

# Investigating sex differences in cancer immunotherapy treatment effects: the INSITE study

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Building Interdisciplinary Research Careers in Women's Health

## BACKGROUND

- Immune checkpoint inhibitors (ICIs) exhibit impressive clinical response rates for a subset of patients with cancer.
- ICIs can induce side effects called immune-related adverse events (irAEs) that may affect any organ system and can be life-threatening.
- Retrospective evidence suggests female patients may be at greater risk of irAEs than male patients.
- However, prospective studies designed to investigate sex differences, including in patient-reported outcomes (PROs) related to irAEs, are lacking.

## STUDY AIM

- Characterize sex differences in patient-reported symptomatic irAEs.
- *Hypothesis 1a: Female patients will report a greater variety and more severe symptoms than males.*
- *Hypothesis 1b: Female patients will report a greater symptom burden over time than males.*

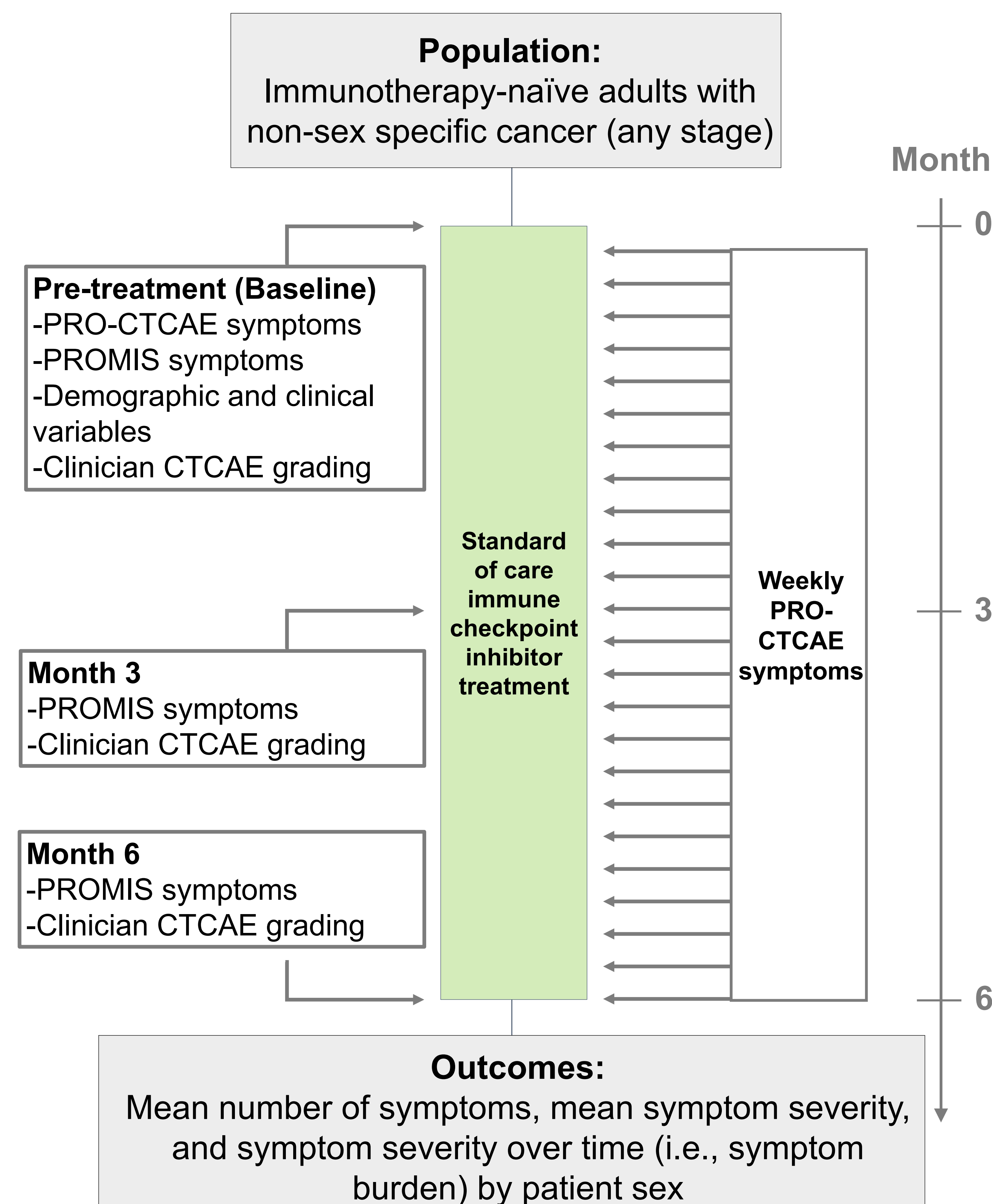
## STUDY DESIGN

- Prospective study of symptomatic irAEs during the first 6 months of immune checkpoint inhibitor treatment for cancer
- IrAEs assessed using 1) weekly PROs, and 2) clinician-graded irAEs (at selected timepoints; see Figure 1)
- Sample size: N=90 (45 females, 45 males)

## ELIGIBILITY

- Adults 18 and older with a planned course of immunotherapy ≥6 months
- Any cancer type or stage, excluding breast, prostate, and reproductive system cancers
- Immunotherapy-naïve
- Not concurrently receiving chemotherapy, biological or targeted therapy, or non-palliative radiation
- Life expectancy of ≥6 months

FIGURE 1. INSITE STUDY SCHEMATIC



## STUDY MEASURES AND ANALYSIS

- NCI PRO-CTCAE symptom questionnaire: cutaneous, cardio/circulatory, gastrointestinal, fatigue/sleep, mood, neurological, pain, and respiratory symptoms
- PROMIS-29 symptom questionnaire
- Cancer history, ICI treatment, irAEs & management abstracted from the electronic health record.
- Symptom quantity and severity by sex and change in symptoms over time will be analyzed with linear regression and linear mixed-effects models.

TABLE 1. CURRENT STUDY SAMPLE

Characteristic	# of participants N=34 (%)
<b>Female sex</b>	14 (41%)
<b>Mean age</b>	62.1 years
<b>Race/ethnicity</b>	
Non-Hispanic White	33 (97%)
Non-Hispanic Black	1 (3%)
<b>Cancer type</b>	
Melanoma	19 (56%)
Bladder/Kidney/Urethra	7 (21%)
Other	8 (24%)
<b>Stage IV</b>	7 (21%)
<b>ICI agent</b>	
PD-1 inhibitor	29 (85%)
PD-L1 inhibitor	1 (3%)
CTLA-4 + PD-1 inhibitor	4 (12%)

## FUTURE DIRECTIONS

- Results will inform symptom monitoring strategies in clinical practice by providing a comprehensive, patient-centered picture of symptom onset, severity, and timing by patient sex
- Future work will investigate female-specific risk factors and modifiable risk factors for irAEs.