



Society for Immunotherapy of Cancer

Advances in Cancer Immunotherapy™

# Cancer Immunotherapy in Practice: Is the Benefit Worth the Risk?

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#LearnACI

# Disclosures



Marianne Davies, DNP

- I do not have any disclosures



# Immune Related Adverse Events (IRAEs)

## NEUROLOGIC

- Posterior Reversible Encephalopathy
- Neuropathy
- Guillain-Barre Syndrome
- Myelopathy
- Autoimmune Encephalitis
- Aseptic Meningitis
- Myasthenia gravis
- Transverse Myelitis
- Non-specific symptoms: headache, tremor, lethargy, memory disturbance, seizure

## RESPIRATORY

- Cough/dyspnea
- Laryngitis
- Pneumonitis
- Bronchitis
- Pleuritis
- Sarcoid-like granulomatosis

## RENAL



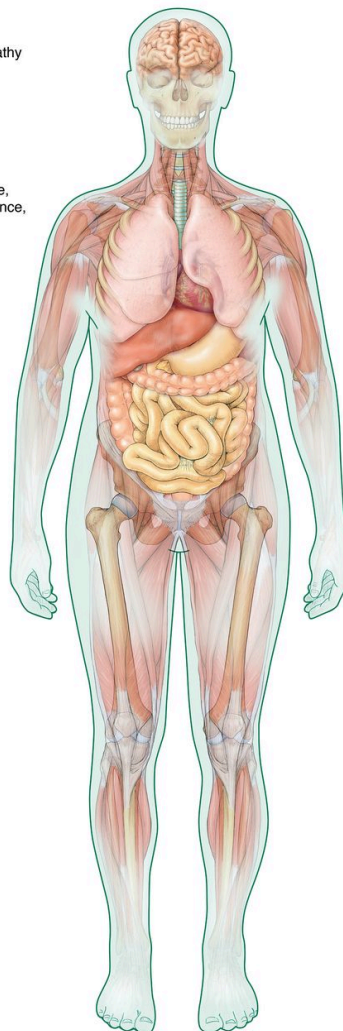
- Tubulointerstitial nephritis
- Acute renal failure
- Lupus nephritis
- Granulomatous lesions
- Thrombotic microangiopathy

## HEMATOLOGIC

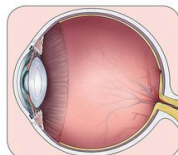
- Autoimmune hemolytic anemia
- Red cell aplasia
- Thrombocytopenia
- Leukopenia/Neutropenia
- Acquired hemophilia
- Myelodysplasia

## DERMATOLOGIC

- Rash/Pruritis
- Mucositis
- Psoriasis
- Vitiligo
- Bullous pemphigoid
- Steven-Johnson syndrome
- DRESS syndrome



## OCULAR



- Uveitis
- Conjunctivitis
- Scleritis, episcleritis
- Optic neuritis
- Blepharitis
- Retinitis
- Peripheral ulcerative keratitis
- Vogt-Koyanagi-Harada

## CARDIOVASCULAR

- Myocarditis
- Pericarditis
- Pericardial effusion
- Arrhythmia
- Hypertension
- Congestive heart failure

## ENDOCRINE

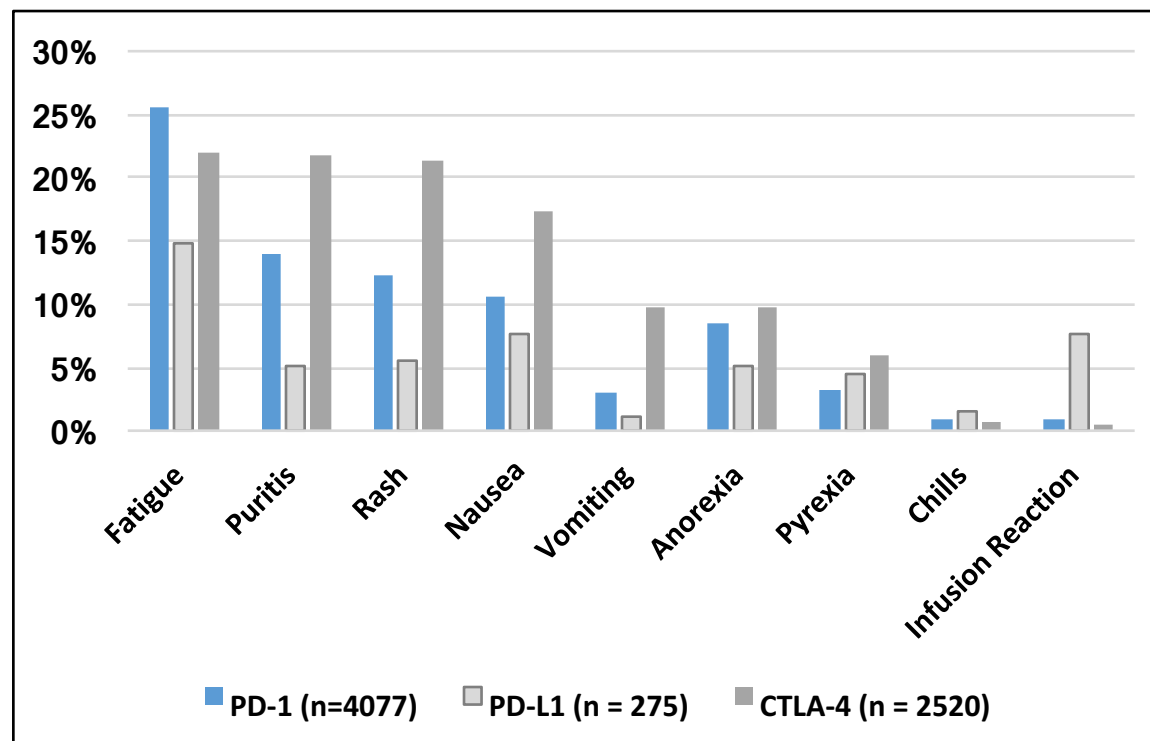
- Hyper or hypothyroidism
- Hypophysitis
- Adrenal insufficiency
- Diabetes

## GASTROINTESTINAL

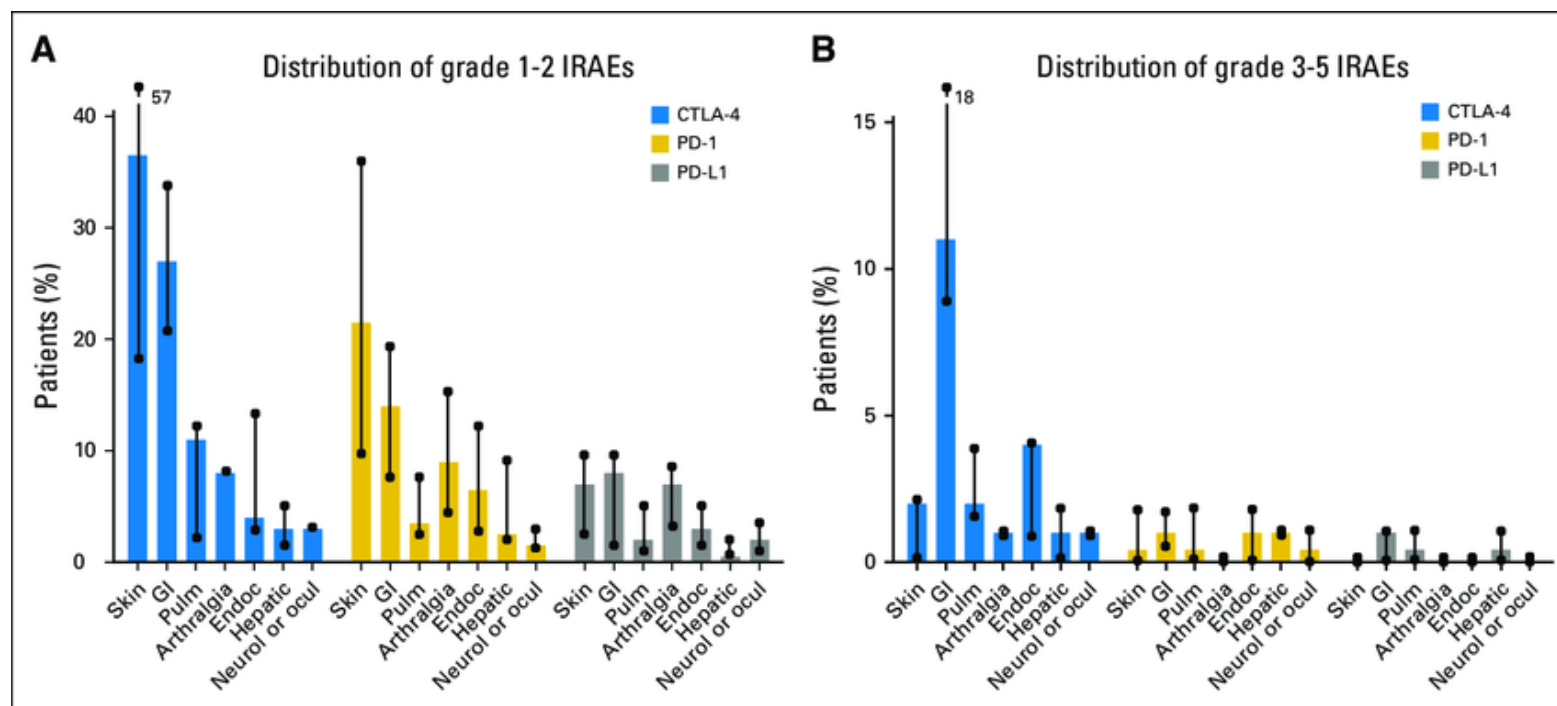
- Diarrhea
- Gastritis
- Colitis
- Ileitis
- Pancreatitis
- Hepatitis

## RHEUMATOLOGIC

- Arthralgias/Myalgias
- Inflammatory Polyarthritis
- PMR-like
- Psoriatic Arthritis
- Oligoarthritis
- Vasculitis
- Sicca Syndrome
- Sarcoidosis
- Inflammatory myositis
- Resorptive bone lesions and fractures



# Frequency of irAEs with ICI Monotherapy



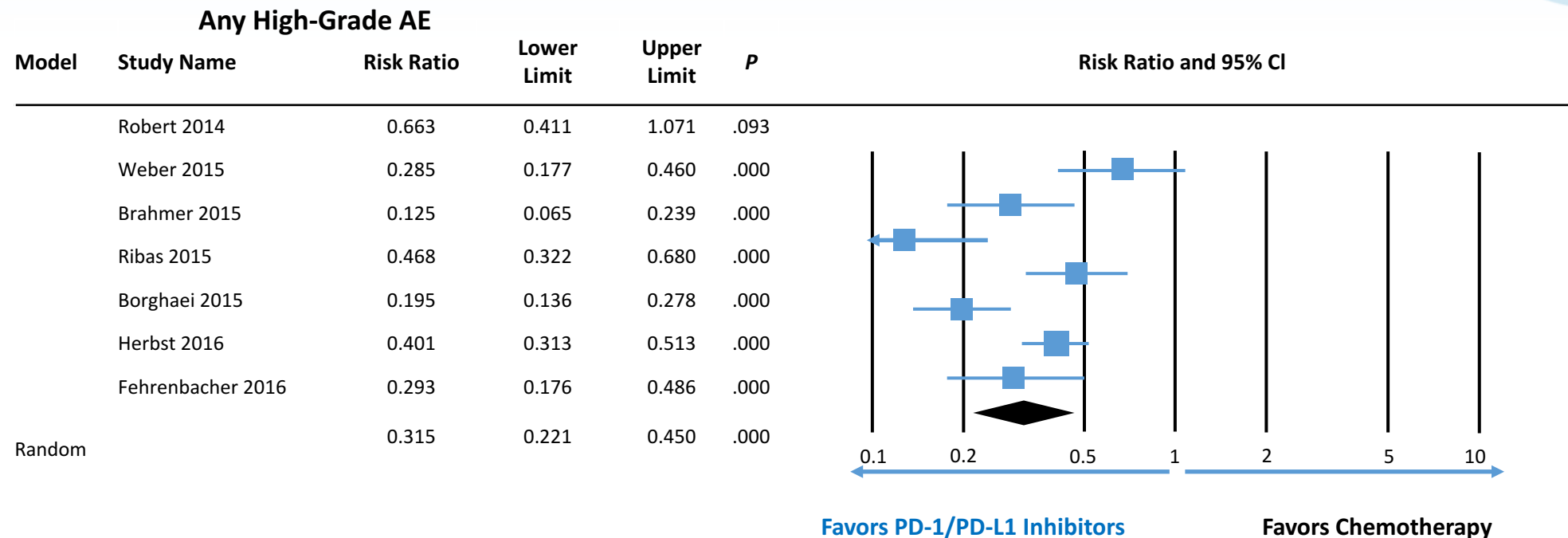
- **Onset**

- Median onset is 5-12 weeks after initiation
  - Within days of first dose
  - After months of treatment
  - After discontinuation of therapy

- **Severity**

- Incidence/severity higher in anti-CTLA-4 agents
- High grade AE to one does not preclude safe administration to another class

# Checkpoint Inhibitor vs Chemotherapy



- Lower total AEs<sup>a</sup> (67.6% vs 82.9%)
- Lower high-grade AEs<sup>a</sup> (11.4% vs 35.7%)
- Lower treatment discontinuation <sup>a</sup> (4.5% vs 11.1%)
- Lower treatment-related deaths (0.6% vs 1.4%)

<sup>a</sup> Statistically significant.

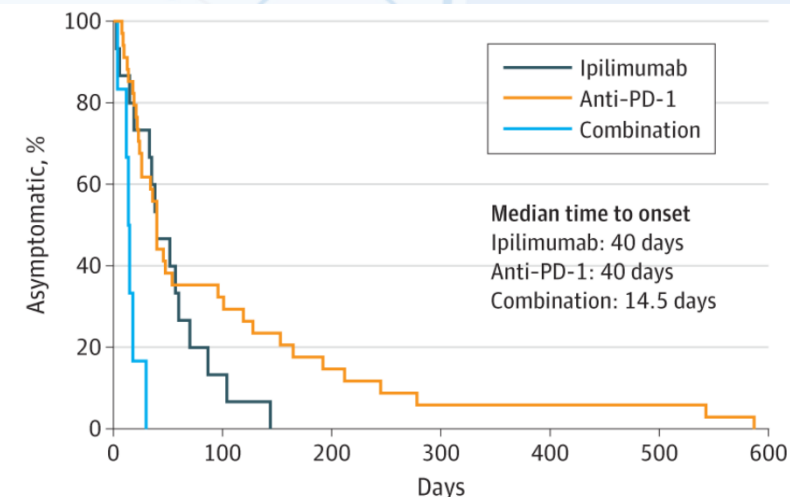
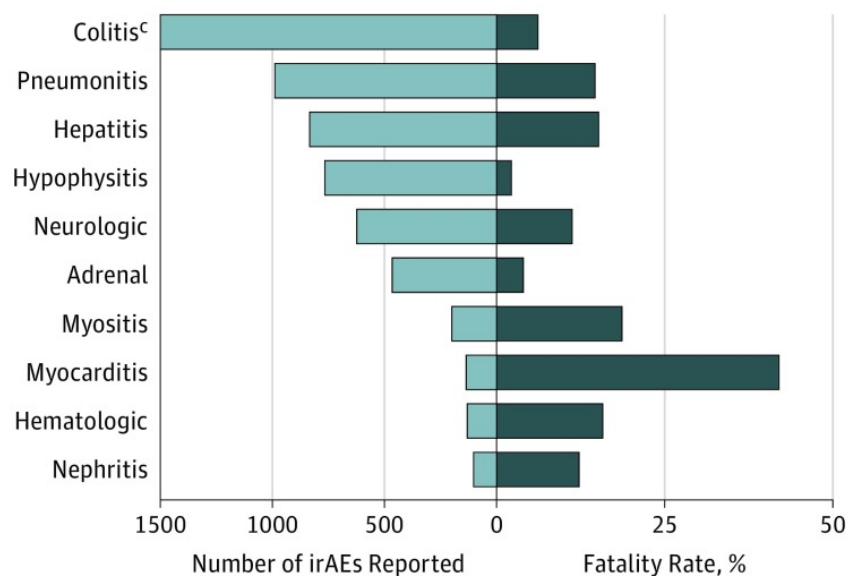
Nishijima TF et al. *Oncologist*. 2017;22:470-479.



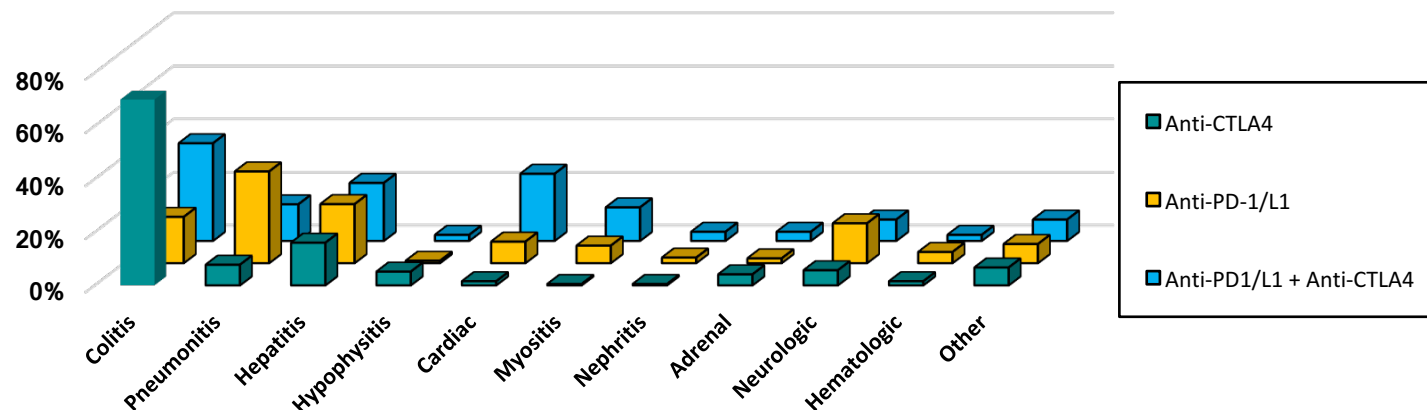
# Fatal irAEs

- Chemotherapy Fatalities: 1.4%
- ICB Fatality rates vary: 0.25%-1.1%

Cases and fatality rates

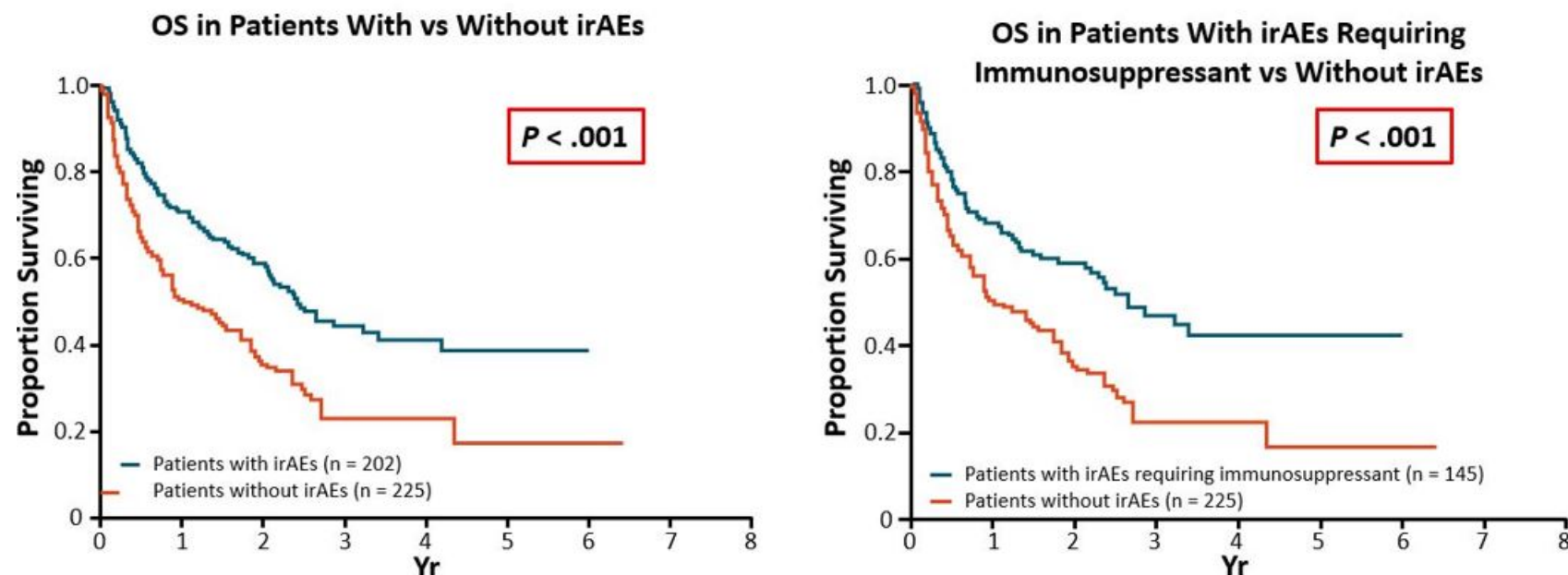


No. at risk							
Ipilimumab	15	2	0	0	0	0	0
Anti-PD-1	34	11	5	2	2	2	0
Combination	6	0	0	0	0	0	0



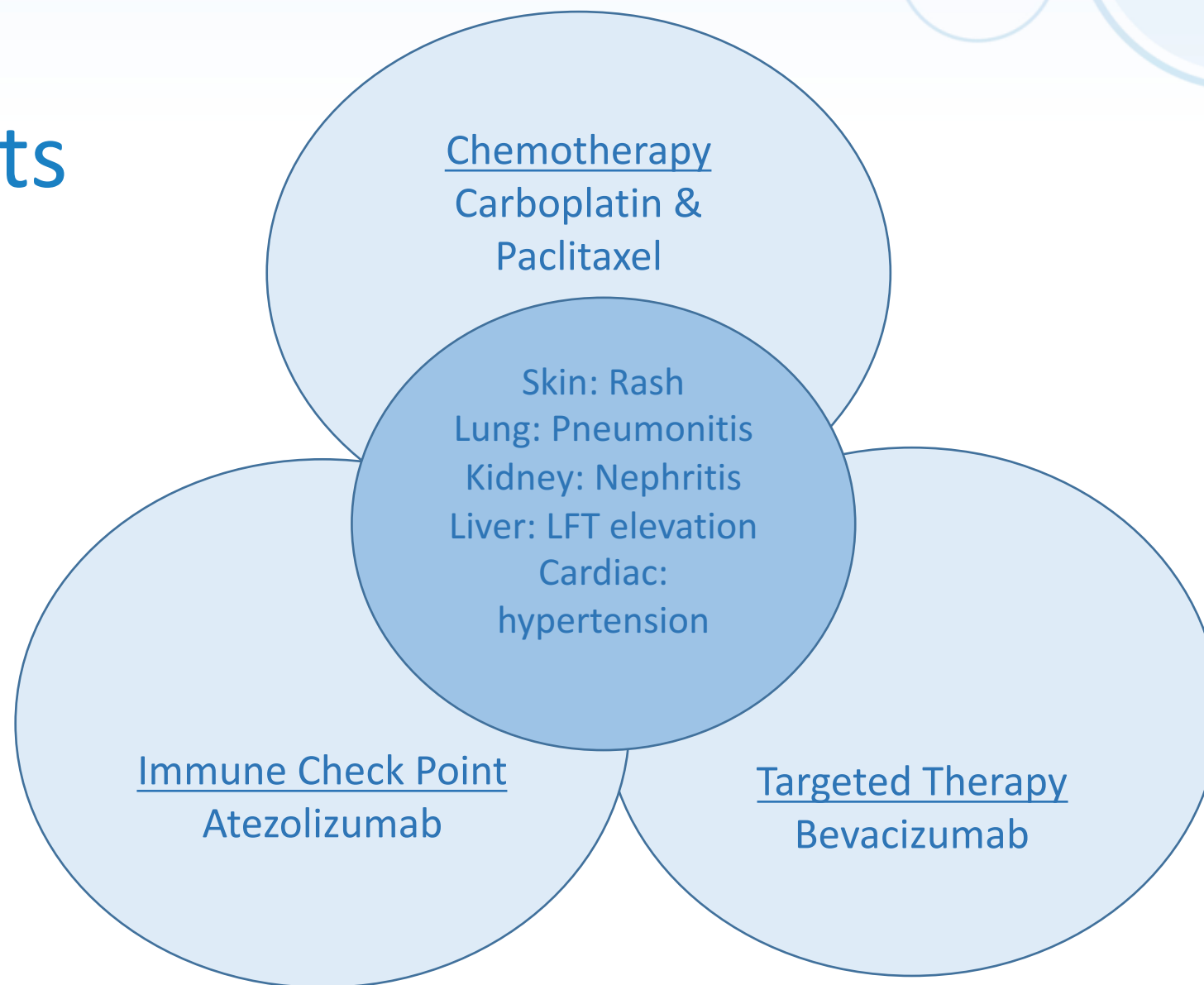
Wang et al. 2018. JAMA Oncol. ; Nishijima et al. 2017. The Oncologist

# Immune Related Adverse Events A Prognostic Biomarker?



- Based on **retrospective** data, patients who experience irAEs (regardless of needing treatment) may have better outcomes compared to patients who do not experience irAEs

# Overlapping Adverse Effects





## Prior to Start of Therapy

### Providers

- Understanding of immune toxicity spectrum
- Identification of IO champions within organization



### Patient Assessment

- Evaluate for autoimmune risks
  - Autoimmune diagnosis
  - Prior organ transplantation
    - Risk of graft loss
- Medication reconciliation, including OTC and herbal
  - Immunosuppressants, immune-stimulants, immune-modulating
  - Antibiotic Use

### Patient Preparation

- Manage expectations about biomarker testing and treatment candidacy
- Adequate birth control during & for at least 5 months after ICPI
- Vaccinations prior to start of therapy
  - Inactivated or killed preparations while on ICPI
  - Live vaccine use not recommended

# Preparation & Prevention

## EDUCATION

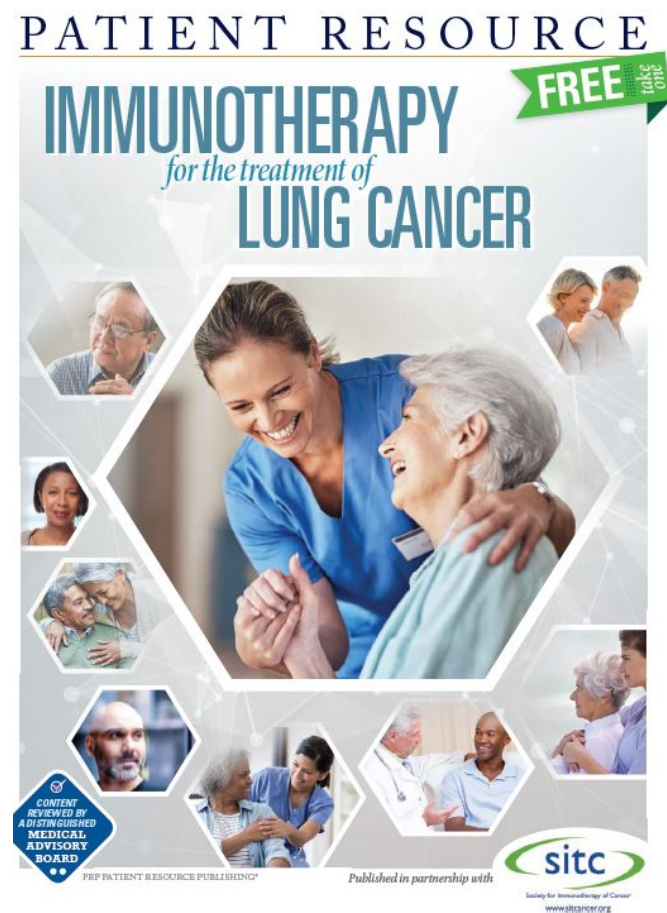
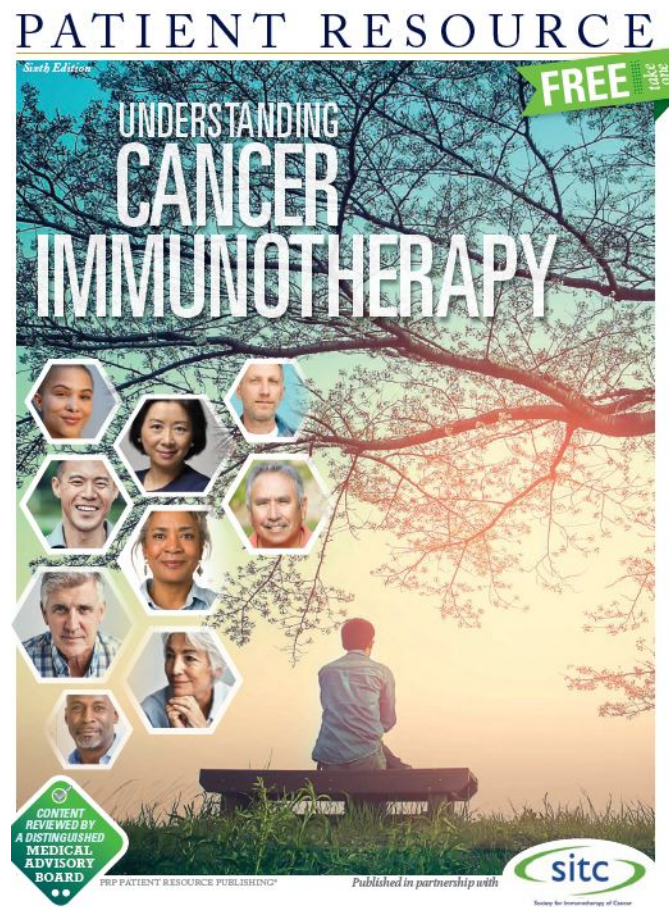
- **How the Immune System works**
- **Role of Immune Checkpoint Inhibitors**
- **Expectations of treatment response**
- **Mechanism of IRAEs**

- **Potential adverse events (IRAEs)**
  - **Onset & presentation**
- **Management of IRAEs**
  - **Telephone Triage**
- **Implications of IRAEs**

**Considerations: Language, Culture, Literacy, Timing, Access**



# Patient Education Resources





# Patient Education Resources

American Society of Clinical Oncology

National Comprehensive Cancer Network

**ASCO** answers

## Side Effects of Immunotherapy

### What is immunotherapy?

Immunotherapy is a treatment that helps your body's immune system fight cancer. The immune system is your body's natural defense system. There are several types of immunotherapy that work in different ways. These medicines are also called "biologics."

You can have immunotherapy by itself or with chemotherapy, radiation therapy, or other treatments. Immunotherapy is given in a doctor's office or in the hospital, usually through a vein (intravenously or IV). Your cancer care team will closely monitor your health during and after this type of treatment.

### What side effects can immunotherapy cause?

Immunotherapy is different from traditional chemotherapy, and it can cause different side effects. These are different for each person. That's why it's important to let your health care team know right away about any changes in how you are feeling.

Side effects depend on the medication, your dose and treatment schedule, cancer type, general health, and other factors. Immunotherapy side effects may happen during treatment, after some time following each treatment, or shortly or years after treatment ends. They can include:

- **Skin and hair changes.** Rash, itching, swelling, itching dry skin, and/or sensitivity to the sun. You might also notice hair loss or extra hair growth.
- **Flu-like symptoms.** Fever, chills, headache, weakness, fatigue, muscle aches, and/or swelling. Your body might feel achy, like you have the flu. Immunotherapy can also cause muscle and joint pain.
- **Immune changes.** For example, immunotherapy might affect your thyroid gland. If it cannot make enough thyroid hormone, you might gain weight and feel very tired. Your doctor may monitor your hormone levels during treatment, depending on what type of immunotherapy you receive.
- **Other side effects.** These can include breathing problems, swelling in your legs, stomach pain, changes in bowel movements, vision changes, sinus congestion, or numbness, tingling, and pain in your hands and feet.

Immunotherapy may be more likely to cause side effects if you take more than 1 type of immunotherapy or take other medicines, including chemotherapy, at the same time.

### Can these side effects be treated?

Yes. Many immunotherapy side effects can be treated. Let your doctor know about any new, continuing, or worsening medical problems you have, even if you don't think it is serious or an emergency if it is related to the immunotherapy. For certain ongoing problems, you might see a specialist. For example, you may see a dermatologist for skin problems, an endocrinologist for hormone problems, or a gastroenterologist for digestive problems.

Some side effects are serious and need treatment right away. If you need medical care at an emergency room or other place not familiar with your cancer treatment, be sure to tell them that you are receiving "immunotherapy" for cancer.

### How can I avoid side effects of immunotherapy?

Talking with your doctor is the best way to prevent and manage immunotherapy side effects. Ask what to expect with your type of immunotherapy and how to avoid side effects. If side effects are likely, ask how they will be treated and when to call your doctor.



### Side effects: Know what to look for

Side effects of immunotherapy can be mild, moderate, or even life threatening. Talk with your doctor to learn which side effects need immediate medical care. With the help of your health care team, check off or circle the immunotherapy side effects that you should watch for. Make copies. If you need to, bring them with you to your appointments or any place where you receive medical care.

### Immunotherapy drug and dose

Type of cancer \_\_\_\_\_ Cancer stage \_\_\_\_\_

### Possible side effects of this immunotherapy medication\*

Any one of these could be a sign of a serious problem. Contact your doctor if you experience a side effect of immunotherapy.

- |   |   |  |  |
|---|---|--|--|
| <input type="checkbox"/> Fever                        | <input type="checkbox"/> Sweating more              | <input type="checkbox"/> Nausea, vomiting            | <input type="checkbox"/> Changes in vision         |
| <input type="checkbox"/> Headaches                    | <input type="checkbox"/> Feeling faint, passing out | <input type="checkbox"/> Numbness or tingling        | <input type="checkbox"/> Diarrhea                  |
| <input type="checkbox"/> Blood in urine or dark urine | <input type="checkbox"/> Confusion                  | <input type="checkbox"/> Fast heartbeat              | <input type="checkbox"/> Constipation              |
| <input type="checkbox"/> Muscle and joint pain        | <input type="checkbox"/> Tiredness                  | <input type="checkbox"/> New swelling or weight gain | <input type="checkbox"/> Pain in body area         |
| <input type="checkbox"/> Cough                        | <input type="checkbox"/> Rash, itching, blisters    | <input type="checkbox"/> Soft stool                  | <input type="checkbox"/> Hair loss or extra growth |
| <input type="checkbox"/> Breathing problems           | <input type="checkbox"/> Redness                    | <input type="checkbox"/> Weight loss or gain         | <input type="checkbox"/> Swelling                  |
| <input type="checkbox"/> Shivering or feeling cold    | <input type="checkbox"/> Yellow skin or eyes        | <input type="checkbox"/> Body aches                  |  |
| <input type="checkbox"/> Other _____                  |   |  |  |

What other medical treatments are you receiving? \_\_\_\_\_

I should contact my doctor's office right away if I have these serious side effects: \_\_\_\_\_

Doctor's name \_\_\_\_\_ Phone \_\_\_\_\_ Email \_\_\_\_\_

For more information on the side effects of immunotherapy, visit [www.cancer.net/sideeffects](http://www.cancer.net/sideeffects). Download Cancer.Net's free mobile app at [www.cancer.net/app](http://www.cancer.net/app) to track and monitor side effects.

\*This is not a complete list. Be sure to talk with your doctor about the side effects of immunotherapy.

The side effect information presented here is not medical advice. It is presented as information from the American Society of Clinical Oncology (ASCO) and the National Cancer Institute (NCI). It is not intended to replace the advice of your doctor. The information is for informational purposes only and is not intended to be used as a substitute for medical advice or to replace the advice of your doctor. The information is for informational purposes only and is not intended to be used as a substitute for medical advice or to replace the advice of your doctor. The information is for informational purposes only and is not intended to be used as a substitute for medical advice or to replace the advice of your doctor.

Health Care Professionals: To order more printed copies, please call 800-275-2262 or visit [www.cancer.net/info](http://www.cancer.net/info).

**Cancer.Net**

Online-Approved Patient Education from ASCO®

ASCO is the Society for Immunotherapy of Cancer (SITC).  
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THE AMO INSPIRATION

100-0000000000000000

**Understanding Immunotherapy Side Effects**

Immune checkpoint inhibitors (a type of immunotherapy) offer a promising new way to treat cancer for some patients. But these medicines can occasionally cause your immune system to attack normal organs and tissues in your body, affecting the way they work. Serious side effects typically occur in less than 5% of patients, but certain side effects can occur in up to 30%–50% of patients.

Contact your health care professional right away if you think you may be experiencing...

- Brain inflammation (encephalitis)**  
Fever, confusion, changes in mood or behavior, neck stiffness, seizures, extreme sensitivity to light.
- Eye problems**  
Blurry or double vision or other vision problems, eye pain or redness.
- Heart problems (myocarditis, arrhythmias)**  
Inflammation of the heart muscle, irregular heartbeat.
- Liver problems (hepatitis)**  
Yellowing of the skin or the whites of the eyes, extreme nausea or vomiting, pain on the right side of the stomach area, dark urine, bleeding or bruising more easily than normal.
- Lung problems (pneumonitis)**  
New or worsening cough, shortness of breath.
- Intestinal problems (colitis)**  
Diarrhea or more frequent stools that have blood or are dark, tarry, or sticky; severe stomach-ache pain.
- Kidney problems**  
Decrease in the amount of urine, blood in the urine.
- Skin problems**  
Rashes, itching, blisters, painful sores or ulcers.
- Nerve problems**  
Numbness or tingling in hands or feet, unusual weakness in legs, arms, or torso.
- Joint or muscle problems**  
Swelling or generalized muscle or joint pain, severe muscle weakness.

**What is immunotherapy?**

- ✓ Immune checkpoint inhibitors are a type of cancer medicine called immunotherapy.
- ✓ These medicines are designed to work with your immune system to treat certain types of cancer.
- ✓ Immunotherapy works differently than traditional chemotherapy and can cause different kinds of side effects.
- ✓ It is important to be aware of possible side effects and contact your health care professional right away if you experience any problems.

**Current FDA-Approved Immune Checkpoint Inhibitors**

- Atezolizumab (Tecentriq®)
- Avelumab (Bavencor®)
- Ipilimumab (Opdivo®)
- Nivolumab (Opdivo®)
- Pembrolizumab (Keytruda®)

**Did you know?**

- No matter where your cancer began, side effects from immunotherapy can affect your whole body.
- Side effects may appear shortly after beginning treatment, within the first couple of months, or even after you finish treatment.
- Because many of these side effects can occur from other causes that would be treated differently, make sure your doctor knows you are or were on immunotherapy.
- You may be more likely to experience side effects if you are taking more than one kind of immunotherapy or immunotherapy combined with other types of cancer medicines.
- Many of these immune side effects are treatable. Your doctor may prescribe corticosteroids or other medications to help manage any problems.
- There are serious side effects that can lead to death, especially if left untreated.

This information does not replace the expertise and clinical judgment of the clinician. If you think you are experiencing these symptoms, call your doctor today.

**NOW AVAILABLE!**  
NCCN Guidelines for Patients®  
Immunotherapy Side Effects series  
Available at [NCCN.org/patients](http://NCCN.org/patients)

**NCCN** National Comprehensive Cancer Network  
NCCN Clinical Practice Guidelines  
Version 1.2020  
Pembrolizumab, Keytruda®  
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# Patient Education Resources

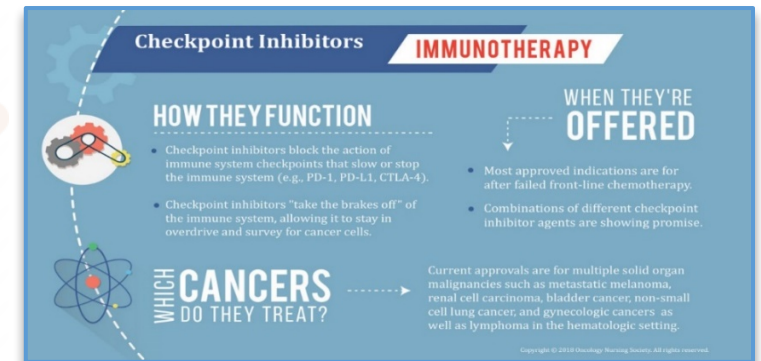
## AIM with Immunotherapy Immuno-Oncology Essentials



## ACCC



## Oncology Nursing Society



# Patient Education Resources

## Cancer Support Community



This booklet gives an overview of immunotherapy and explains how this type of treatment uses the body's natural defenses (immune system) to identify, attack, and kill cancer cells.

Researchers have been trying to use the body's natural defense system to fight cancer for over 100 years. Recent findings have helped scientists understand how this process works. Today, immunotherapy is

being used for several common cancer types. It is estimated that more than half of current cancer clinical trials include some form of immunotherapy. While immunotherapy helps some patients live longer and better, it may not be an option for every patient or cancer type.



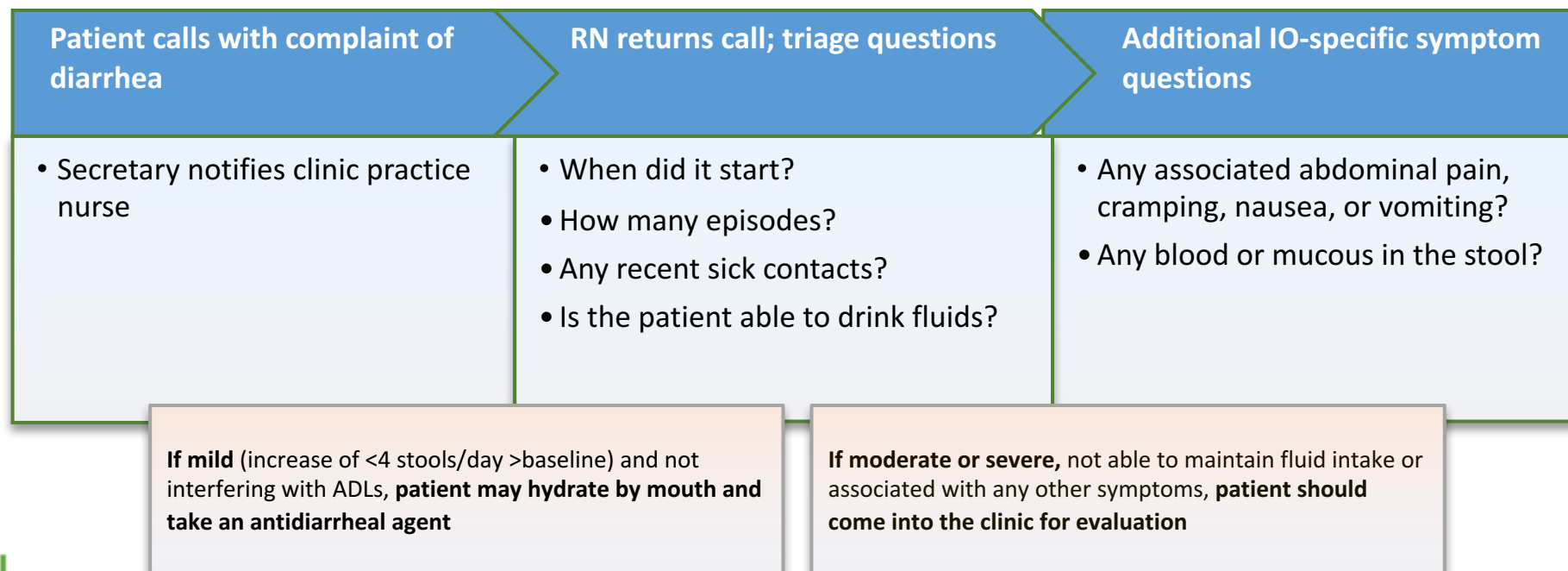
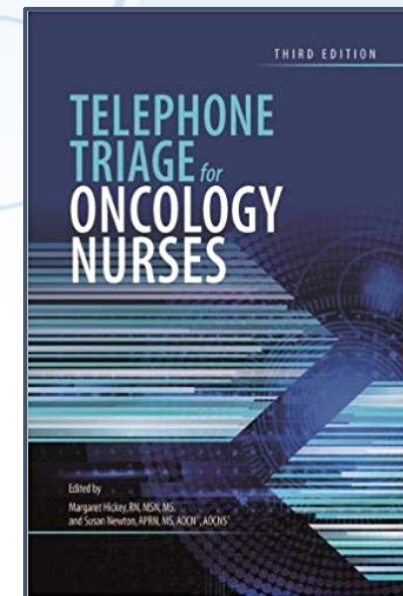
## LUNGEVITY





# Telephone Triage: Guidelines

- Provides tool to distinguish which patients can be treated at home and which ones need to come into the clinic
- **All staff must be educated in the use and updates of the Telephone Triage guidelines**
- Early identification of symptoms will minimize severity of AEs and keep patients on beneficial therapy for a longer period of time



# Telephone Triage: Challenges

## Variable onset of irAEs

25% of ED visits by patients treated with ICPI are due to irAEs<sup>1</sup>

## • CMS implications

By 2020, hospital penalties for cancer hospitals for patient visits to ED or hospitalizations due to chemotherapy; rules for ICPI likely to follow

## • Patient considerations

- ☐ Is the patient a reliable and accurate “historian”?
- ☐ How reliable is the patient to follow telephone instructions? Comprehension of “sense of urgency”?
- ☐ Language barriers, cognitive deficits, alcohol and drug use, comorbidities?
- ☐ How far does the patient live from the clinic? Is there available transportation?
- ☐ What support or resources does the patient have to follow guidelines?

# Managing IRAEs

## Detection

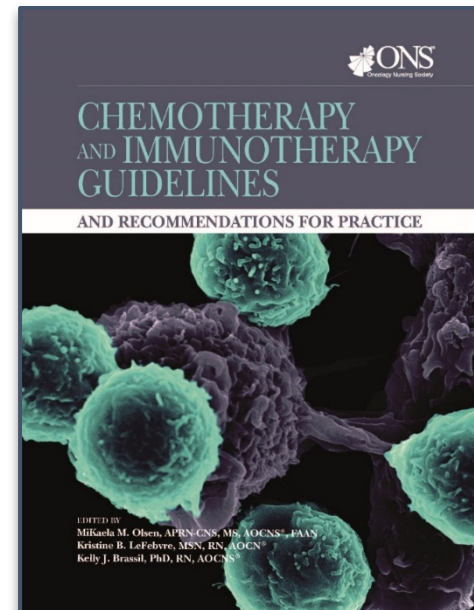
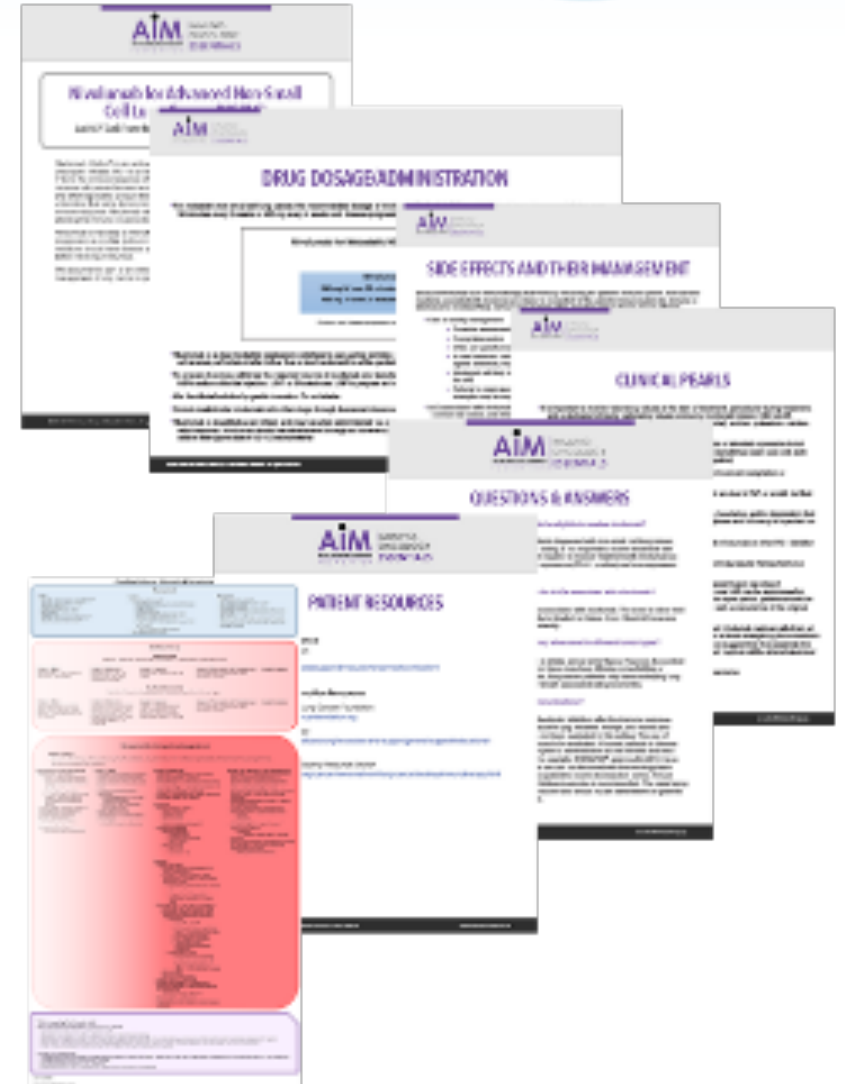
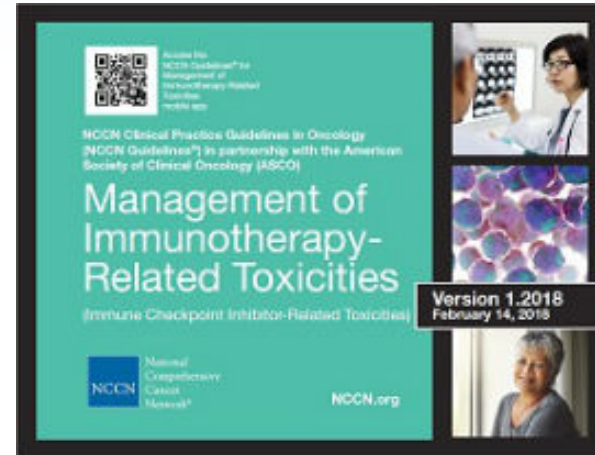
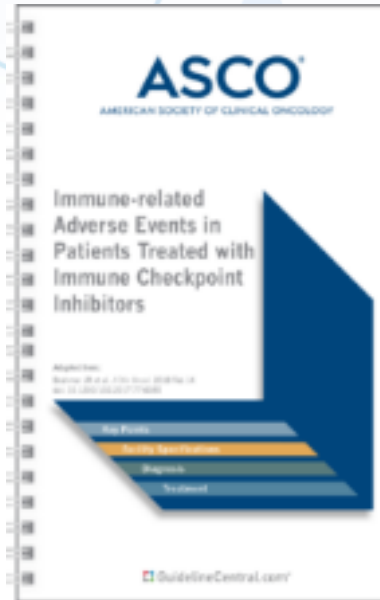
### Interventions

- Regular monitoring
- Telephone triage
- Use of Toxicity Management Guidelines
- Rule out other causes
- Assess and monitor kinetics of toxicity
- Determine need for hospitalization vs ambulatory care

### Patient Education

- Therapy requires close communication
- Report any new signs or symptoms that develop
- Report if seen by any other healthcare provider or admitted to the hospital

# Clinical Practice Guidelines



#LearnACI

# Algorithm for Management of IRAEs

Questions: Continue ICPI, Suspend, Discontinue  
Use of Steroids & Referral to specialists

- **Grade 1: asymptomatic to mild symptoms**
  - Observation
  - Supportive Care
  - Intervention not needed
- **Grade 2: moderate symptoms**
  - Local or noninvasive intervention indicated
  - Withhold drug, consider redose if toxicity resolves to grade  $\leq 1$
  - Low-dose corticosteroids likely needed
    - 0.5 to 1.0 mg methylprednisolone
  - May be able to continue treatment
- **Grade 3: medically significant but not immediately life-threatening**
  - Stop immunotherapy immediately
  - Hospitalization indicated
  - High-dose steroids indicated
    - 1.0-2.0 mg methylprednisolone
  - Slow steroid taper over  $\geq 1$  mo once toxicity resolves to grade  $\leq 1$
- **Grade 4: life-threatening consequences**
  - Urgent intervention
  - Permanently discontinue ICI therapy



# Dermatologic IRAE: macules, papules, pustules

## Education & Assessment

### What Patient Should Report?

- Dry Skin
- Pruritis
- Rash
- Skin peeling
- Blistering
- Oral lesions
- Anal, genitourinary, vaginal lesions
- Impact on ADLs

### What to Assess

- Total body exam (including mucosa)
- Distribution of rash
- Presence of peeling or blistering
- Prior history of dermatologic autoimmune disease (eczema, psoriasis, scleroderma)

### Rule out other causes

- Other drug reaction
  - Chemotherapy
- Cellulitis
- Contact dermatitis
- Sun Exposure
- Radiation Recall
- Infection
- Bullous dermatitis
- DRESS/DIHS
- Stevens-Johnson Syndrome/ Toxic epidermal necrolysis

Supportive Care: Gentle skin care, non-steroidal moisturizers or emollients; sun protective measures; Oral antihistamines for pruritus

## GRADING

1

- Mild <10% BSA
- With/out other symptoms (pruritis, burning, tightness)

2

- Moderate 10-30% BSA
- With/out other symptoms
- Limit IADLs

3

- Severe >30% BSA
- Limiting self-care ADLs

4

- Potentially Life-Threatening
- Papules/pustules, sloughing; superinfection



# Gastrointestinal IRAE: diarrhea, colitis

## Education & Assessment

### What Patient Should Report?

- Increase in stool frequency
- Increase in ostomy output
- Blood or mucous in stool
- Abdominal cramping/pain
- Urgency, incontinence

### What to Assess

- Calculate freq. & volume of diarrhea
- History of opioid constipation
- Stool cultures
- Stool lactoferrin +/- calprotectin if available

### Rule out other causes

- Dietary intolerance
- Infectious etiology
- Other drug cause (bowel regimen; antibiotics)

Supportive Care: Bland BRAT diet, Hydration, anti-spasmodic, anti-diarrheal; discontinue laxatives or stool softeners

## GRADING

1

- < 4 stools > base
- Mild increase in ostomy output
- Asymptomatic

2

- 4-6 stools > baseline
- Limiting ADLs
- Abdominal cramps/pain

3

- > 7 stools > baseline
- Limiting self-care ADLs
- Severe abdominal pain; peritoneal signs

4

- Life-threatening
- Hemodynamic collapse

# Pulmonary IRAE: pneumonitis

## Education & Assessment

What Patient Should Report?	What to Assess	Rule out other causes
<ul style="list-style-type: none"> <li>• Increase or new onset dyspnea, cough, wheezing, chest pain, fever, increased oxygen requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Oxygen saturation at rest and ambulation</li> <li>• Resp rate</li> <li>• Breath sounds</li> <li>• Nasal swab</li> <li>• Sputum culture</li> <li>• CXR</li> <li>• CTA</li> </ul>	<ul style="list-style-type: none"> <li>• Infection</li> <li>• Disease progression</li> <li>• Pulmonary embolism</li> <li>• Pleural effusion</li> <li>• Pulmonary fibrosis post Radiation Therapy</li> </ul>
Supportive Care: Smoking cessation; vaccinations (influenza, pneumococcal)		

## GRADING

1

- <25% lung, confined to one lobe
- Asymptomatic
- Diagnostic observation

2

- 25-50% of lung
- Symptomatic: SOB, cough, chest pain
- Limiting IADLs

3

- > 50% of lung
- Severe symptoms
- Limiting self-care ADLs
- Oxygen indicated

4

- Life-threatening
- Respiratory compromise

# Hepatic IRAE: transaminitis, hepatitis

## Education & Assessment

### What Patient Should Report?

- Abdominal pain
- Nausea, emesis
- Yellowing of skin
- Bleeding or bruising
- Drowsiness
- Fatigue
- Change in stool culture
- Ascites
- Excessive skin itching

### What to Assess

- Liver function tests: Total bilirubin, AST, ALT, Alk Phos
- Electrolytes
- Viral panel: hepatitis

### Rule out other causes

- Hepatotoxic drugs: acetaminophen, supplements
- Concurrent Chemotherapy
- ETOH use
- Infection
- Reactivation of viral hepatitis
- Disease progression

Supportive Care: Limit hepatotoxic drugs and alcohol use  
Infliximab CONTRAINDICATED due to potential hepatotoxic effects

## GRADING

1

- AST/ALT: > ULN-3.0 x ULN
- T Bili: > ULN-1.5xULN

2

- AST/ALT: >3.0-5.0 x ULN
- Tbili: >1.5-3.0xULN

3

- AST/ALT: >5.0-20.0x ULN
- Tbili: >3.0-10.0xULN

4

- AST/ALT: > 20x ULN
- T Bili: > 10 x ULN

# Renal IRAE: nephritis

## Education & Assessment

### What Patient Should Report?

- Vague nausea
- Decreased urine output
- Blood in urine
- Ankle swelling

### What to Assess

- Serum creatinine
- Electrolytes
- Urinalysis
- Urine protein/creatinine ratio
- Urine lytes & osmo

### Rule out other causes

- Other nephrotoxic drugs: antibiotics, NSAIDs, PPIs
- Concurrent Chemo
- Contrast dye
- Dehydration
- Pre/post renal causes
- Infection

Supportive Care: Hydration; Limit nephrotoxic drugs and use of contrast dye

## GRADING

1

- Creatinine >ULN-1.5 x ULN

2

- Creatinine >1.5- 3.0 x baseline; > 1.5-3.0 x ULN

3

- Creatinine >3.0 baseline; >3.0- 6.0 x ULN

4

- Creatinine > 6.0 ULN
- Life-Threatening
- Dialysis indicated

# Endocrine Toxicities: Thyroid

## Presentation

Fatigue, sluggishness, anorexia, weight loss/gain, irritability, mood change, palpitations, feeling hot/cold, visual disturbances, headaches, change in sexual drive.

## Assessment

- Close laboratory monitoring  
Monitor TSH & free T4 every 4-6 weeks
- Rule out other causes: infection, brain metastases, primary vs secondary AE

## SURGICAL Considerations

- Anesthesia complications from untreated hypothyroidism -> delayed emergence, hypothermia, bradycardia, low cardiac output and impaired hypoxic and hypercapnic respiratory drive.
- In severe cases, myxedema coma. Hypoventilation, profound hypotension, bradycardia, severe hypothermia & electrolyte abnormalities.
- If suspicion, 200-400 µg IV levothyroxine (T4) followed by 100 µg day or 10-24 µg triiodothyronine (T3) every 8 hours (caution with cardiac patients).
- Untreated hyperthyroidism -> risk of thyroid storm intraoperatively. Tachycardia, fever, cardiovascular collapse.
- Tx: IV beta-blockers and hydration
- If sub-clinical, initiate beta-blocker with methimazole or propylthiouracil several weeks before surgery

## Treatment: Thyroid Dysfunction

Levothyroxine: adjust levels to maintain free T4 level at mid-range

Typically: 1.6 mcg/kg/day

Educate patients that hormone replacement is likely lifetime

### Asymptomatic Hypothyroidism

- TSH btw 4-10; T4 norm: continue ICPI
- TSH >10; T4 norm: continue; consider levothyroxine
- TSH low; T4 low/norm: consider central hypothyroidism

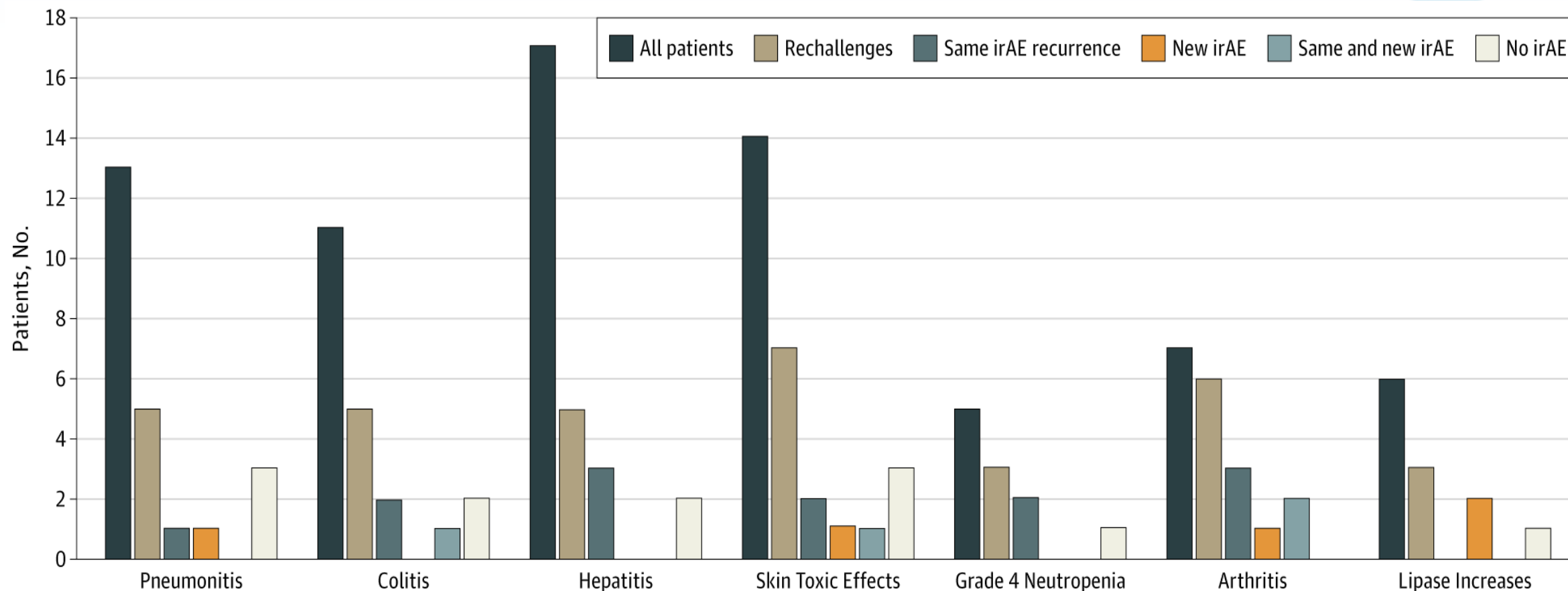
### Clinical Hypothyroidism

- Monitor TSH and T4 every 4-6 weeks
- Levothyroxine replacement
- Consider endocrine consultation
- Exclude concomitant adrenal insufficiency

### Thyrotoxicosis

- Continue ICPI
- Propranolol for palpitations
- Repeat TFTs in 4-6 weeks.

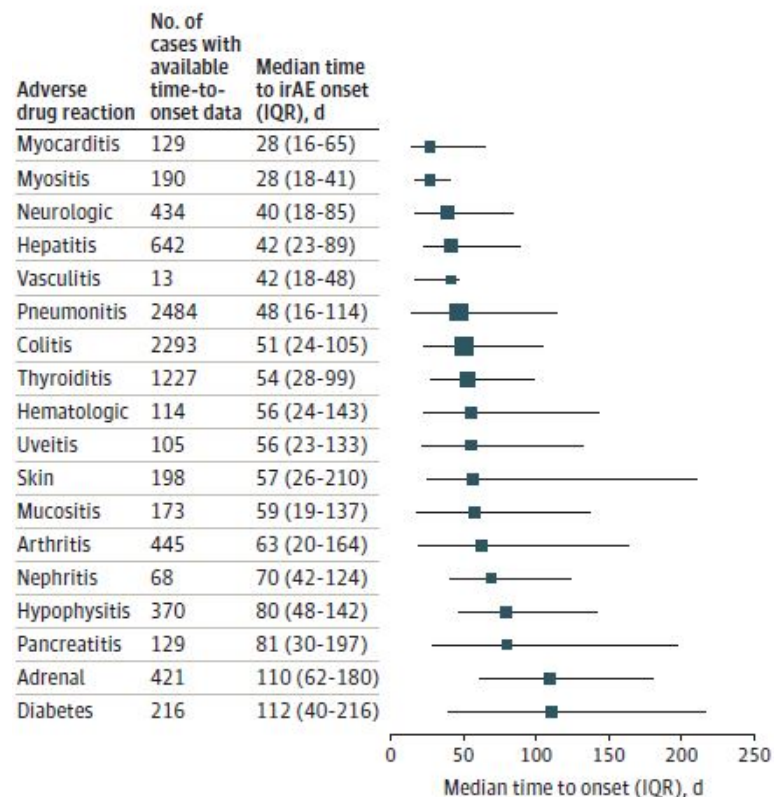
## Patient Outcomes after Anti-PD-1 or Anti-PD-L1 Rechallenge following irAEs



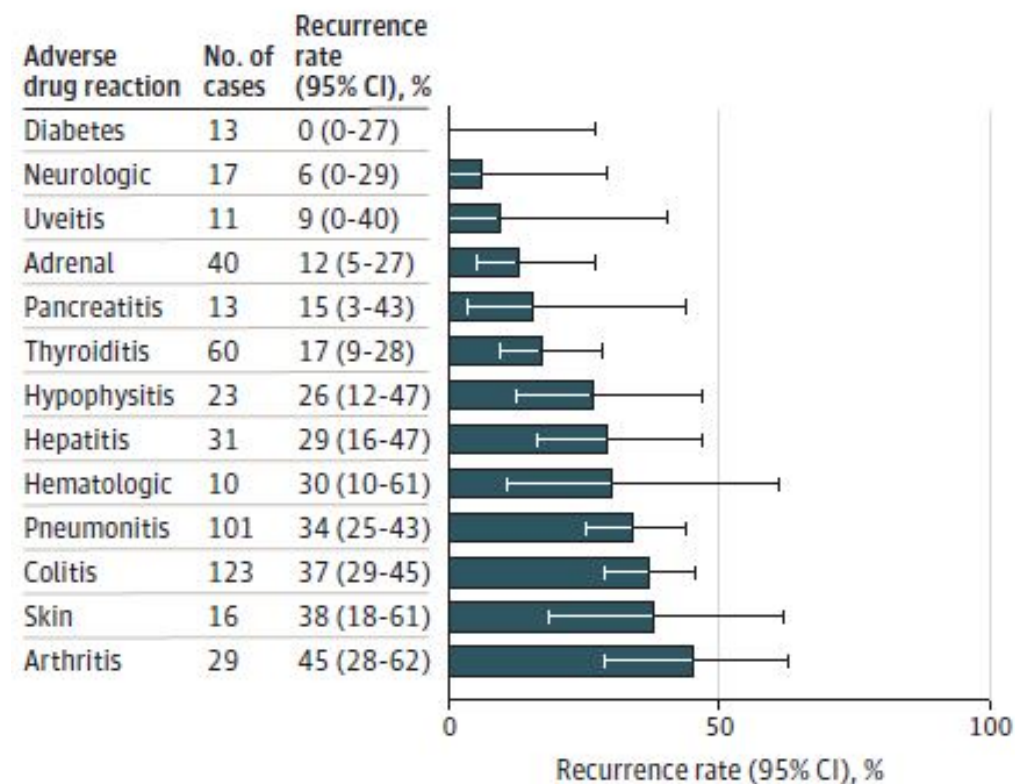
Simonaggio et al. JAMA Oncol 2019; 5 (9):1310-1317



# Rechallenge After IRAEs



Squares represent the median and whiskers represent the interquartile range (IQR) of time to immune-related adverse event (irAE) onset. Square size is log-proportional to the number of cases.



# Multidisciplinary Strategies to Reduce Acute Care

(Handley, 2018)

## Strategy

## Example Interventions (order of complexity)

Enhance access and care coordination

- Reliable mechanisms for patient to contact the care team
- Improved and standardized care transitions
- Patient Navigation programs
- **Automated Hovering**

Standardized clinical pathways for symptom management

- Outpatient symptom management and telephone triage
- Supportive care
- ED symptom pathways

Develop urgent care tactics

- Flexible scheduling and embedded urgent care
- Cancer providers embedded in ED
- Dedicated acute care treatment clinics
- Dedicated cancer ED

# BEST PRACTICE MODELS

## Immune Toxicity Clinics

- Specialized clinics to treat patient's with emergent IMAEs staffed by specialists with expertise

## Immune Tumor Boards

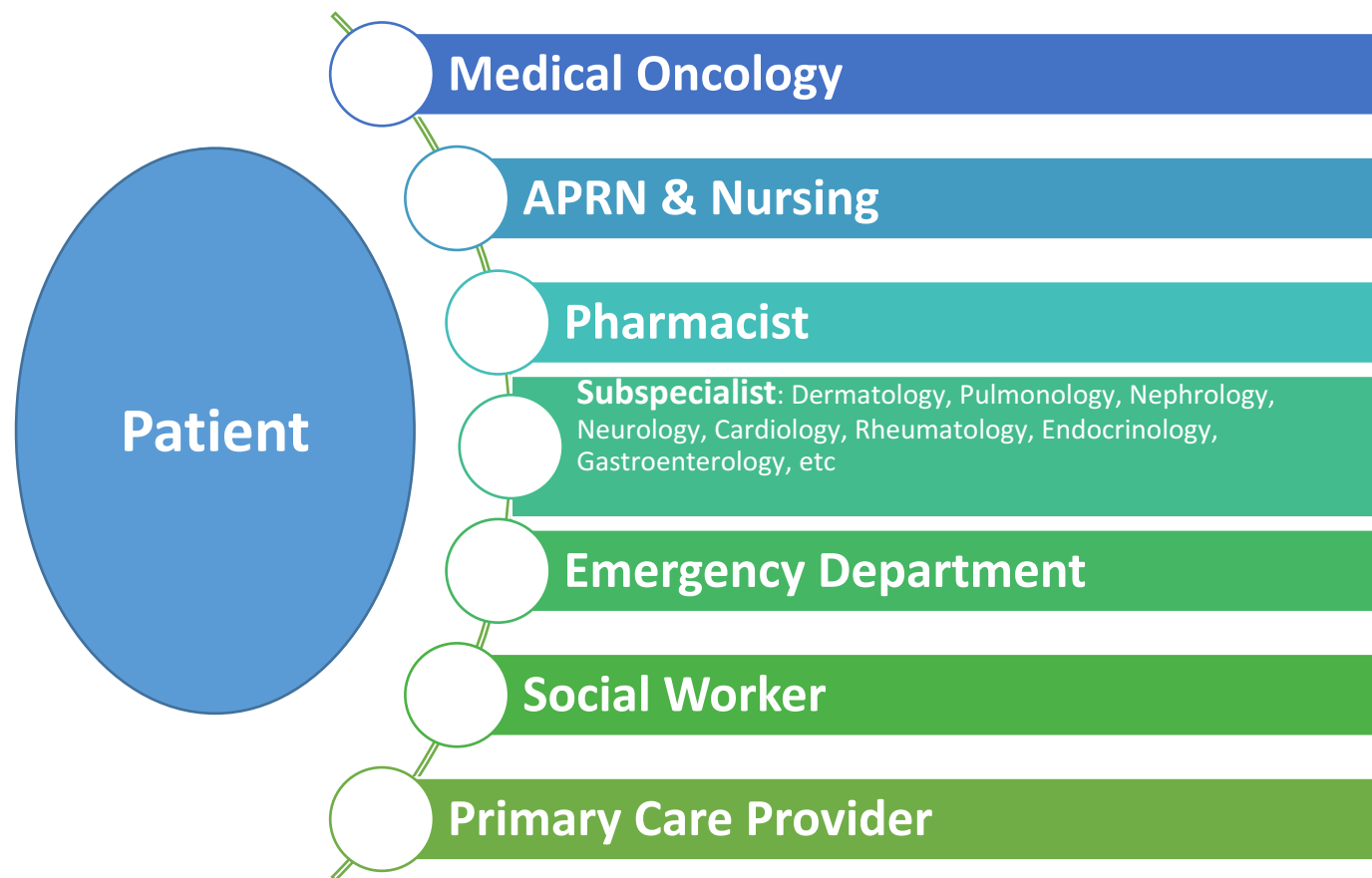
- Virtual, Scheduled or Reactive
- Identification of appropriate patients
- Discussion of toxicities
- Discussions of predictive biomarkers.

## Immune Toxicity Service

- Inpatient Consult Service
- Round on patients admitted with IMAEs
- Educate inpatient services

# Multidisciplinary Patient Care

- Team-wide and interdisciplinary communication, collaboration and coordination of care is essential.
  - Discuss potential for IRAEs with the entire healthcare team and educate colleagues.



# Questions?

