Oncology for the Internists

"Team based Cancer Care in 2026 and beyond"

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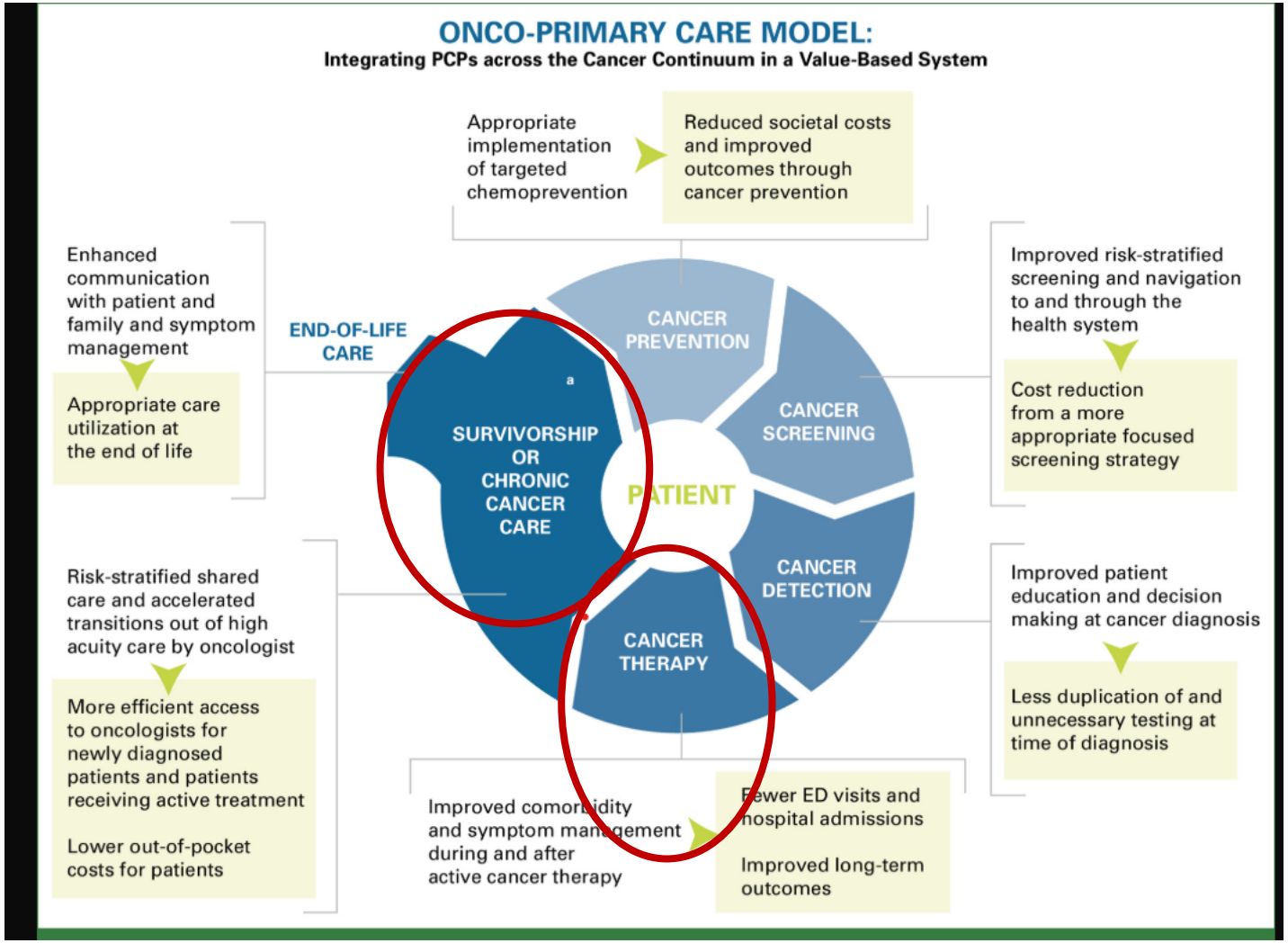
Competing Interests

No relevant disclosures

Session Objectives

1. Briefly discuss **changing landscape of cancer and cancer survivorship**
2. Discussion on **Targeted and immune mediated therapies and toxicities**
3. Building meaningful partnership **in long term care of Survivors**

Oncology, Primary Care and Survivorship



We have more cancer survivors!

Cancer Statistics 2026

Trends in five-year relative survival (%), US, 1975–2021

American Cancer Society

Site	1975-77	1995-97	2015-2021
All sites	49	63	70
Breast (female)	75	87	92
Colon & rectum	50	61	65
Leukemia	34	48	68
Liver & intrahepatic bile duct	3	7	22
Lung & bronchus	12	15	28
Melanoma of the skin	82	91	95
Non-Hodgkin lymphoma	47	56	74
Ovary	36	43	52
Pancreas	3	4	13
Prostate	68	97	98
Uterine cervix	69	73	68
Uterine corpus	87	84	81

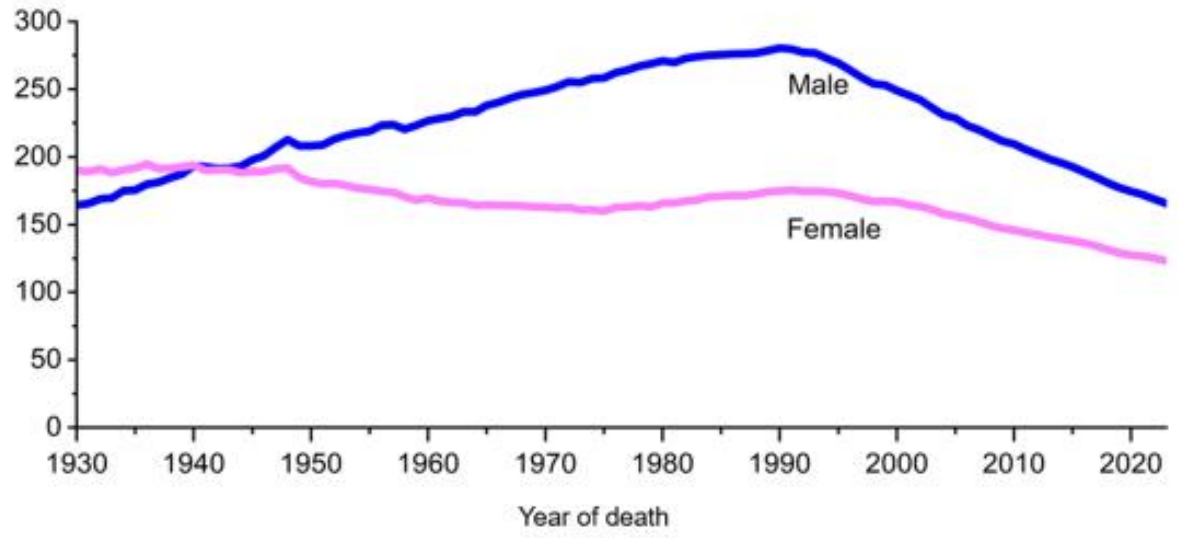
Survival is age adjusted for normal life expectancy and are based on cases diagnosed in the Surveillance, Epidemiology, and End Results (SEER) 9 areas for 1975-1977 and 1995-1997 and in the SEER 21 areas for 2015-2021; cases followed through 2022.
Data source: Surveillance, Epidemiology, and End Results program, National Cancer Institute, 2025.

We have more survivors!

Cancer Statistics 2026

Trends in cancer death rates, US, 1975-2023

American Cancer Society

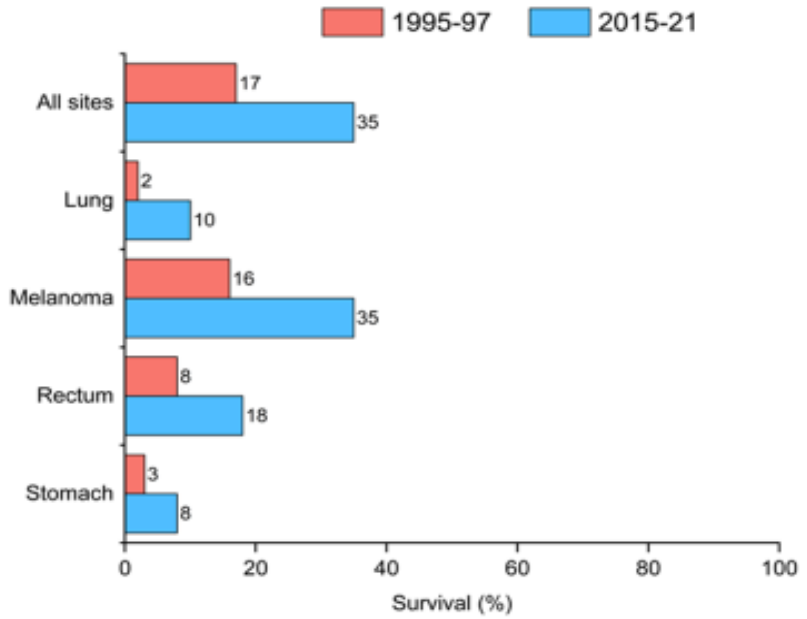


Rates are age adjusted to the 2000 US standard population.
Data source: National Center for Health Statistics, Centers for Disease Control and Prevention, 2025.

We have more survivors!

Cancer Statistics 2026

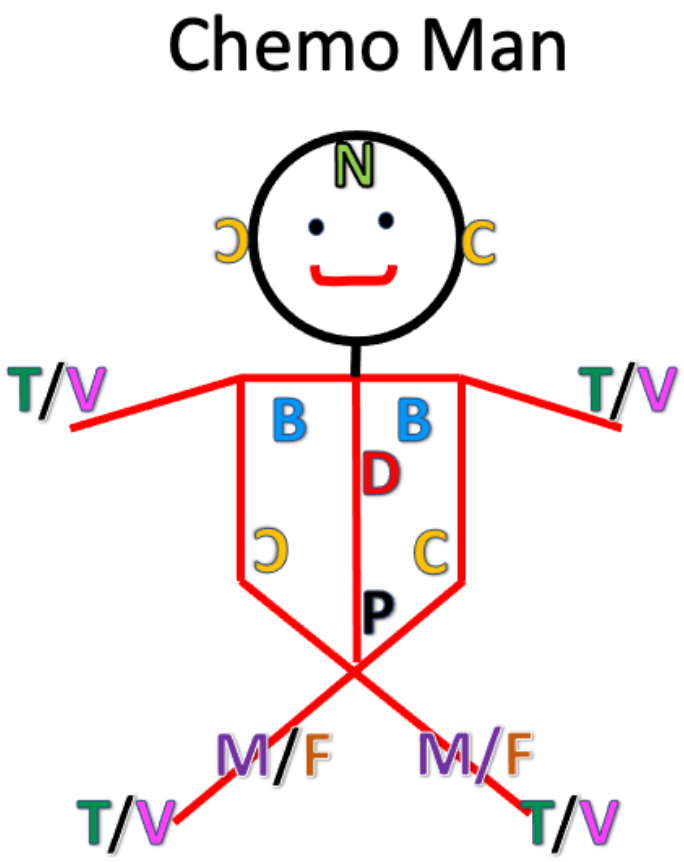
Trends in five-year relative survival (%), distant stage disease, US



Survival is age adjusted for normal life expectancy and are based on cases diagnosed in the Surveillance, Epidemiology, and End Results (SEER) 21 areas for 2015-2021 and cases were followed through 2022. Race is exclusive of Hispanic origin. Colorectum excludes appendiceal cancer.
Source: Surveillance, Epidemiology, and End Results program, National Cancer Institute, 2025.

Chemotherapy related side effects

“Chemo Person”



B: **Bleomycin, Busulfan**
Pulmonary fibrosis

C: **Cisplatin, Carboplatin**
Nephrotoxicity & Ototoxicity

D: **Doxorubicin**
Cardiotoxicity

M/F: **Methotrexate, 5-Flurouracil**
Myelosuppression

N: **Nitrosoureas** (lomustine, carmustin)
Neurotoxic (crosses BBB)

P: **Cyclophosphamide**
Hemorrhagic Cystitis

T: **Taxanes (paclitaxel, docetaxel)**
Peripheral neuropathy

V: **Vinca alkaloids (vincristine > vinblastine)**
Peripheral neuropathy

Modified from Dan Petroni MD (SOM class of 2011)

The Platinum Trio: Distinguishing Toxicities

Cisplatin	Oxaliplatin	Carboplatin
		
The “Classic” Heavy Hitter.	**The “Cold” Agent.**	**The “Marrow” Agent.**
• Nephrotoxicity • Ototoxicity • Peripheral Neuropathy	• Cold-induced peripheral neuropathy • Laryngopharyngeal Dysesthesia	• Dose-limiting Myelosuppression • Thrombocytopenia specifically
Highly Emetogenic.	Triggered by cold drinks/air.	

Long Term Hearing Loss: Decline in QOL

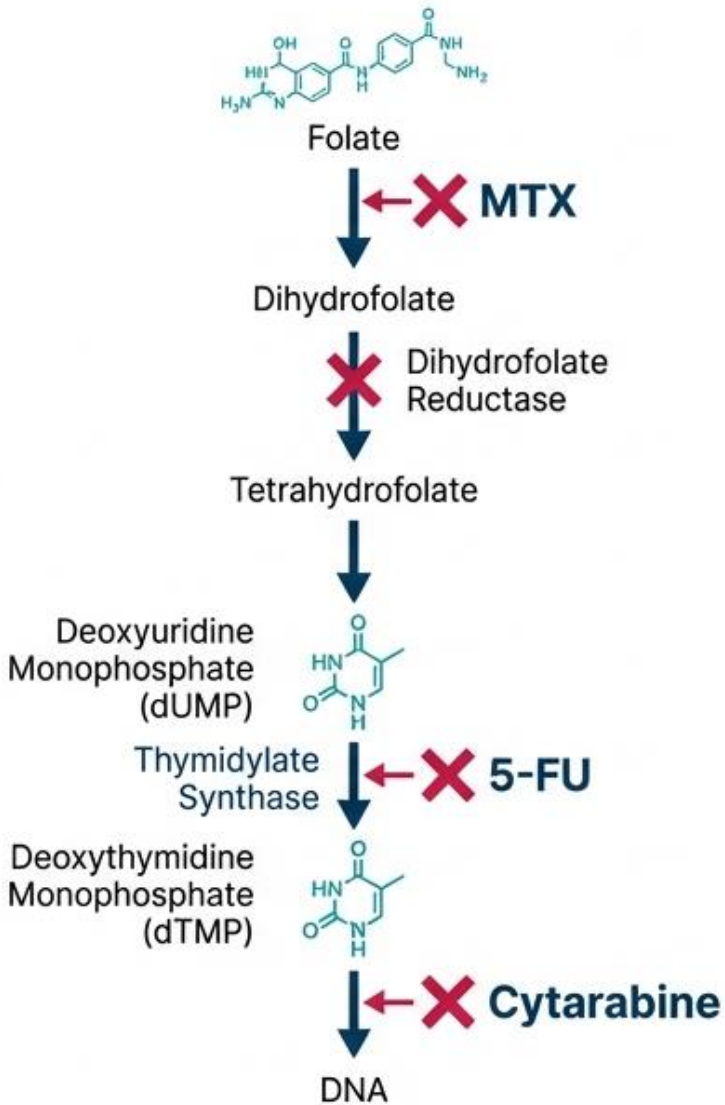
- Only 18% of patients get routine audiology exams before/during treatment
- Anywhere between 20-84% of patients have long term severe, bilateral sensorineural hearing loss


commentaries

Hear Me Out: Mitigating Cisplatin-Induced Ototoxicity

Aakash Desai, MBBS[1] and Devika Das, MBBS[2]

Antimetabolites: DNA Synthesis Blockade



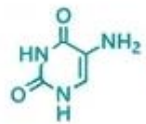
Methotrexate (MTX)

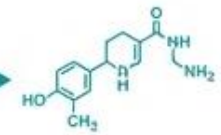
Folate Antagonist.


Mucositis


Hepatotoxicity


Renal


Leucovorin Rescue


Folate Pathway Blockade

5-Fluorouracil (5-FU)

- Pyrimidine Antagonist.

Board Alert Box

Classic Vignette: Chest pain during infusion → Coronary Vasospasm

Cytarabine

- Pyrimidine Antagonist.
- High dose toxicity: Cerebellar toxicity (Ataxia, Nystagmus)


Ataxia

Nystagmus

Alkylating Agents & Anthracyclines

Nitrogen Mustards (Cyclophosphamide / Ifosfamide)

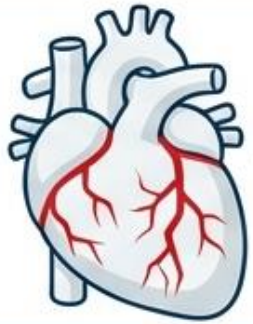
Mechanism:
Alkylating DNA

← Hemorrhagic Cystitis

Differentiation Pearl: Ifosfamide = Encephalopathy. Cyclophosphamide = SIADH.

Anthracyclines (Doxorubicin)

Mechanism:
DNA intercalation



← Dose-dependent Cardiomyopathy

- Monitor with Echocardiography.

Microtubule Inhibitors: Taxanes vs. Vincas

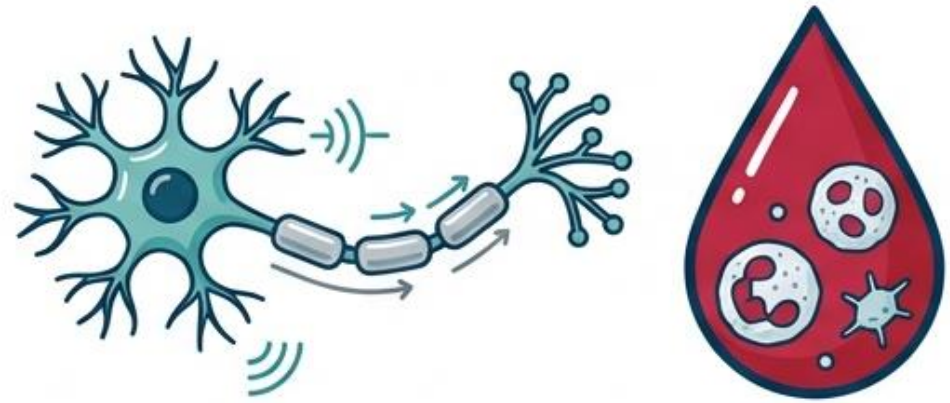
Vincristine (Vinca Alkaloids)

- Major Toxicity: Peripheral Neuropathy & Ileus (Constipation).

NO Myelosuppression (Bone Marrow Sparing).

Fatal if given intrathecally.

Paclitaxel (Taxanes)



- Major Toxicity: Peripheral Neuropathy.

YES Myelosuppression (Neutropenia).

Pre-medicate to prevent hypersensitivity.

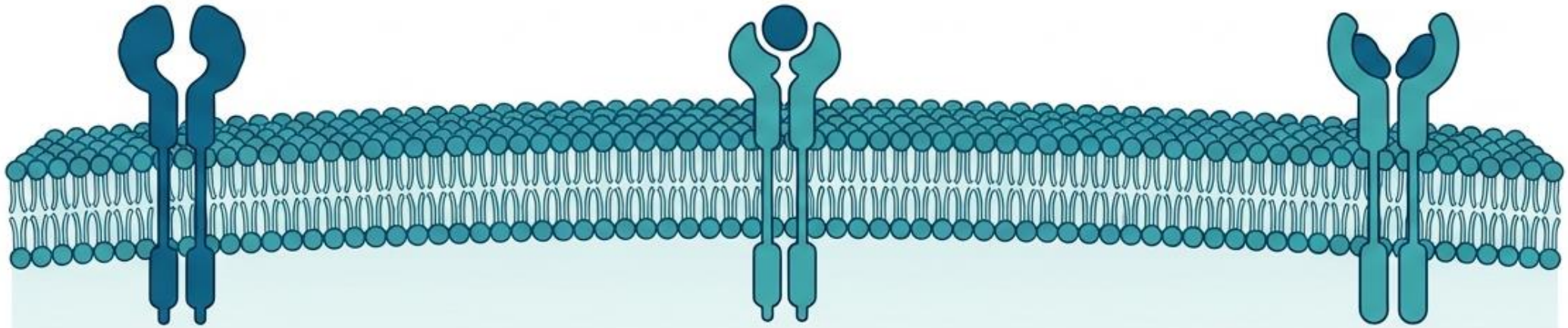
Targeted Therapies

Surface Target Inhibitors

HER2
(Trastuzumab)

EGFR
(Erlotinib, Cetuximab)

VEGF
(Bevacizumab)



Target: HER2/neu.

Toxicity: Reversible Cardiomyopathy (Heart Failure).

Action: Monitor LVEF (Echo) at baseline and q3 months.

Target: Epidermal Growth Factor.

Toxicity: Acneiform Rash (Face/Upper trunk), Diarrhea, Hypomagnesemia.

Safety Amber

Pearl: Rash severity correlates with BETTER response.

Target: Angiogenesis.

Toxicity: HTN, Proteinuria, Clots, Perforation.

Alert Crimson

Warning: Poor Wound Healing. Do NOT use within 28 days of surgery.

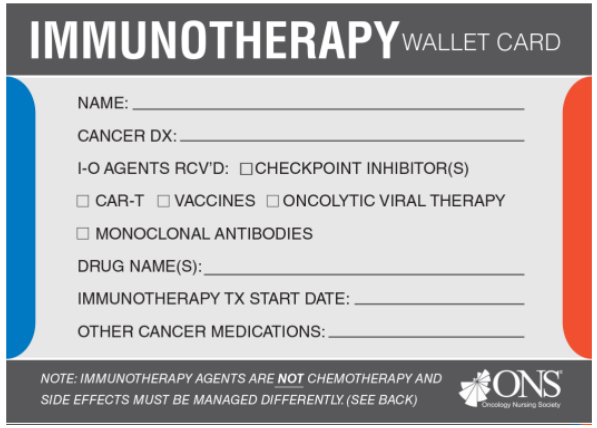
The Golden Cheat Sheet: Rapid Review

Drug	Buzzword Toxicity	Management / Pearl
Cyclophosphamide	Hemorrhagic Cystitis	Mesna + Hydration
Doxorubicin	Cardiomyopathy	Dexrazoxane
Cisplatin	Nephro / Oto / Neuro	Fluids + Electrolytes
Oxaliplatin	Cold-Induced Neuropathy	Avoid Cold
Bleomycin	Pulmonary Fibrosis	Monitor PFTs
Trastuzumab	Reversible Heart Failure	Monitor LVEF
Bevacizumab	Wound Healing / Perforation	Hold pre-surgery
Tamoxifen	Endometrial Ca / Clots	Biopsy bleeding
Abiraterone	Hypokalemia / HTN	Add Prednisone
Metoclopramide	Dystonia	Diphenhydramine
Vincristine	Neuropathy / Ileus	NO Myelosuppression

Immunotherapy Toxicity

Patient and Caregiver Education and Counseling

- Provide overview of MoA
- Provide information booklet, wallet card


IMMUNOTHERAPY WALLET CARD

NAME: _____

CANCER DX: _____

I-O AGENTS RCV'D: ☐CHECKPOINT INHIBITOR(S)

☐ CAR-T ☐ VACCINES ☐ ONCOLYTIC VIRAL THERAPY

☐ MONOCLONAL ANTIBODIES

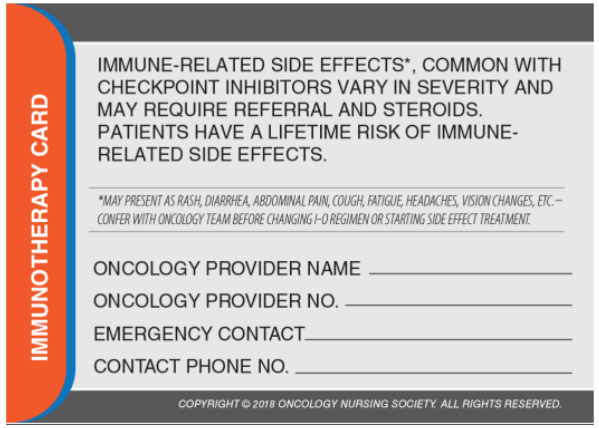
DRUG NAME(S): _____

IMMUNOTHERAPY TX START DATE: _____

OTHER CANCER MEDICATIONS: _____

NOTE: IMMUNOTHERAPY AGENTS ARE **NOT** CHEMOTHERAPY AND SIDE EFFECTS MUST BE MANAGED DIFFERENTLY. (SEE BACK)

ONS Oncology Nursing Society


IMMUNOTHERAPY CARD

IMMUNE-RELATED SIDE EFFECTS*, COMMON WITH CHECKPOINT INHIBITORS VARY IN SEVERITY AND MAY REQUIRE REFERRAL AND STEROIDS. PATIENTS HAVE A LIFETIME RISK OF IMMUNE-RELATED SIDE EFFECTS.

*MAY PRESENT AS RASH, DIARRHEA, ABDOMINAL PAIN, COUGH, FATIGUE, HEADACHES, VISION CHANGES, ETC.– CONFER WITH ONCOLOGY TEAM BEFORE CHANGING I-O REGIMEN OR STARTING SIDE EFFECT TREATMENT.

ONCOLOGY PROVIDER NAME _____

ONCOLOGY PROVIDER NO. _____

EMERGENCY CONTACT _____

CONTACT PHONE NO. _____

ons.org/clinical-practice-resources/immunotherapy-patient-wallet-card

- Ensure patient understands AEs associated with both ICI and CT during and after tx
  - Address any concerns about reporting symptoms
  - Review how to contact office to report symptoms
  - Review symptoms that patient needs to report urgently (eg, temp ≥100.5°F)
  - Counsel to report all symptoms!

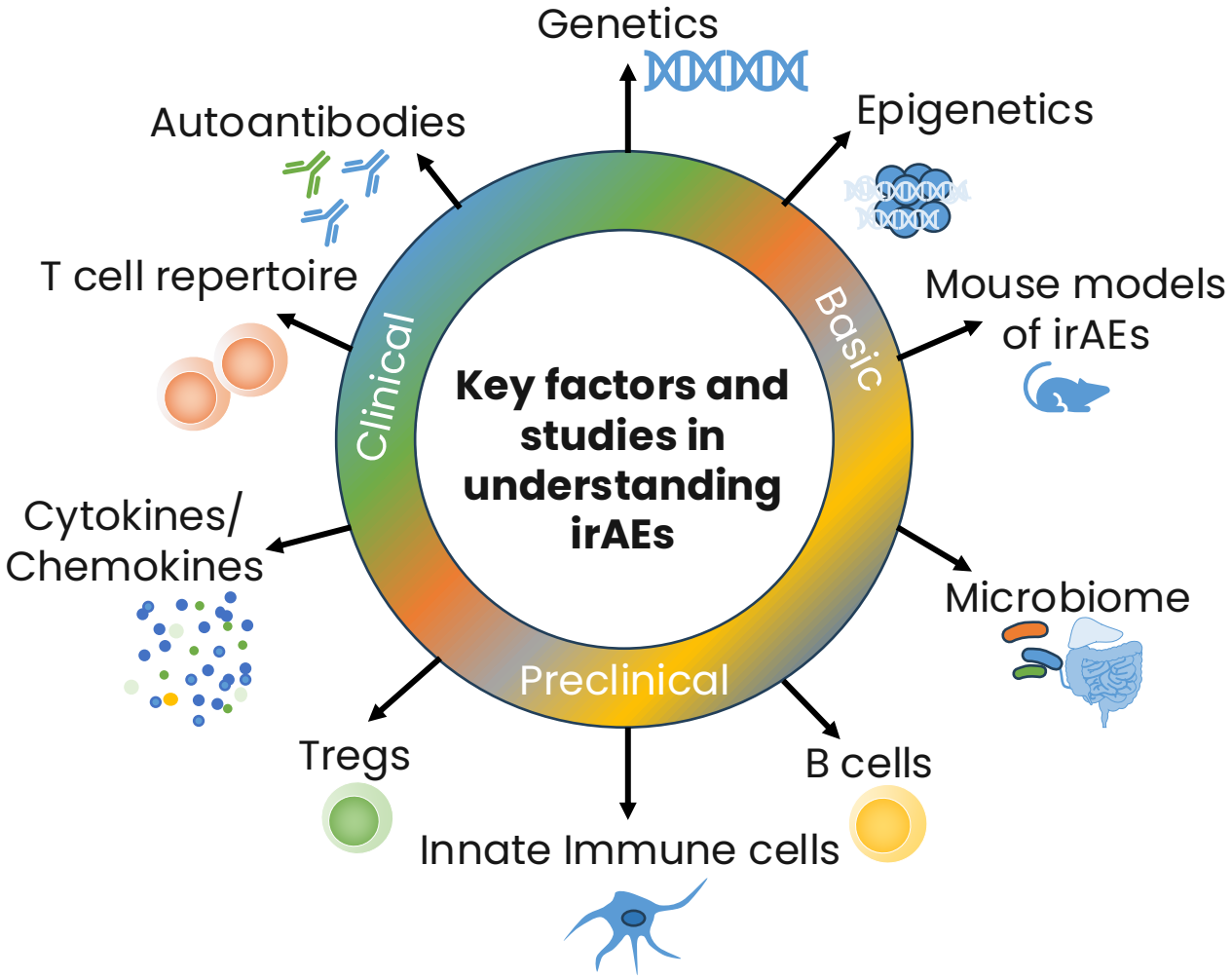
Patient Counseling Script

"If we catch the irAE early, there's a better chance we can reverse it and restart you on the ICI."

Aso. Asia Pac J Oncol Nurs. 2022;9:100076. Brahmer. J Immunother Cancer. 2021;9:e002435.
Cheema. Curr Oncol. 2022;29:869. Wood. Clin J Oncol Nurs. 2019;23:271.

Underlying Mechanism of irAEs

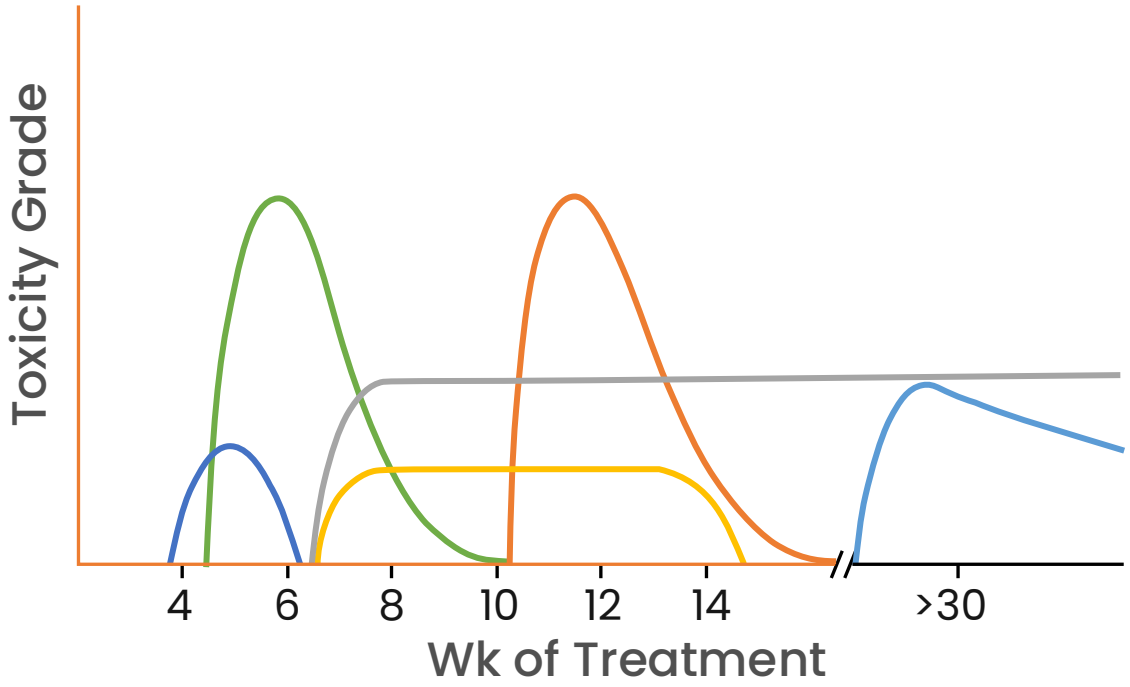
- **Common conception:**
  - **Directly drug related, T-cell mediated**
- **Alternative conception more complicated:**
  - **Directly vs indirectly drug related**
  - **T cell vs cytokine vs antibody mediated**
- **Consideration of distinct mechanisms may drive more personalized/biologically directed management approach**



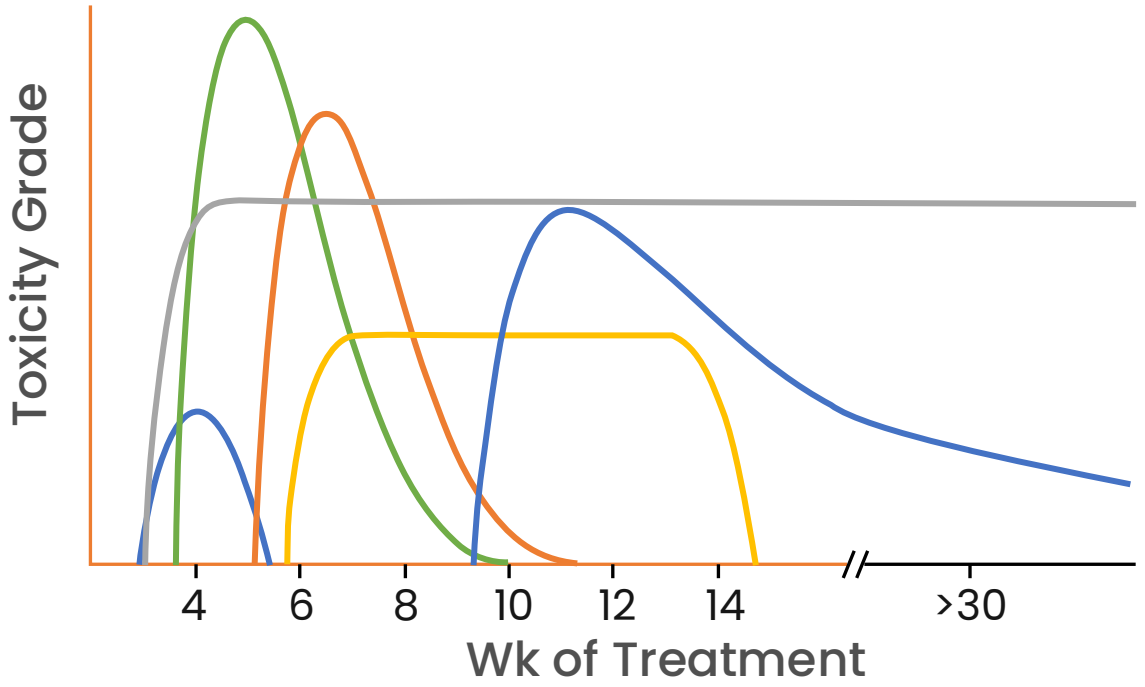
Khan. Semin Cancer Biol. 2020;64:93.

irAEs: Timing of Onset

Anti–PD-1 or Anti–PD-L1 antibody



Ipilimumab + Anti–PD-1 Antibody



Nephritis
Colitis
Endocrinopathy
Liver toxicity
Pneumonitis
Skin, rash, or pruritus

- Martins. Nat Rev Clin Oncol. 2019;16:563.

Shared Decision-making in the Clinic

Patients and HCPs work together to match preferences, address conflicts, solve problems, and address the meaning of the patient experience

Strategies for Facilitating SDM

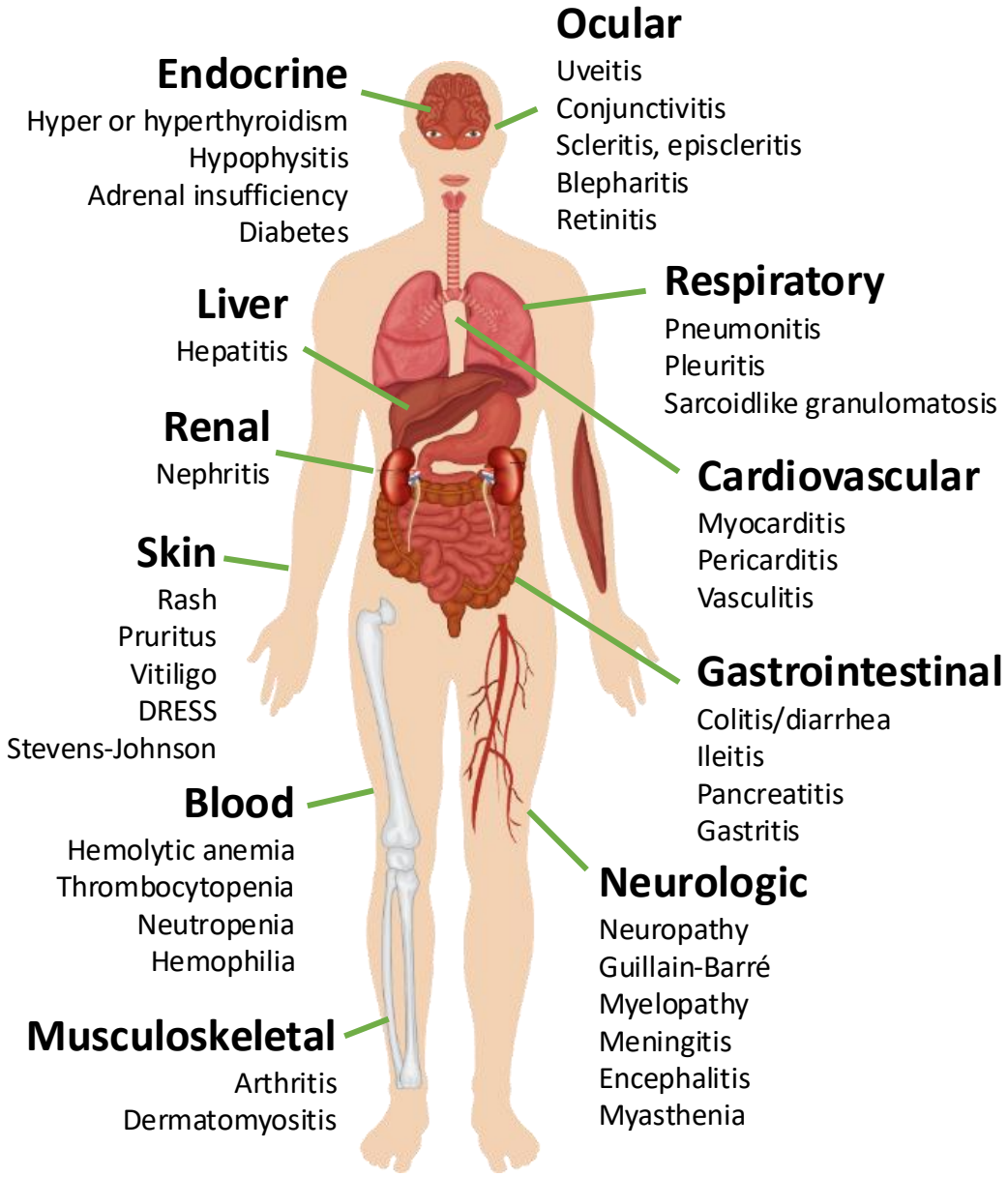
- Foster a productive conversation in which patient preferences are discussed
- Protect the space and quality time
- Increase participation by including caregivers and other members of the MDT

Discussion:

- **How does your MDT interplay with disease and patient management?**
- **Which topics are most difficult to discuss with patients and caregivers?**

Spectrum of irAEs

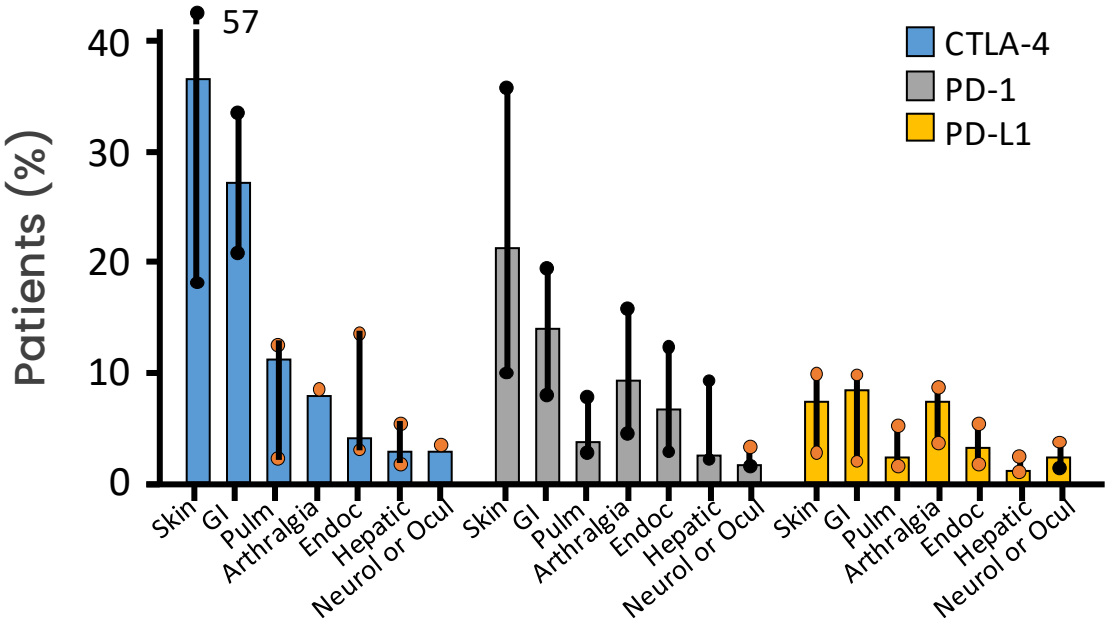
- irAEs can affect <u>any</u> organ of the body
- Onset varies
  - Usually 2-3 mo after starting tx
  - Up to 2 yr after tx completion
- Maintain high level of suspicion for irAEs when new symptoms develop
- If irAEs are suspected, conduct a complete workup, including lab tests, to rule out other causes



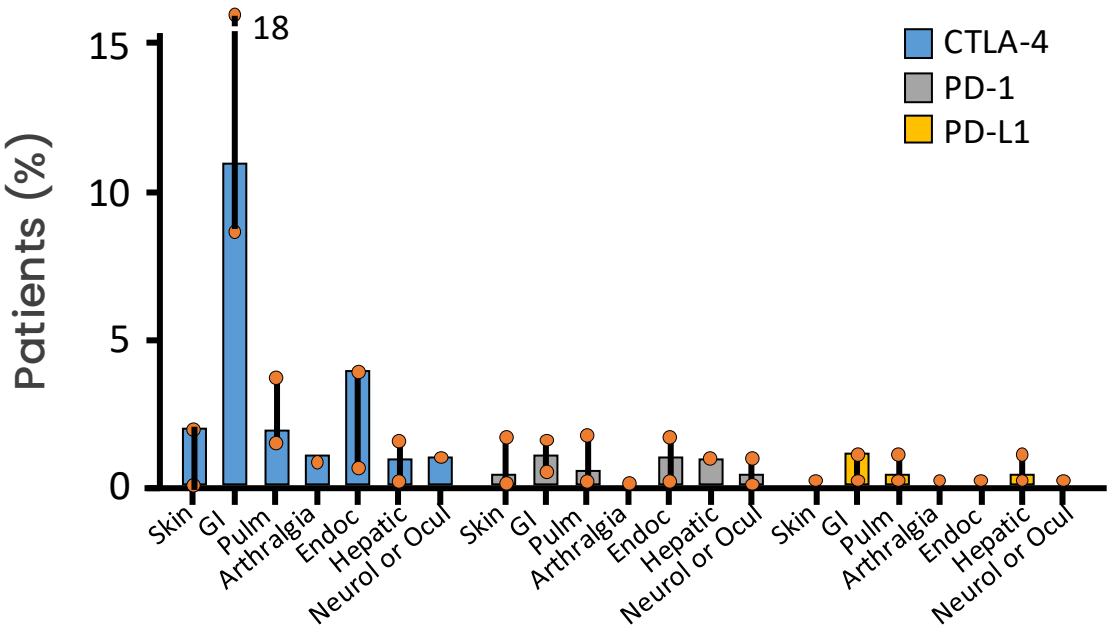
Brahmer. JCO. 2018;36:1714. Champiat. Ann Oncol. 2016;27:559. Michot. Eur J Cancer. 2016;54:139. Robert. ASCO 2017. Education session: checkpoint inhibitor immunotherapy. Steven. Rheumatology (Oxford). 2019;58:vii29. Winer. J Thorac Dis. 2018;10:S480. Zimmerman. Am Soc Clin Oncol Educ Book. 2018;38:682.

Frequency of irAEs With ICI Monotherapy*

Distribution of Grade 1/2 irAEs[1]



Distribution of Grade 3-5 irAEs[1]

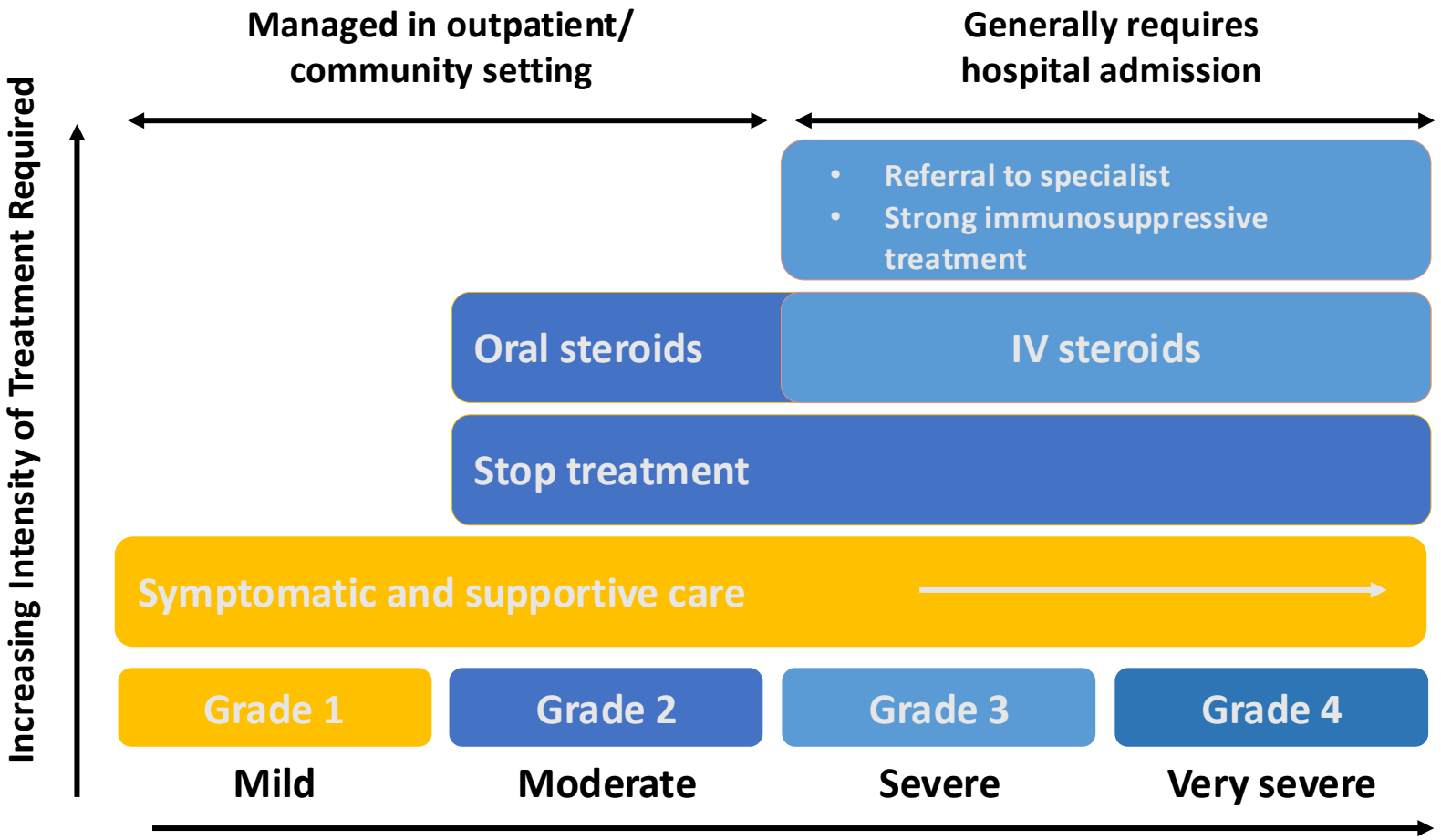


*CTLA4 monotherapy is not commonly used in NSCLC

- **Incidence of irAEs varies among malignancies**
  - **Colitis more common in melanoma; pneumonitis more common in NSCLC[2]**

➢ 1. Michot. Eur J Cancer. 2016;54:139. 2. Owen. Clin Lung Cancer. 2018;19:E893.

General Recommendations for Treatment of irAEs



- Steroids (PO/IV): 0.5-2.0 mg/kg/day prednisone or equivalent; slow taper over 4-6 wk
- For some irAEs (eg, rash), ICI can be restarted after resolution
- Endocrinopathies: ICI can generally be continued with management
- Management via a multidisciplinary approach is beneficial
  - Consult with specialists for severe irAEs

Haanen. Ann Oncol. 2022;33:1217. NCCN. Clinical practice guidelines in oncology: management of immune checkpoint inhibitor-related toxicities. v.1.2026. nccn.org. Vaddepally. Biomedicines. 2022;10:790.

General Recommendations for Management of AEs With Chemoimmunotherapy

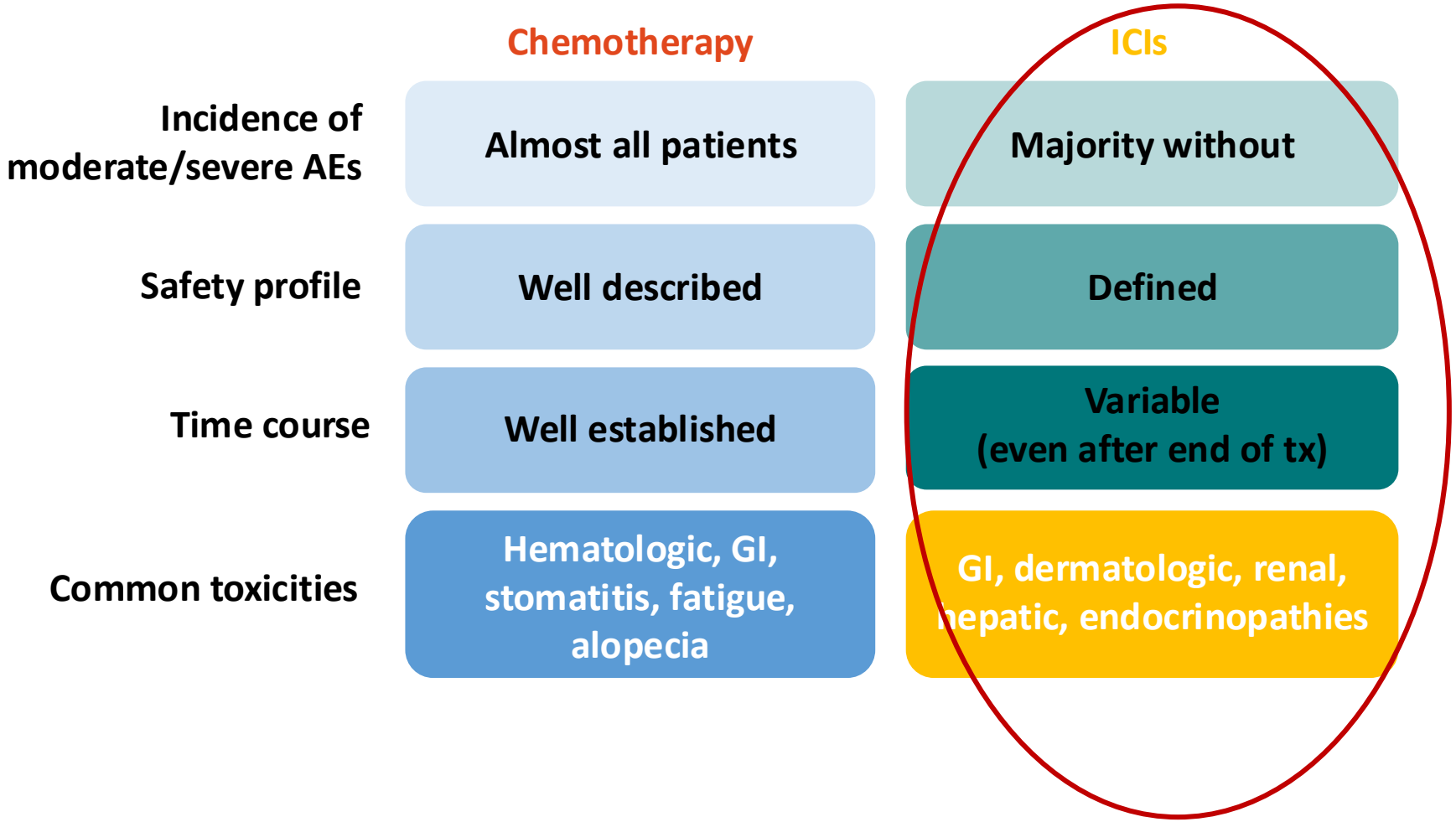
- Counsel patients: “Report all your symptoms and let the provider figure out what’s causing it”
  - Sometimes patients assume a symptom is just due to CT
- Management depends on figuring out cause of AE → **timing is critical!**
  - Employ a multidisciplinary approach for challenging cases

Parameter	CT	ICI
Typical timing/pattern	▪ Rapid onset after administration ▪ Cyclical onset/recovery	▪ Onset after several cycles ▪ Persists/worsens over time
General management strategies		
▪ Hold dose	Yes	Yes
▪ Reduce dose	Yes	No
▪ Switch to less toxic agent	Yes	No
▪ Steroids	Rarely (depends on toxicity)	Yes*
▪ Permanently discontinue	Yes (if severe)	Yes (if severe)

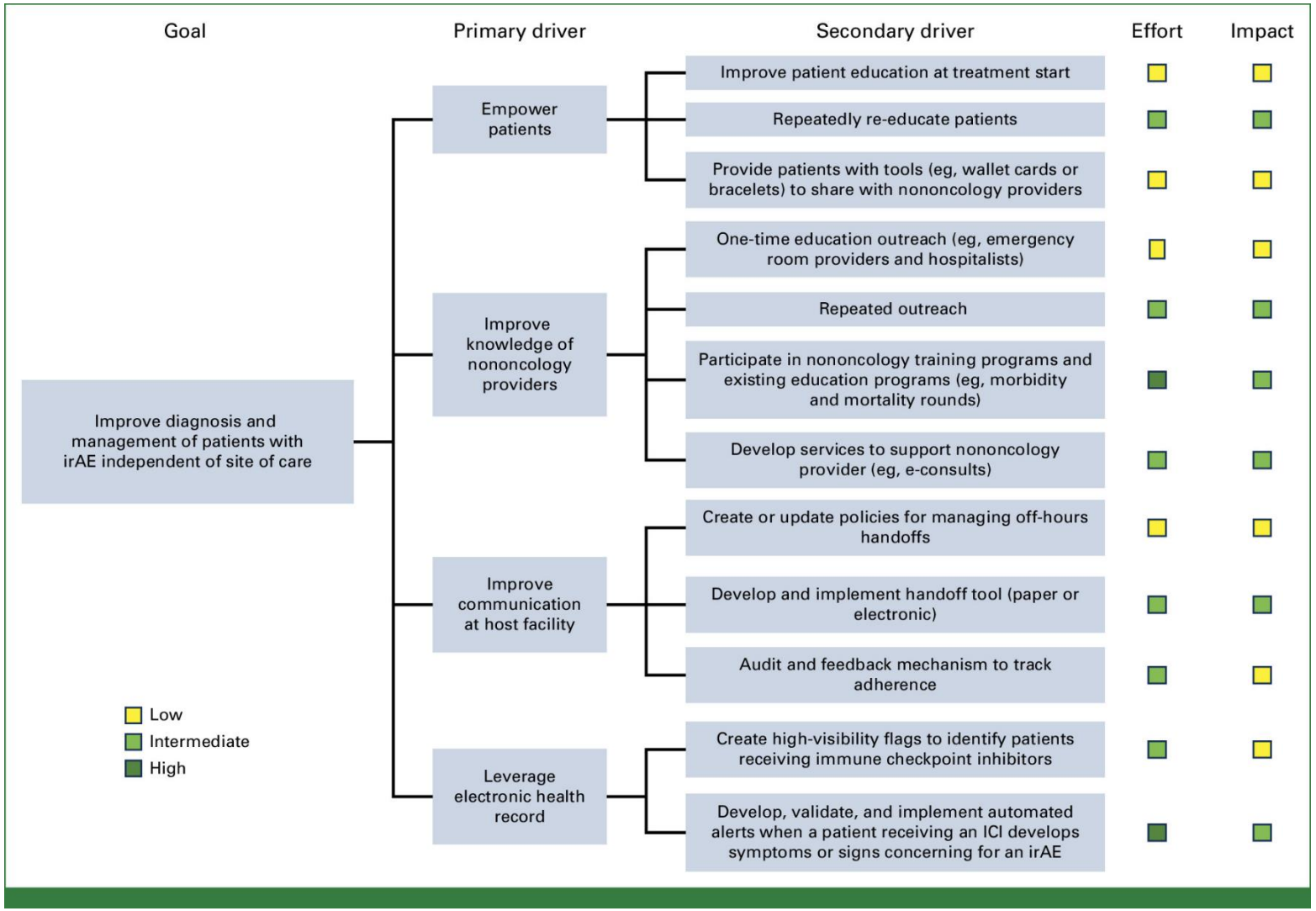
***Steroid should be tapered slowly over 4-6 wk**.

Hoffner. Cancer Treat Rev. 2020;85:101979. Madden. Clin J Oncol Nurs. 2017;21:30. Schneider. JCO. 2021;39:4073.

Differences in AEs Between Chemotherapy and ICIs



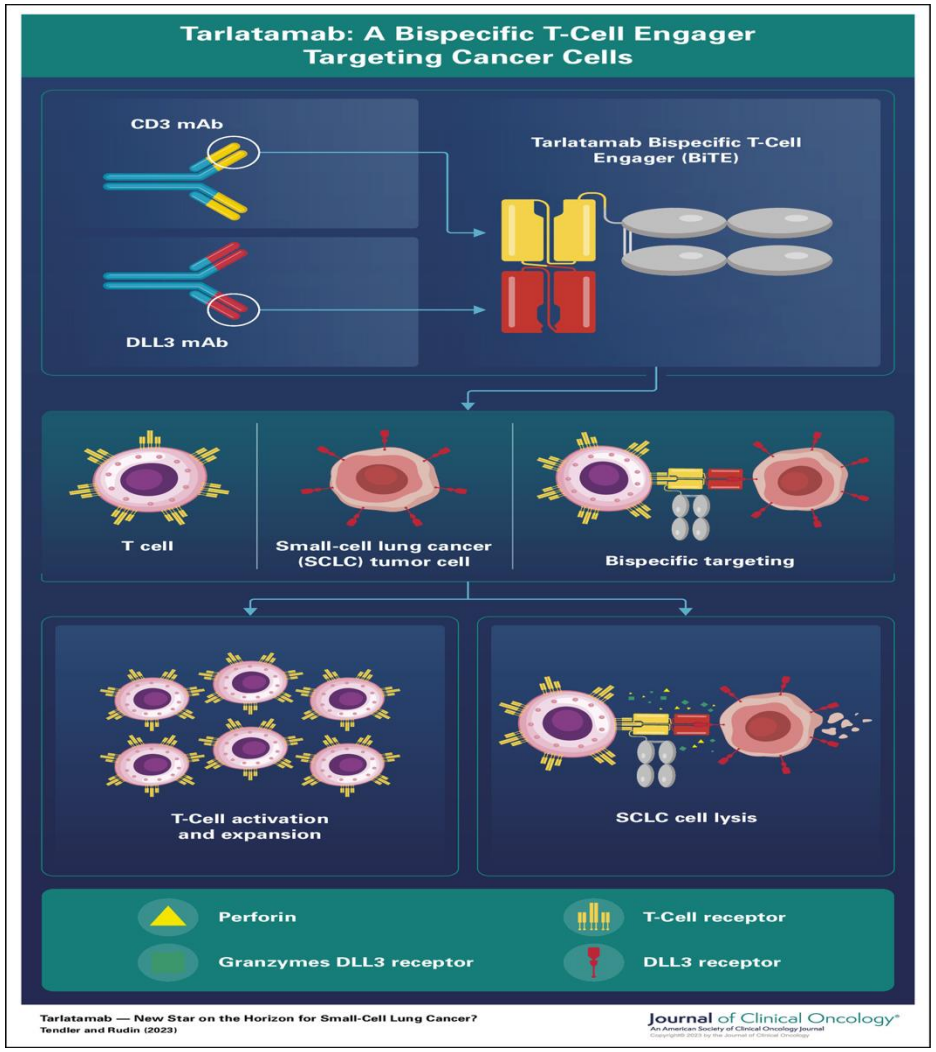
- Brahmer. JCO. 2018;36:1714. Kuderer. Nat Rev Clin Oncol. 2022;19:681. Brahmer. JCO. 2018;36:1714.



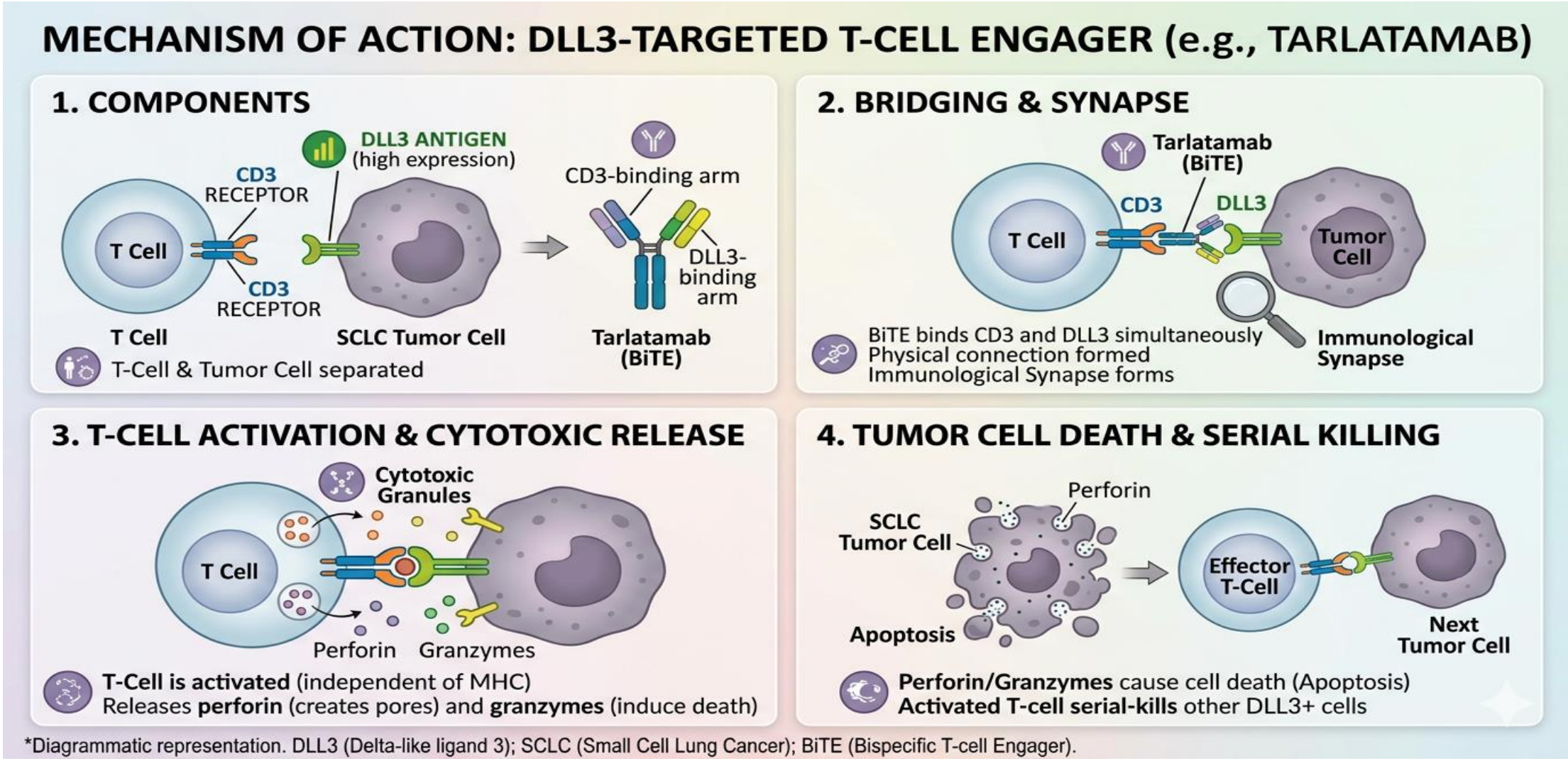
Risk of Knowledge Gaps Among Nononcologists Caring for Patients With Cancer: The Example of Immune Checkpoint Inhibitors

Garrett Bourne, MD[1]; Devika Das, MD[1]; Joseph O. Jacobson, MD[2]; and Navid Sadeghi, MD[3]

Mechanism of action with T-cell engagers

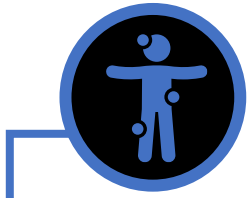


Mechanism of action with T-cell engagers



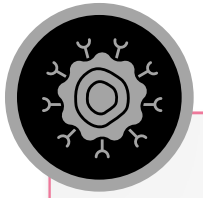
*Diagrammatic representation. DLL3 (Delta-like ligand 3); SCLC (Small Cell Lung Cancer); BiTE (Bispecific T-cell Engager).

AEs Associated With Tarlatamab



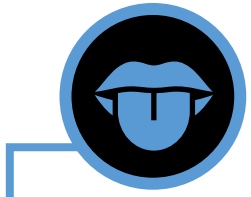
CRS[1,2]

CRS is a systemic inflammatory response likely mediated by proinflammatory cytokines



ICANS[3]

ICANS is a disorder of the CNS that results from the activation or engagement of endogenous or infused T cells and/or other immune effector cells



Dysgeusia[4–6]

Dysgeusia is a taste disorder that may be be caused by T-cell–mediated destruction of DLL3-expressing taste bud cells

Other associated AEs[4]

Other AEs may include pyrexia, neutropenia, decreased appetite, anemia, constipation, asthenia, and fatigue

1. Khadka. Immunotherapy. 2019;11:851. 2. Shimabukuro-Vornhagen. J Immunother Cancer. 2018;6:56.
3. Lee. Biol Blood Marrow Transplant. 2019;25:625. 4. Sands. Cancer. 2025;131:e35738.

Clinical Presentation of CRS

- Fever is a defining and often initial symptom of CRS; fevers related to CRS can be high grade and last many days[1]
- Other clinical signs and symptoms include, but are not limited to, tachycardia, tachypnea, and headache, with potentially life-threatening complications such as cardiac dysfunction, acute respiratory distress syndrome, and renal/hepatic dysfunction[2,3]
- In severe CRS, a systemic inflammatory response may occur, presenting with symptoms such as hypotension, hypoxia, and/or organ dysfunction[1]
- CRS is largely confined to the first administration of tarlatamab during step-up dosing; the median time to CRS occurrence is typically 4-16 hr after infusion[4]

1. Géraud. Eur J Cancer. 2024;205:114075. 2. Lee. Biol Blood Marrow Transplant. 2019;25:625.
3. Shimabukuro-Vornhagen. J Immunother Cancer. 2018;6:56. 4. Sands. Cancer. 2025;131:e35738.

CRS Grading Scale (2019)

CRS Parameter[1]	Grade 1	Grade 2	Grade 3	Grade 4
Fever	≥38°C	≥38°C	≥38°C	≥38°C
With				
Hypotension	None	Not requiring vasopressors	Requiring a vasopressor with/without vasopressin	Requiring multiple vasopressors (excluding vasopressin)
And/or				
Hypoxia	None	Requiring low-flow nasal cannula or blow-by	Requiring high-flow nasal cannula, facemask, nonrebreather mask, or Venturi mask	Requiring positive pressure (eg, CPAP, BiPAP, intubation, mechanical ventilation)

- **CRS symptoms may be progressive; must include fever at onset and may include hypotension, capillary leak (hypoxia), and end-organ dysfunction**

1. Lee. Biol Blood Marrow Transplant. 2019;25:625. 2. Schubert. Ann Oncol. 2021;32:34.

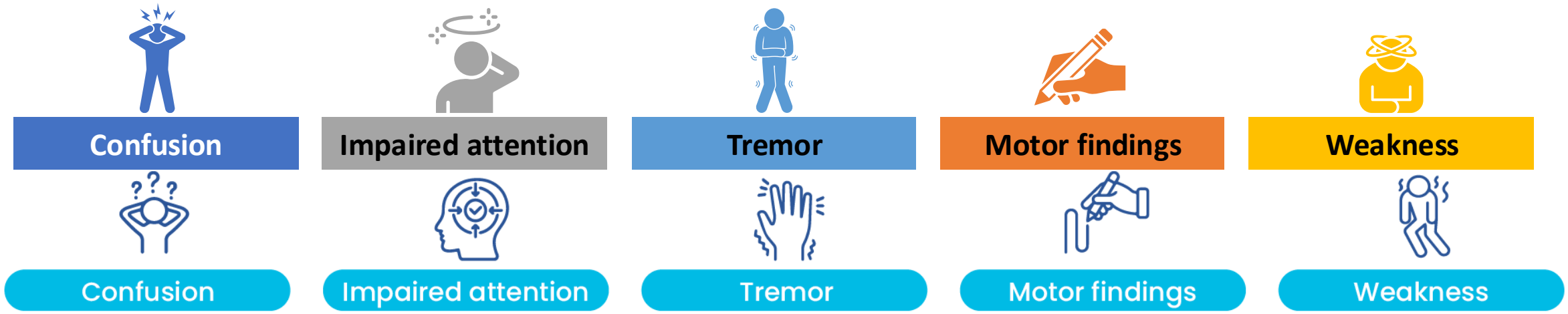
Key Points for Managing CRS Associated With Tarlatamab

Key points for prevention	**Step-up tarlatamab dosing**: C1D1: 1 mg with 24 hr monitoring, C1D8: 10 mg with 24 hr monitoring, C1D15: 10 mg with 6-8 hr monitoring; then C2+ D1, D15: 10 mg with 2-8 hr monitoring **Prophylaxis:** Dexamethasone 8 mg IV on D1, D8; 1L IV fluid on D1, D8, D15			
	Grade 1	**Grade 2**	**Grade 3**	**Grade 4**
Key points for management	Infection workup; Symptom management with paracetamol/ acetaminophen; IV fluids	**Recommend hospitalization** Grade 1 strategies *PLUS* supplemental O_2 if needed Consider: dexamethasone 8 mg/kg IV; tocilizumab 8 mg/kg IV	**ICU** Grade 2 strategies *PLUS* supplemental O_2; vasopressor support; dexamethasone 8 mg/kg IV and/or tocilizumab 8 mg/kg IV	**ICU** Grade 3 strategies *PLUS* supplemental O_2 (positive pressure); multiple vasopressors; dexamethasone; tocilizumab; support for organ failure (ventilation)
		At the next planned dose, administer prophylaxis and monitor patients for 22-24 hr in an appropriate healthcare setting (discontinue for recurrent grade 3)		**Permanently discontinue tarlatamab**

Tarlatamab PI. Sands. Cancer. 2025;131:e35738. Géraud. Eur J Cancer. 2024;205:114075.

ICANS: Symptoms and Timing

- ICANS may occur more commonly after CRS but can also overlap with CRS[1,2]
- ICANS symptoms are highly variable[1]
- Early symptoms may include mild lethargy, dysgraphia, aphasia, impaired attention, confusion, apraxia, and tremors and may progress to altered consciousness, seizures, and cerebral edema[1,2]
- Symptoms develop a median of 5 days after final dose of tarlatamab, with a median time to resolution of 6.5 days[3]



1. Lee. Biol Blood Marrow Transplant. 2019;25:625. 2. Maus. J Immunother Cancer. 2020;8:e001511. 3. Ahn. NEJM. 2023;389:2063.

Implementation of Tarlatamab for SCLC using an Outpatient Care Program

Patients receive tarlatamab in outpatient infusion center

24-hr observation in outpatient oncology immediate care center (ICC) on site

Dexamethasone to be taken prior to return to healthcare facility for later-onset symptoms

Inpatient admission

Preplanned: 10

Direct admission from ICC: 13

Admitted from home

CRS: 5

ICANS: 4

Both: 3

Other: 1

CRS: 2

Infection: 5

Grade	CRS, n	ICANS, n
1	12	9
2	9	8
3	3	5
4	0	0

- Multidisciplinary partnership
- Developed guidance protocol
- Provided training and education on guideline-directed management of CRS and ICANS
- Rollout occurred sequentially from the main site to satellite sites
- Collaborate with community doctors and refer back to community after a few cycles
- Educated patients and caregivers

Carlisle. ASCO 2025. Abstr 8106

Oncology, Primary Care and Survivorship

ONCO-PRIMARY CARE MODEL:

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Oncology, Primary Care, and Survivorship: Time for Onco-primary Care?

Authors: Kevin C. Oeffinger, MD, FASCO , Cheyenne Corbett, PhD , Kevin P. Shah, MD, MBA, and Leah L. Zullig, PhD AUTHORS INFO & AFFILIATIONS

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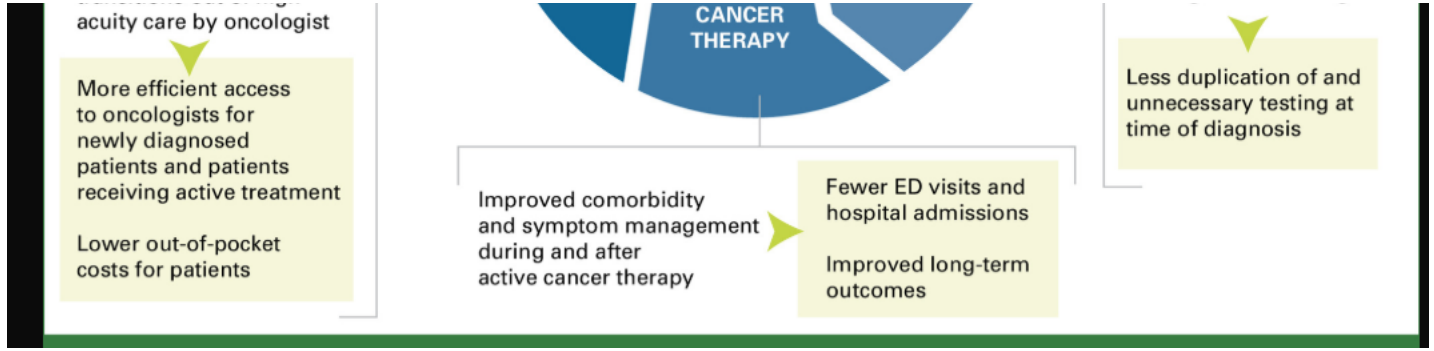

Survivorship

- An individual is considered a cancer survivor from diagnosis through the balance of life-which would include survivors living with cancer and those free of active cancer (NCCN/NCI)

- As of January 2025, there are an estimated 18.6 million cancer survivors in the U.S., representing approximately 5.4–5.5% of the population.

- This number is projected to exceed 22 million by 2035 and may continue growing through 2040 as incidence rises and survival improves due to advances in early detection and treatment

National Comprehensive Cancer Network®

NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®)

Survivorship

Version 2.2026 — April 8, 2026

- Long Term Pain and Hormonal Side effects
- Psychosocial and Sexual Health
- Cognitive decline and Rehab
- Long Term organ toxicities
- Secondary Cancer screening and Vaccination

Plenty of opportunities to collaborate!

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