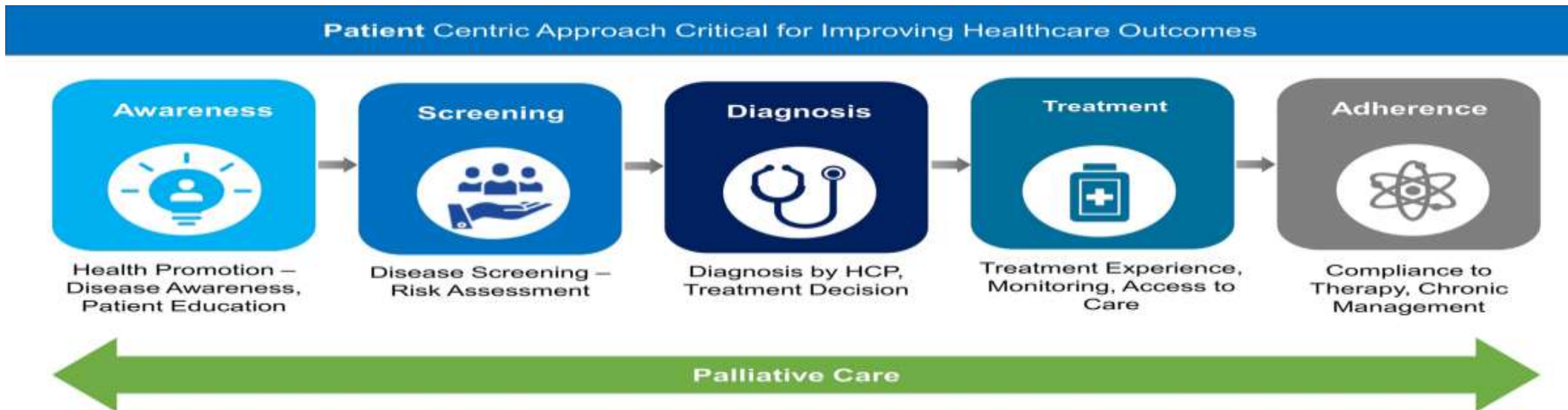


**PATIENT SAFETY IS NOT JUST A PRACTICE,
IT IS A PHILOSOPHY**

**SAFETY IS NOT EXPENSIVE,
IT IS PRICELESS**

Take Home Message

- Shift from Single Disease to **Integrated, patient-centred Total Risk Approach**
- **Bridge NCD and Communicable Care**, eg incorporate mandatory diabetes screening in TB Pathways, integrate mental health checks across metabolic clinics
- Prioritize **medication safety, reduce polypharmacy**
- **Strengthen transitions of care between primary HCPs and specialists**
- Standardize **Safety checks** along the **patient's trajectory Pathway**
- **Build bi-directional referral networks, strengthen transitions of care**



Irrespective of the health care set up, safe NCD practices and addressing of co-morbidities can be integrated across clinical pathways



