A Global Quality Improvement Initiative in Immuno-Oncology

primeOncology

Final Outcomes Analysis

March 18, 2019

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Overview and Methodology

This three-activity curriculum on immuno-oncology is designed to engage learners with a virtual oncology practice as it begins a quality improvement (QI) initiative focused on improving the care provided to adult patients with cancer receiving immune checkpoint inhibitor therapy. The activities are targeted towards physicians, PAs, nurses, and other healthcare providers who care for patients in oncology practices.

Curriculum components:

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative - Module 1
(Launched April 26, 2018)

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative - Module 2
(Launched August 21, 2018)

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative - Module 3
(Launched December 20, 2018)

Data from the activities was analyzed to evaluate learning across all Learning Objectives and learning domains (Knowledge, Competence, Confidence, and Performance) using a matched-score methodology from Pre-Test to Post-Test. Learning gaps were identified, and Predictive Modeling was conducted to identify significant drivers of the curriculum's primary learning gap to guide future educational efforts.

Activity Outcomes Protocol	Curriculum Outcomes Protocol	Advanced Analytics
Learning Domain Questions (Pre-Test/Post-Test) ➢ Knowledge ➢ Competence ➢ Confidence ➢ Practice Strategy	Quality Improvement Domains (Baseline) Learning Objectives (Pre-Test/Post-Test) RealIndex® Performance Metric (Baseline/Final)	Calculation of target gap score Predictive Modeling to identify drivers

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Quantitative Impact Summary

Participants

840

Total participation in three enduring activities

737

Total number of unique learners who see an average of

4-7

patients with cancer each week per clinician

Profession distribution:

36% Physicians

26% Nurses

9% PAs and 5% NPs

Specialty distribution:

37% Oncology

21% Primary Care

Results

Learning Objectives

Increased proficiency to:

Create approaches to monitor and manage immune-related adverse events (irAEs) resulting from treatment with immune checkpoint inhibitors
by 63% (52%➔85%)

Describe foundational principles of quality improvement as they relate to healthcare
by 137% (35%➔84%)

Develop optimum treatment strategies using checkpoint inhibitors to treat a variety of tumor types
by 93% (42%➔82%)

Discuss best practices related to shared decision making in clinical practice
by 138% (38%➔91%)

Confidence

Increased reported Confidence in the ability to identify and manage immune-related adverse events associated with checkpoint inhibitors
by 27% (2.7➔3.4, out of 5)

Impact

Performance

Significant increase in RealIndex Performance scores
by 22% (45%➔54%)

Future Education

should focus on learning gaps related to:

1. **Managing pulmonary irAEs**
2. **PD-L1 testing to inform immune checkpoint inhibitor therapy**
3. **Use of immune checkpoint inhibitors as second-line treatment**
4. **Strategies to increase and sustain QI efforts**
5. **Shared decision making during treatment selection**

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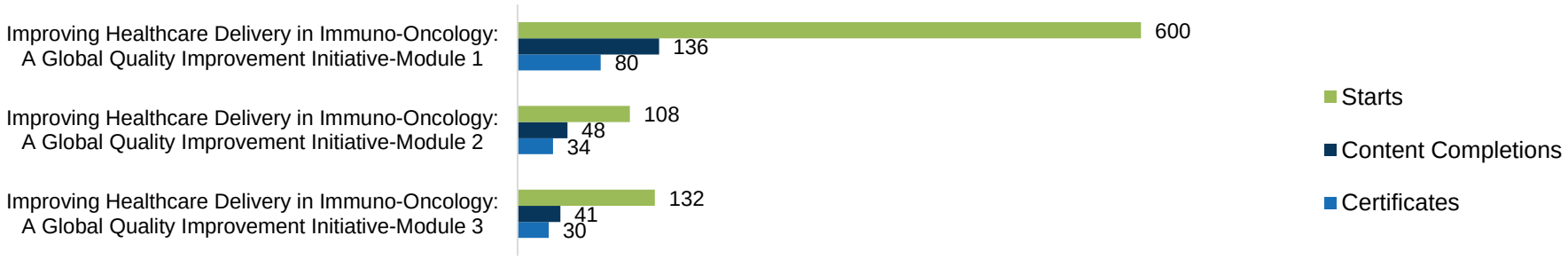
Population Summary

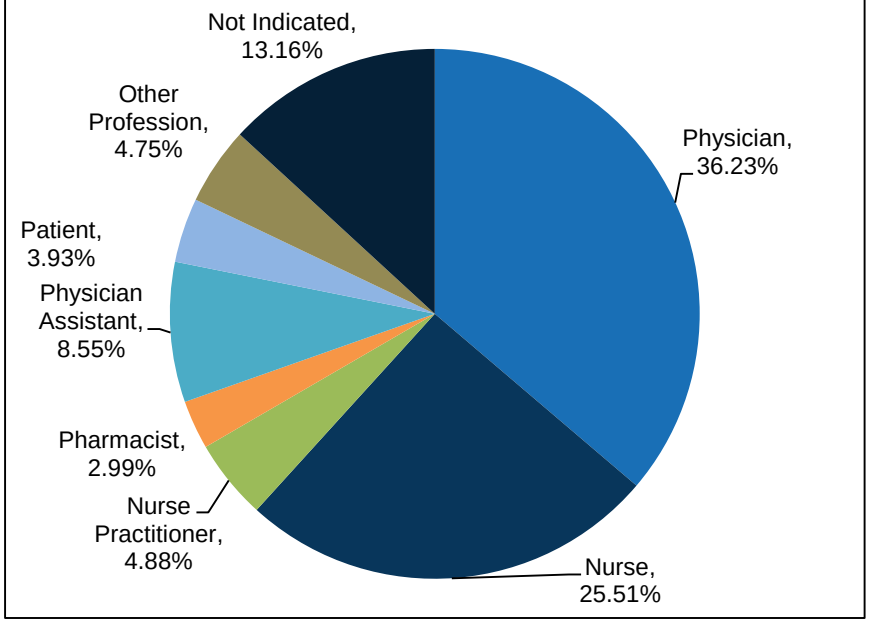
Starts: 840 Unique: 737 Completions: 225 Certificates: 144

Activity Participation of All Learners



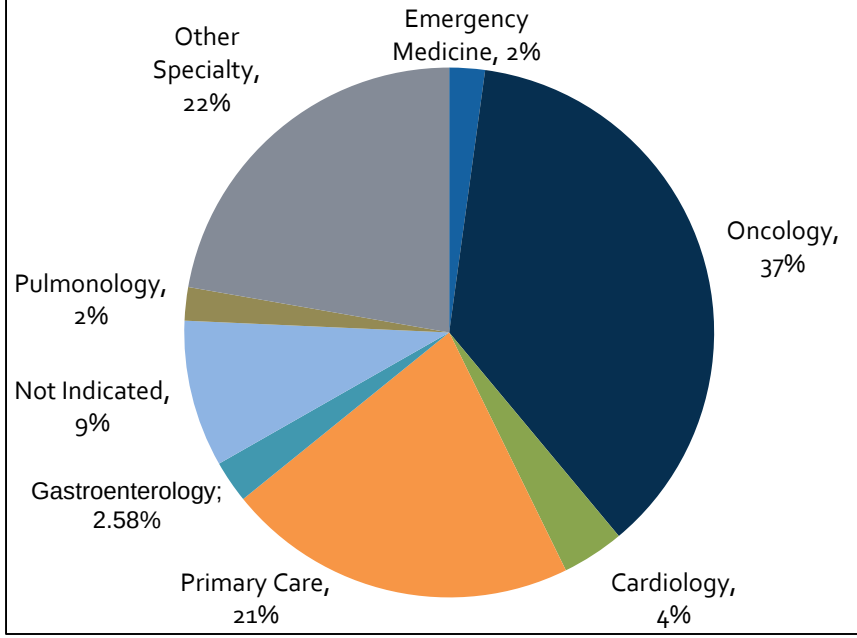
Professional Distribution

N=737 unique learners



Specialty Distribution

N=737 unique learners



Note: Professions and specialties making up < 2% of the population are grouped together as “Other Profession” or “Other Specialty”. Specialties self-reported as either “Other” or “N/A” are grouped together as “Not Indicated”.

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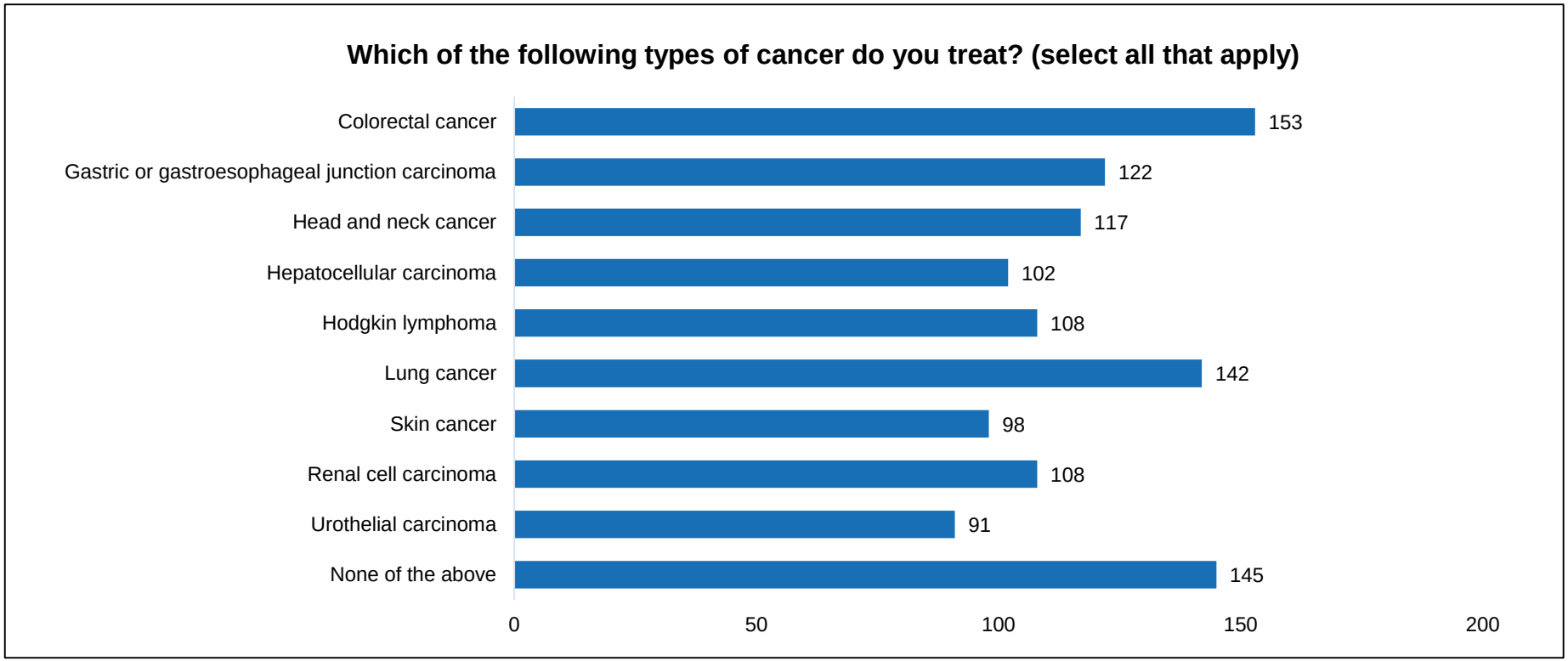
Oncology Specialization



- In Module 1, learners were asked which of the following types of cancer that they treat out of the above options, and asked to select all that apply (N=1,186 selections).
- The two most common cancers treated were **colorectal cancer (N=153)** and **lung cancer (N=142)**.

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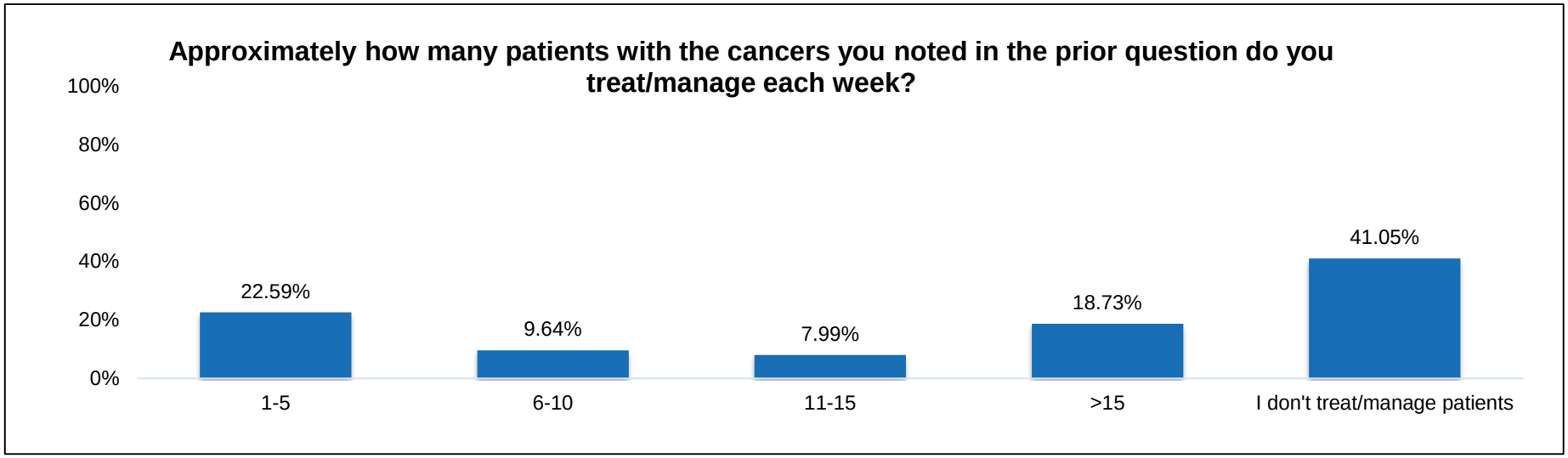
Patient Reach



- The evaluation section included a question asking learners to approximate the number of patients with the cancers they indicated earlier that they treat/manage each week (N=363 responders).
- Findings were then applied to the total number of unique learners who completed at least one activity (N=173).
- This educational curriculum therefore has the potential to impact the care of:
  - 4–7 patients with cancer each week per clinician
  - 77–1,218 patients (997 average) with cancer each week for the total learner population

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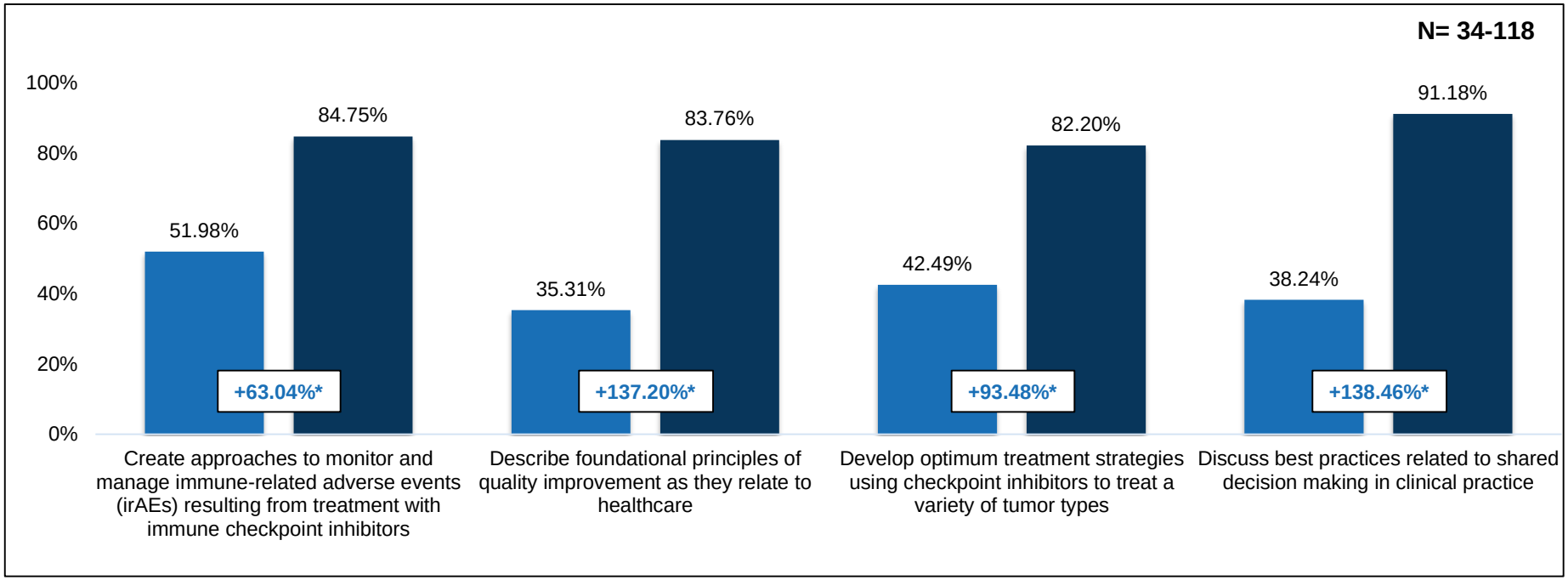
Learning Objectives



- Learners demonstrated substantial significant gains ranging from 63% to 138% on all four Learning Objectives.
- Although Pre-Test averages were low on all Learning Objectives (35%-52%), the substantial gains resulted in high Post-Test averages (> 82%) in all areas.

Note. * indicates significance $p \leq .05$, matched data. The LO related to shared decision making was mapped entirely to questions from Module 2 with a smaller sample size, explaining the large range of N.

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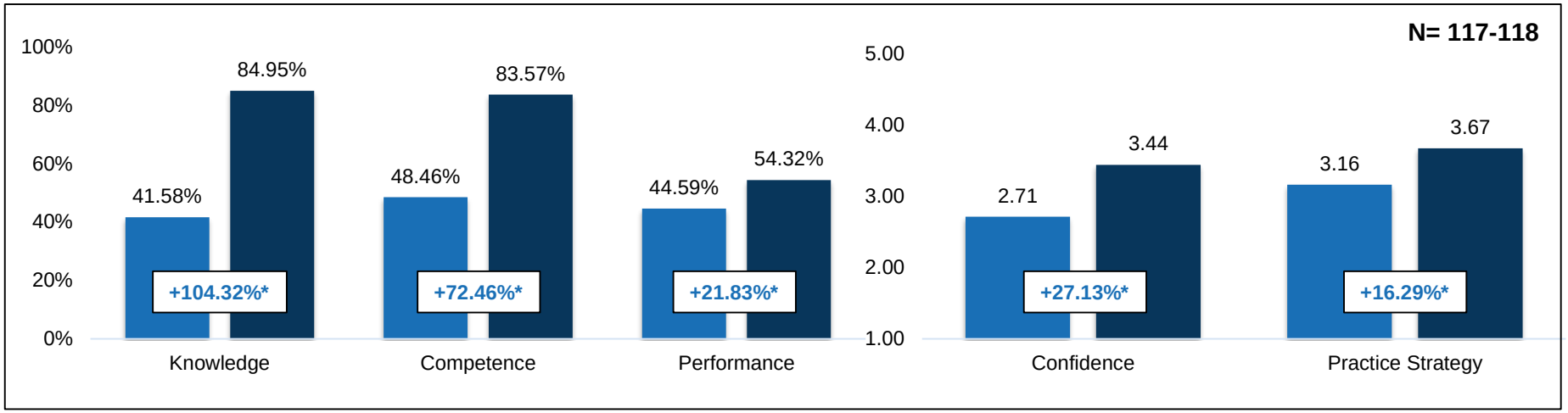
Learning Domains



- When analyzing proficiency at the domain level, learners improved significantly from low Pre-Test (baseline) scores on all learning domains.
- The most substantial gains were measured in Knowledge and Competence (104% and 72%, respectively), resulting in high Post-Test scores in both domains.
- In contrast to the high Knowledge and Competence scores, the low final score that was measured on the RealIndex Performance metric (54%) suggests that learners remain challenged applying their fact- and case-based proficiency to day-to-day practice.
- The low Performance scores correlate with the moderate Post-Test ratings (<3.7) that were measured in Confidence and practice strategy.

Note. * indicates significance $p \leq .05$, matched data

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Primary Learning Gap

Managing pulmonary immune-related adverse events (irAEs)

The primary learning gap for this curriculum, with the greatest number of low scoring items, related to the management of pulmonary immune-related events (irAEs). Learners remained challenged on three Performance items that focused on strategies for managing irAEs through dosing modifications of checkpoint inhibitors and the use of antibiotics and steroids. Learner difficulty in this area was further supported by the low scores on six Multidimensional question statements that also addressed the management of irAEs.

RealIndex: *MG is a 63-year-old man who was recently diagnosed with metastatic lung adenocarcinoma by pulmonary biopsies (T2N2M1b; left adrenal gland and bone). He has a 40 pack-year smoking history but stopped smoking 2 years ago. Molecular testing revealed no actionable mutations. PD-L1 testing is ordered. Based on the results of the PD-L1 testing, you start the patient on a checkpoint inhibitor (with or without other agents). MG responds well to treatment. However, about 2 months after initiating therapy, he develops mild dyspnea and cough, but is afebrile. Chest x-ray shows ground glass opacities in the left lung; white blood cell count is within normal limits. Based on these results you treat MG for this irAE. MG recovers from the pulmonary irAE, but, after 2 additional months on checkpoint inhibitor therapy, he is found to have evidence of disease progression (ie, new lesions in the right adrenal gland and lung). You decide to switch therapy at this time (ie, to second-line treatment). MG responds well to this second-line therapy.*

- 62% of participants correctly categorized as "Consistent**", "Withhold checkpoint inhibitor"**
- 28% of participants correctly categorized as "Not Consistent", **" Admit patient, start broad spectrum antibiotics and IV steroids"**
- 61% of participants correctly categorized as "Not Consistent", **"Reduce checkpoint inhibitor dose by half"**

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Primary Learning Gap (cont'd)

Managing pulmonary immune-related adverse events (irAEs)

Multidimensional (In-Activity)*: An additional chart audit on patients seen in the clinic who were receiving immunotherapy was conducted. A sample of these cases are itemized below. Based on your clinical experience, please sort the following clinical situations to the left (Consistent with best practices in the management of irAEs) or right (Not consistent with best practices in the management of irAEs) columns.*

- 59% of participants correctly categorized as **"**Consistent**", "A patient from the Eastern Group experiencing rash covering approximately 8% body surface area: Continued immune checkpoint inhibitor therapy; topical steroids; supportive management."**
- 21% of participants correctly categorized as "Not Consistent", **"A patient from the Northern Group started on an anti–PD-1 agent: Monitored thyroid function tests every cycle for the first 6 months, then every second cycle thereafter."**
- 59% of participants correctly categorized as "Consistent", **"A Western Group patient with 8-10 liquid stools per day (over baseline) for the past 2 days: Held checkpoint inhibitor therapy; hospitalized and isolated (until infection can be excluded); IV (methyl)prednisolone (1.0 mg/kg)."**
- 53% of participants correctly categorized as "Consistent", **"A City Center patient with grade 3 pneumonitis and concurrent hepatotoxicity: Discontinued checkpoint inhibitor therapy; hospitalized; IV (methyl)prednisolone (2 mg/kg/d); empiric antibiotic treatment; infliximab 5 mg/kg."**
- 33% of participants correctly categorized as "Not Consistent", **"A patient from the Southern Group experiencing hepatoxicity initially grade 2 now grade 1: Began steroid taper over 4 weeks."**
- 43% of participants correctly categorized as "Not Consistent", **"A patient from the Western Group with ground glass changes in the right lung on chest x-ray, with dyspnea and cough: Reduced dose of checkpoint inhibitor by 50%; started antibiotics; start oral prednisolone (1 mg/kg/d)."**

Learning Gap #2

Use of PD-L1 testing to inform immune checkpoint inhibitor therapy

Learners remained challenged on Knowledge and Performance items that addressed the use of PD-L1 testing to guide the selection of immune checkpoint inhibitors, including atezolizumab, pembrolizumab, nivolumab, and ipilimumab. Learner difficulty in this area was also supported by in-activity Multidimensional questions.

Knowledge: *What result on PD-L1 testing (ie, tumor proportion scores) supports the use of atezolizumab in metastatic NSCLC?*

- 65% of learners correctly answered, **"No results necessary; PD-L1 testing not required before use of atezolizumab".**

RealIndex: *MG is a 63-year-old man who was recently diagnosed with metastatic lung adenocarcinoma by pulmonary biopsies (T2N2M1b; left adrenal gland and bone). He has a 40 pack-year smoking history but stopped smoking 2 years ago. Molecular testing revealed no actionable mutations. PD-L1 testing is ordered. Based on the results of the PD-L1 testing, you start the patient on a checkpoint inhibitor (with or without other agents). MG responds well to treatment. However, about 2 months after initiating therapy, he develops mild dyspnea and cough, but is afebrile. Chest x-ray shows ground glass opacities in the left lung; white blood cell count is within normal limits. Based on these results you treat MG for this irAE. MG recovers from the pulmonary irAE, but, after 2 additional months on checkpoint inhibitor therapy, he is found to have evidence of disease progression (ie, new lesions in the right adrenal gland and lung). You decide to switch therapy at this time. MG responds well to this second-line therapy.*

- 68% of participants correctly categorized as "Consistent", **" Use IHC 223 assay before starting first-line pembrolizumab"**
- 53% of participants correctly categorized as "Not Consistent", **" Use IHC 223 assay before starting first-line nivolumab"**
- 63% of participants correctly categorized as "Not Consistent", **" Start nivolumab +/- ipilimumab regardless of PD-L1 levels"**

Multidimensional: *The team conducted a chart audit of patients receiving checkpoint inhibitor therapy. A sample of the cases they reviewed are listed below. Please sort appropriately, based on your clinical experience, the treatment decisions made below to the left (Consistent with best practices in use of checkpoint inhibitor therapy) or right (Not consistent with best practices in the use of checkpoint inhibitor therapy) columns.*

- 37% of participants correctly categorized as **"Not Consistent", "Ordered PD-L1 testing for a patient with metastatic NSCLC at the Eastern Group, but if there is a delay in obtaining results, start pembrolizumab monotherapy and adjust treatment, as needed, after PD-L1 testing results are available."**
- 56% of participants correctly categorized as "Consistent", **"Started pembrolizumab monotherapy for a patient at the City Center group with metastatic NSCLC, with PD-L1 of 65%."**

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Learning Gap #3

Use of immune checkpoint inhibitors as second-line treatment

Learners also remained challenged on Performance and Multidimensional question items that addressed the selection of second-line therapies for patients presenting with disease progression after initial therapy.

RealIndex*: MG is a 63-year-old man who was recently diagnosed with metastatic lung adenocarcinoma by pulmonary biopsies (T2N2M1b; left adrenal gland and bone). He has a 40 pack-year smoking history but stopped smoking 2 years ago. Molecular testing revealed no actionable mutations. PD-L1 testing is ordered. Based on the results of the PD-L1 testing, you start the patient on a checkpoint inhibitor (with or without other agents). MG responds well to treatment. However, about 2 months after initiating therapy, he develops mild dyspnea and cough, but is afebrile. Chest x-ray shows ground glass opacities in the left lung; white blood cell count is within normal limits. Based on these results you treat MG for this irAE. MG recovers from the pulmonary irAE, but, after 2 additional months on checkpoint inhibitor therapy, he is found to have evidence of disease progression (ie, new lesions in the right adrenal gland and lung). You decide to switch therapy at this time (ie, to second-line treatment). MG responds well to this second-line therapy.*

- 60% of participants correctly categorized as "Not Consistent", **"If nivolumab or atezolizumab were used as first-line treatments, then start pembrolizumab as second-line treatment"**

Multidimensional*: The team conducted a chart audit of patients receiving checkpoint inhibitor therapy. A sample of the cases they reviewed are listed below. Please sort appropriately, based on your clinical experience, the treatment decisions made below to the left (Consistent with best practices in use of checkpoint inhibitor therapy) or right (Not consistent with best practices in the use of checkpoint inhibitor therapy) columns.*

- 44% of participants correctly categorized as "Consistent", **" Started nivolumab monotherapy for a patient at the Southern Group with unresectable melanoma who was no longer responding to other treatments."**
- 27% of participants correctly categorized as "Not Consistent", **" Started nivolumab/ipilimumab to treat a patient with advanced NSCLC at the Northern Group with progression on or after platinum-based chemotherapy."**
- 50% of participants correctly categorized as "Consistent", **" Started pembrolizumab for a patient at the Northern Group with locally advanced urothelial carcinoma that progressed within 4 months of initiating platinum-containing chemotherapy."**
- 30% of participants correctly categorized as "Not Consistent", **"Started nivolumab for a patient at the City Center Group with Hodgkin lymphoma who progressed after autologous hematopoietic stem cell transplantation."**

Learning Gap #4

Strategies to implement and sustain QI efforts

Low scores were measured on multiple In-Activity questions addressing the actions of a quality improvement (QI) team to achieve quality goals, including interpretation of data dashboards, implementation of PDSA cycles, and selection of interventions.

In-Activity: *Based on the current team's make up, which of the following potential QI team members would be most important to add to the group for this current initiative?*

- 41% of learners correctly answered, **"Health information technology (IT) specialist".**

In-Activity: *Which of the following tools can the QI team use to aid in their gap analysis of current work processes, as part of the PDSA cycle?*

- 68% of learners correctly answered, **"All of the above".**

In-Activity: *How might the QI team address the gaps identified in the biomarker process map?*

- 29% of learners correctly answered, **"Adopt reflex testing for all cases identified to be malignancy (i.e., automatic biomarker testing based on histology results)".**

In-Activity: *Which of the following approaches may help the QI team sustain the changes they've achieved?*

- 51% of learners correctly answered, **"Ongoing data measurement".**

In-Activity: *Which of the following conclusions can be drawn from the updated data dashboard?*

- 27% of learners correctly answered, **"Overall, improvements are greatest at the larger groups (eg, City Center)".**

In-Activity: *Six months after the registry data are analyzed and presented to the overall group (a total of 1 year since the last data dashboard was presented), the QI team updates the data dashboard. How should the QI team interpret the updated data dashboard?*

- 28% of learners correctly answered **"3 and 4"**, indicating **"Patient-reported SDM findings indicate improved performance on QM4, but not yet at goal across clinics**" and **"Interventions and refinements continue to produce improvements across Quality Measures; QI team should focus on consolidating effective processes into routine workflow"**.

Learning Gap #5
Shared decision making during treatment selection

Low scores were also measured on a Performance item and In-Activity question that addressed the importance of involving the patient in the decision-making process concerning therapy selection.

RealIndex*:* *MG is a 63-year-old man who was recently diagnosed with metastatic lung adenocarcinoma by pulmonary biopsies (T2N2M1b; left adrenal gland and bone). He has a 40 pack-year smoking history but stopped smoking 2 years ago. Molecular testing revealed no actionable mutations. PD-L1 testing is ordered. Based on the results of the PD-L1 testing, you start the patient on a checkpoint inhibitor (with or without other agents). MG responds well to treatment. However, about 2 months after initiating therapy, he develops mild dyspnea and cough, but is afebrile. Chest x-ray shows ground glass opacities in the left lung; white blood cell count is within normal limits. Based on these results you treat MG for this irAE. MG recovers from the pulmonary irAE, but, after 2 additional months on checkpoint inhibitor therapy, he is found to have evidence of disease progression (ie, new lesions in the right adrenal gland and lung). You decide to switch therapy at this time (ie, to second-line treatment). MG responds well to this second-line therapy.*

- 21% of participants correctly categorized as "Not Consistent", **"Starting second-line therapy: Determine best treatment by working with a multidisciplinary panel and notify the patient about this switch"**

In-Activity: *Which of the following in the first step in the process of SDM?*

- 43% of learners correctly answered, **"Let patients know that their concerns are a key part of the decision-making process".**

Predictive Modeling

Predictive Modeling was performed on the gap with the greatest number (nine) of low scoring items:

- **Managing pulmonary immune-related adverse events (irAEs)**

All questions across learning domains (Knowledge, Competence, Confidence, and Performance), as well as learner demographics, were analyzed to identify positive and/or negative predictors of learners' target (or gap).

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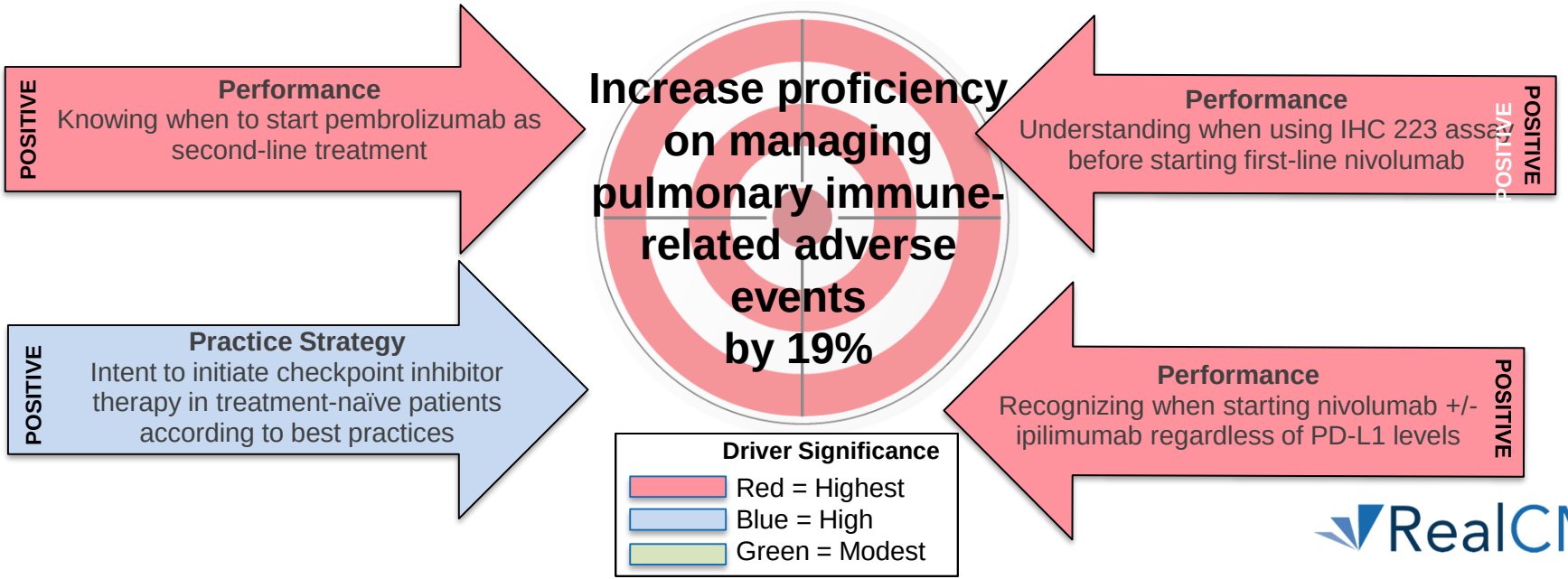
The Target-Gap Model

Managing pulmonary immune related adverse events

- Predictive modeling identified significant drivers which impacted learners' proficiency on **managing pulmonary immune related adverse events,** accounting for 40% of the variance of the gap mean (R^2 = .401). Addressing these drivers has the potential to increase proficiency by 19% (percentage difference between gap and nongap items multiplied by the R^2).
    - **Performance:** Knowing if pembrolizumab should be used as second-line treatment if nivolumab or atezolizumab were used as first-line therapy increases proficiency.
    - **Performance:** Recognizing if PD-L1 testing by IHC is necessary before starting first-line nivolumab increases proficiency.
    - **Performance:** Recognizing whether nivolumab +/- ipilimumab should be used regardless of PD-L1 levels increases proficiency.
    - **Practice strategy:** High reported intent to initiate checkpoint inhibitor therapy in treatment-naïve patients according to best practices and approved indications increases proficiency.



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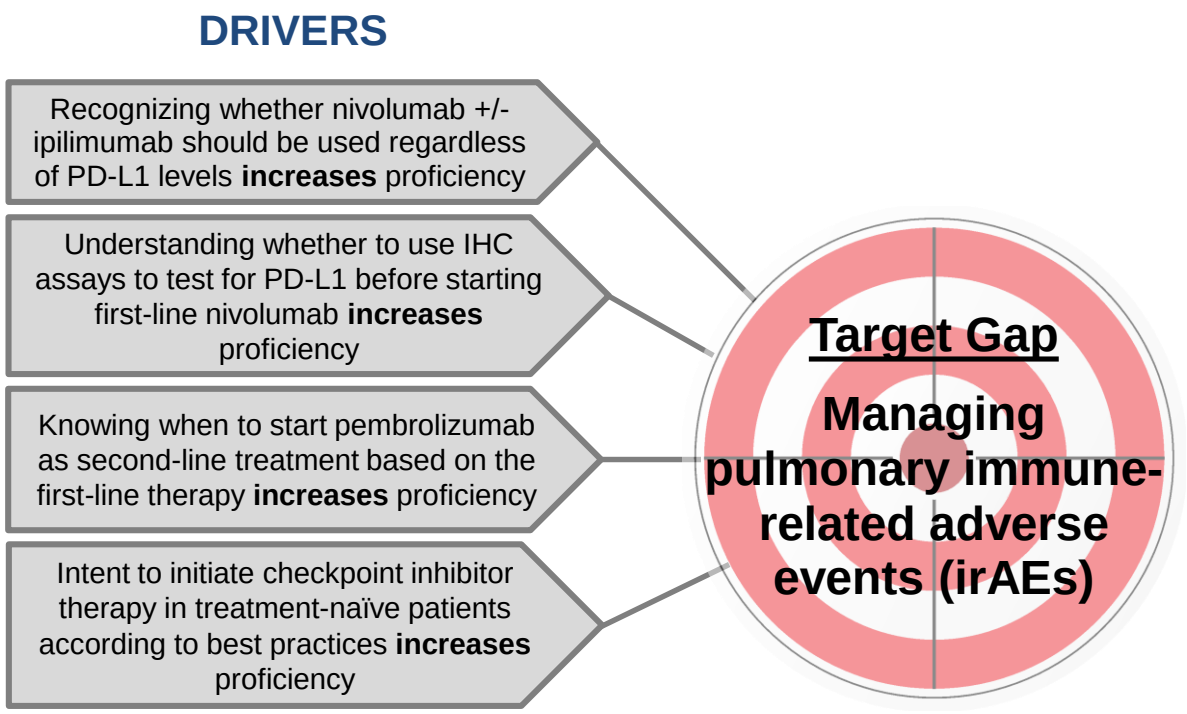
Predictive Modeling: Focus for Future Activities

All domain and demographic questions were analyzed to determine drivers of the curriculum's identified learning gap on **managing pulmonary immune-related adverse events (irAEs).** Significant positive drivers were identified.



From these drivers, future education should focus on increasing learner proficiency on managing pulmonary irAEs by:

1. *Increasing awareness of which immune checkpoint inhibitors should be used based on PD-L1 levels*
2. *Focusing on case scenarios that include indications for the use of first-line nivolumab mono- and combination therapy*
3. *Reinforcing when pembrolizumab should be initiated as second-line therapy based on the first-line treatment that was used*
4. *Highlighting best practices for determining when checkpoint inhibitor therapy should be initiated in treatment-naïve patients*

Positive Driver (increases proficiency on the target gap)

Negative Driver (decreases proficiency on the target gap)

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Appendix

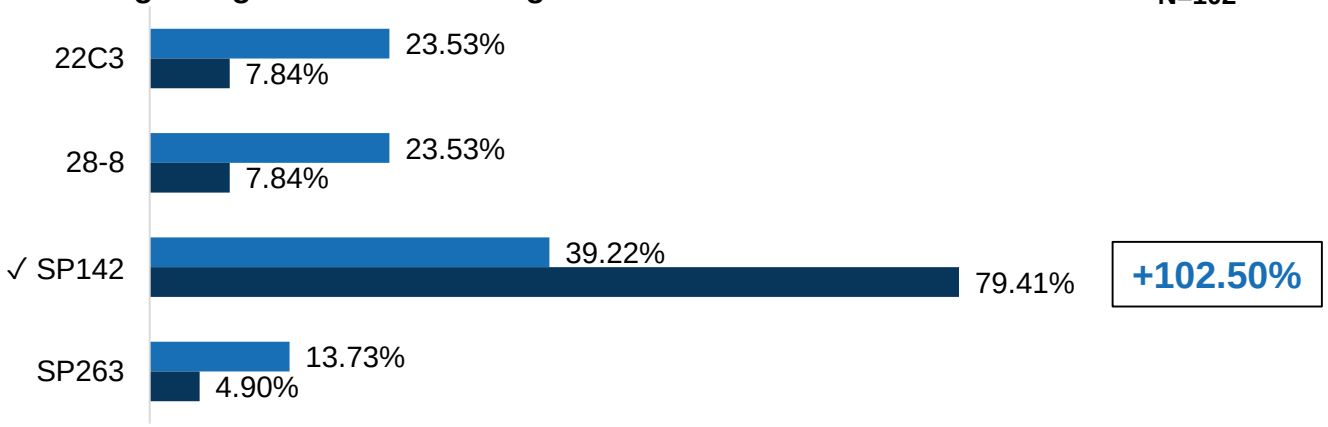
Item-Level Analyses: Slides 20-39

Knowledge Items

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

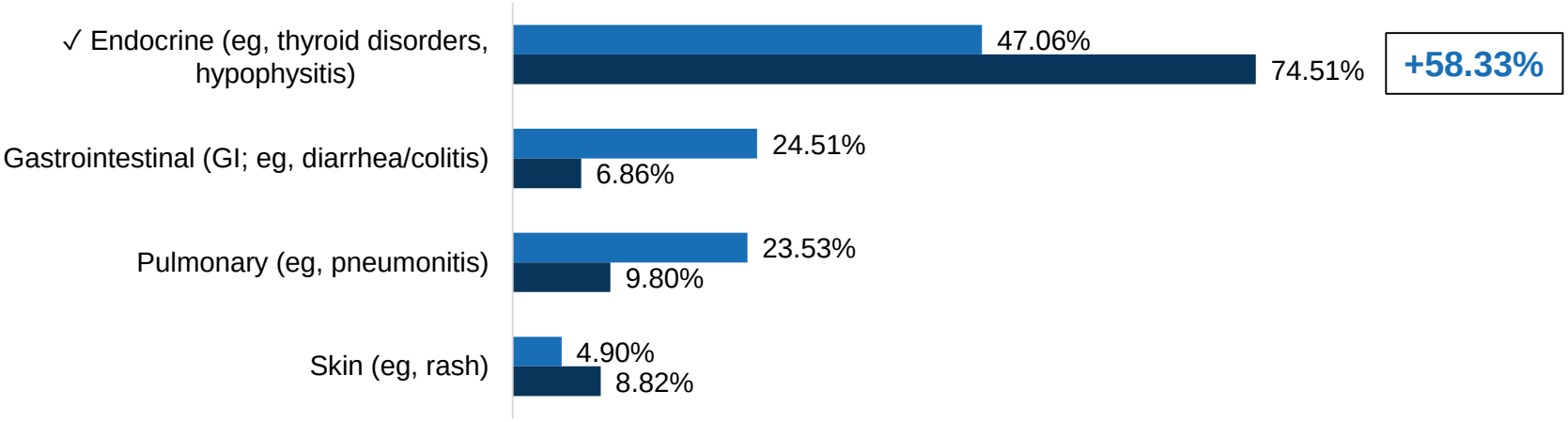
The Blueprint PD-L1 IHC Assay Comparison Project was designed to provide information on the correlation between four PD-L1 assays. Which of the following was least aligned with the others regarding tumor cell staining of PD-L1?

N=102



Based on results from the CheckMate 067 study by Larkin et al evaluating the use of nivolumab +/- ipilimumab, which of the following irAEs are most likely to have the latest median time to onset?

N=102



Note: Data is matched
Correct answer is designated by an ✓

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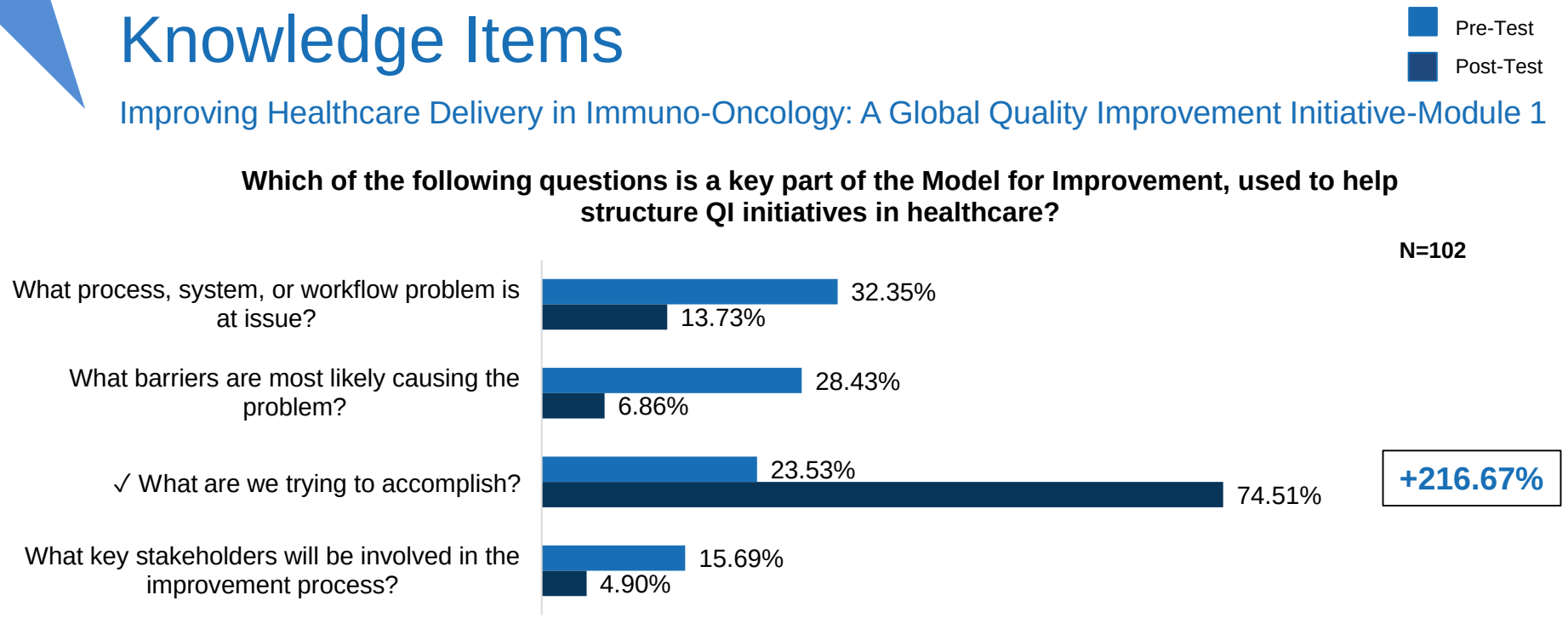
Knowledge Items

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

Which of the following questions is a key part of the Model for Improvement, used to help structure QI initiatives in healthcare?



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Correct answer is designated by an ✓

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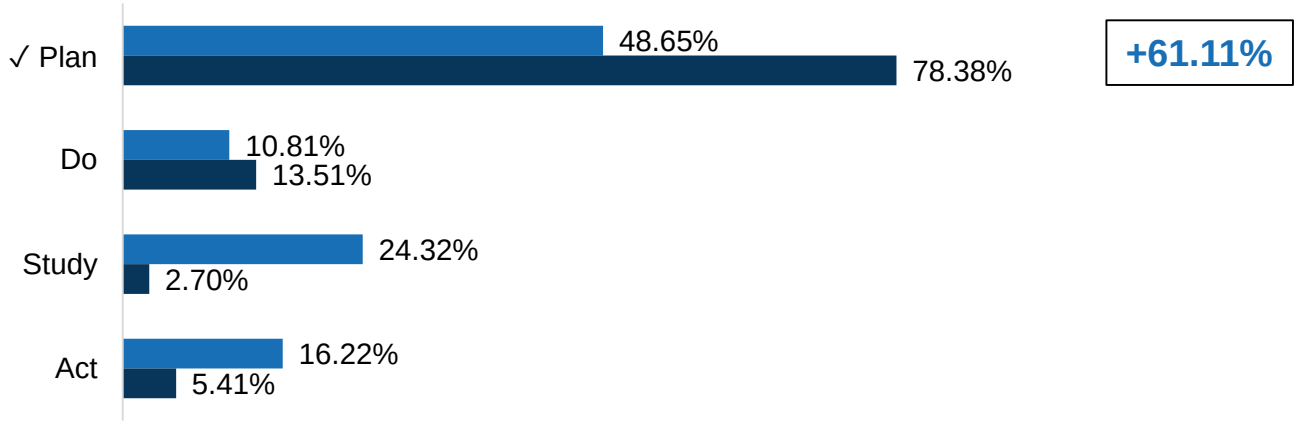
Knowledge Items

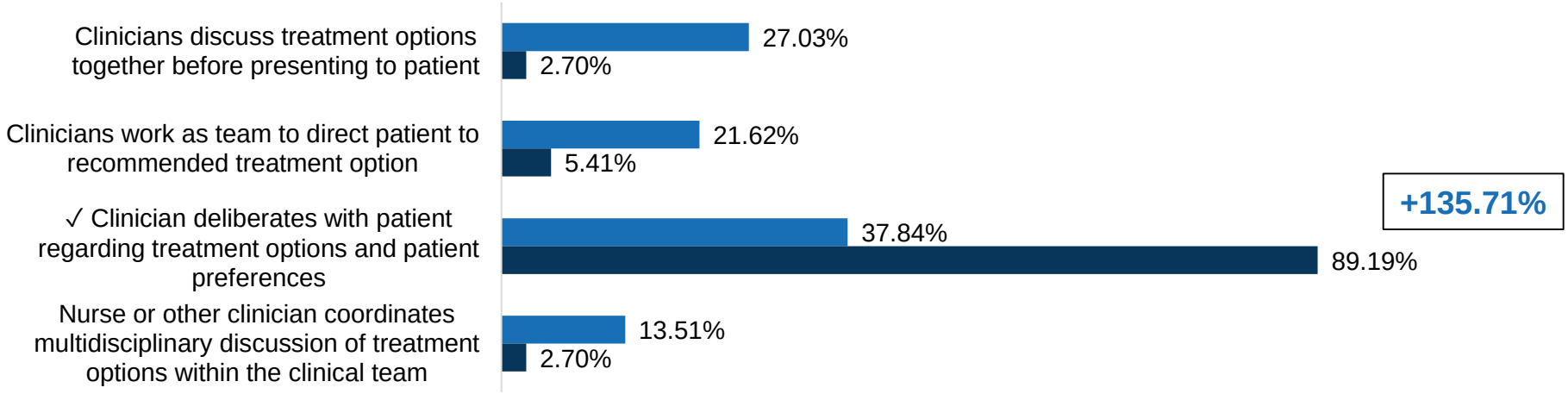
Pre-Test
Post-Test

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

In which part of the Plan-Do-Study-Act (PDSA) cycle of quality improvement is a Fishbone diagram typically used? N=37



Which of the following is a component of shared decision making? N=37



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Correct answer is designated by an ✓

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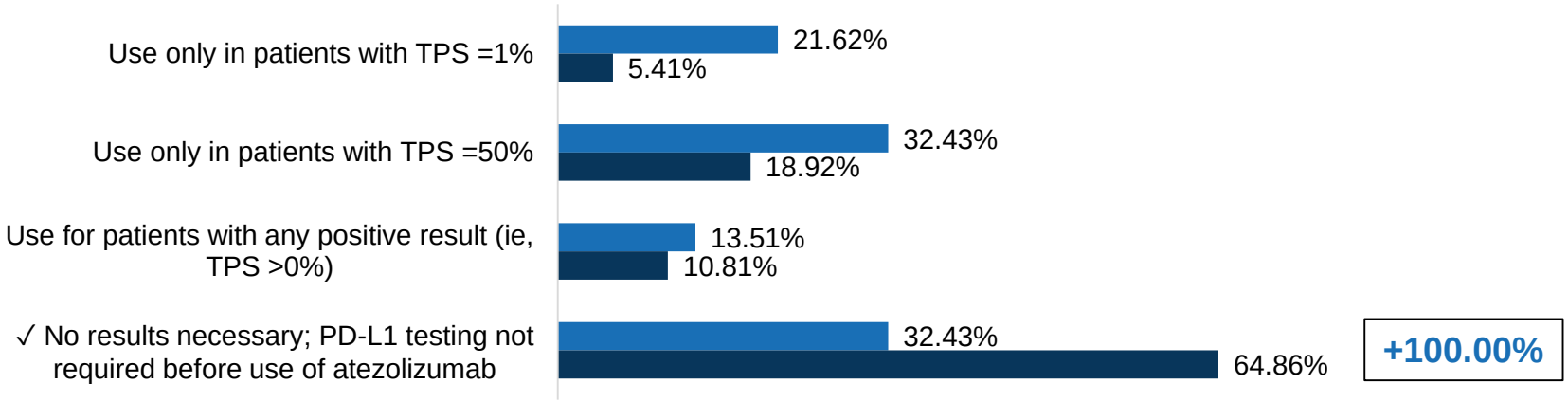
Knowledge Items

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

What result on PD-L1 testing (ie, tumor proportion score [TPS]) supports the use of atezolizumab in metastatic NSCLC?

N=37



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Correct answer is designated by an ✓

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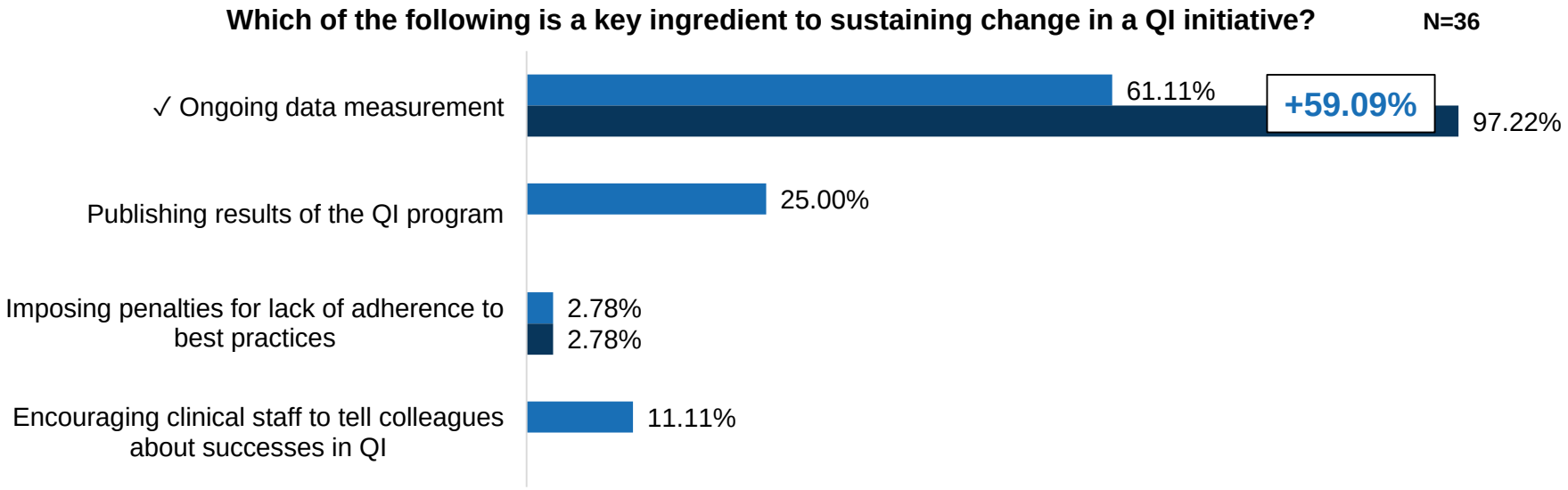
Knowledge Items

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 3



Note: Data is matched
Correct answer is designated by an ✓

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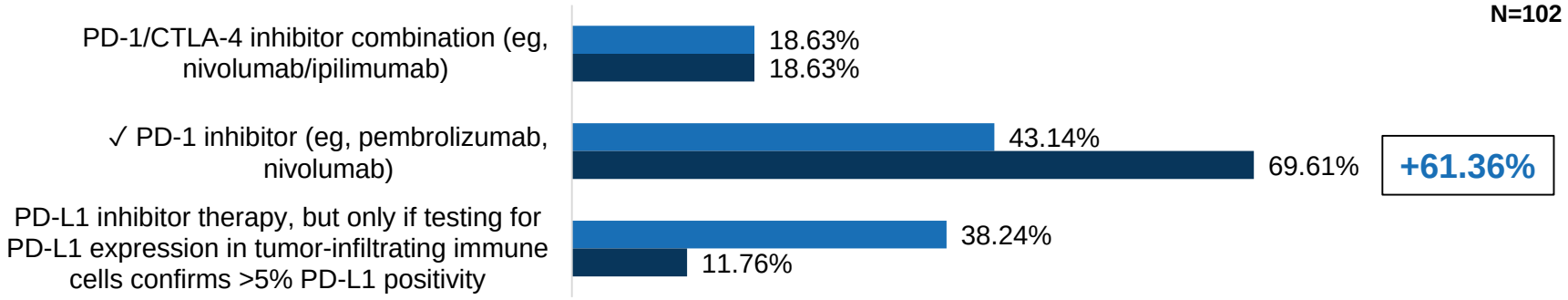
Competence Items

Pre-Test
Post-Test

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

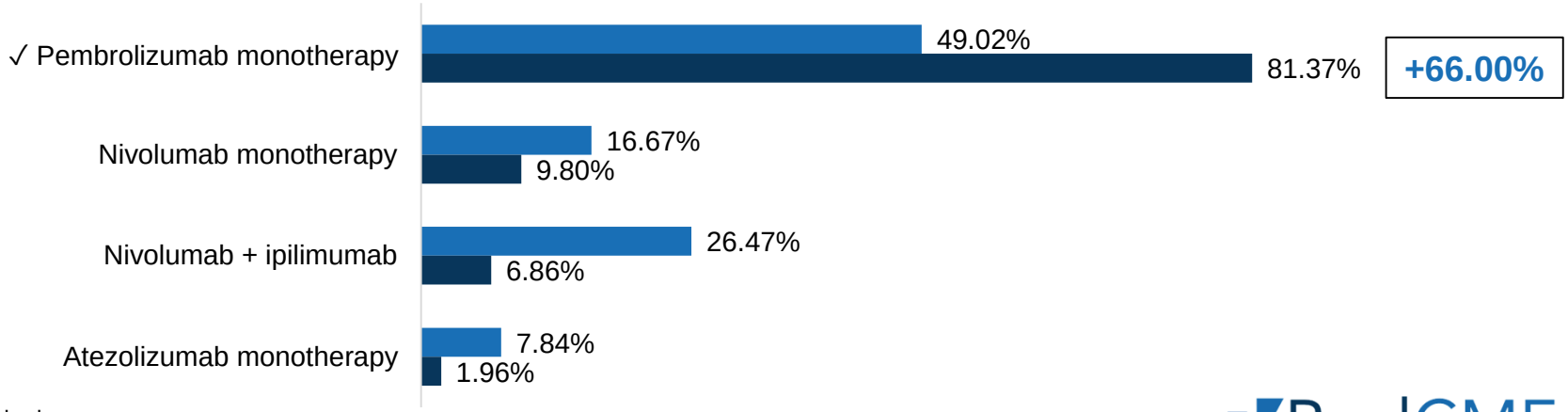
A 70-year-old woman, former smoker, was diagnosed with high-grade, muscle-invasive bladder cancer and multiple lung metastases. Her performance status (PS) is 0 and her creatine clearance (CrCl) is within normal limits. She is started on gemcitabine/cisplatin but is found to have disease progression after 3 cycles. Which of the following is the most appropriate treatment at this time?

N=102



A 63-year-old patient of yours is diagnosed with metastatic NSCLC. Laboratory testing reveals no actionable mutations and PD-L1 testing shows 75% positivity. Which of the following is the best treatment option for this patient?

N=102



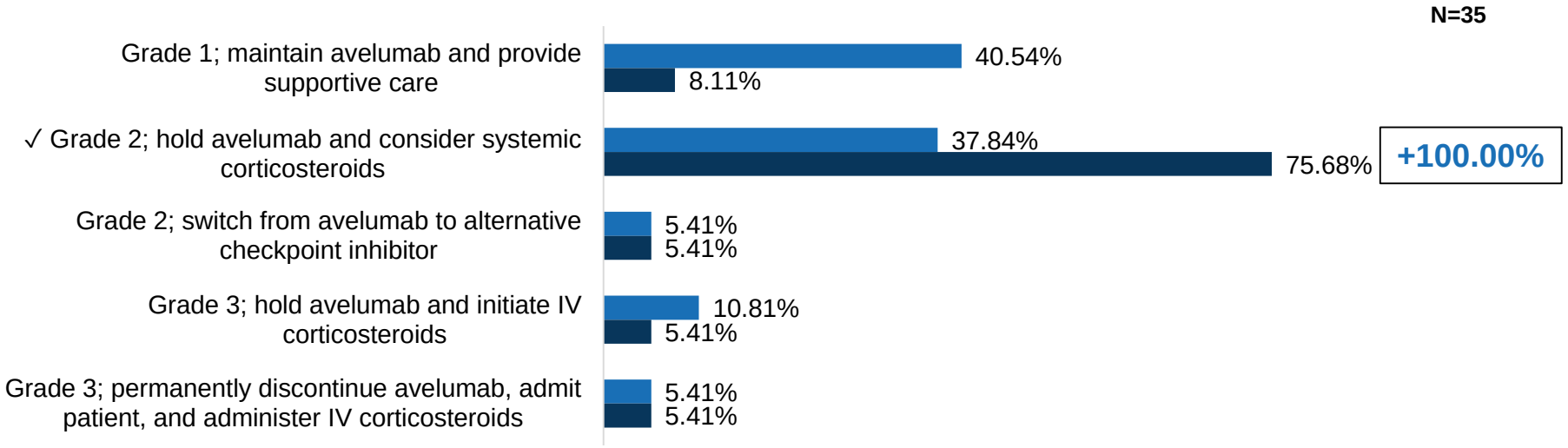
Note: Data is matched
Correct answer is designated by an ✓

RealCME

Competence Items

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

A 61-year-old woman with metastatic Merkel cell carcinoma who is being treated with first-line avelumab presents to her oncologist for a checkup. The patient reports 6-8 stools per day, which is an increase of 4-6 stools over her usual bowel habits. She has no history of gastrointestinal disease. Workup rules out infection and other potential causes of colitis. Which of the following correctly identifies the grade and recommended management of this adverse event?



Note: Data is matched
Correct answer is designated by an ✓

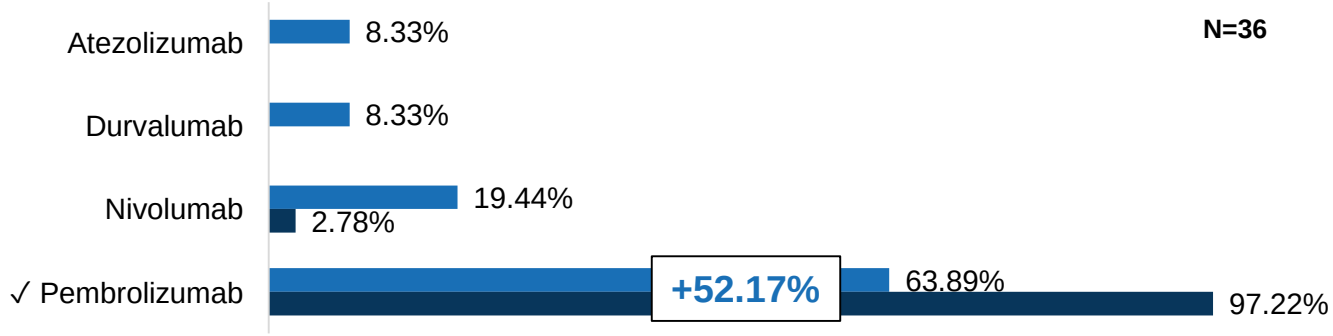
RealCME

Competence Items

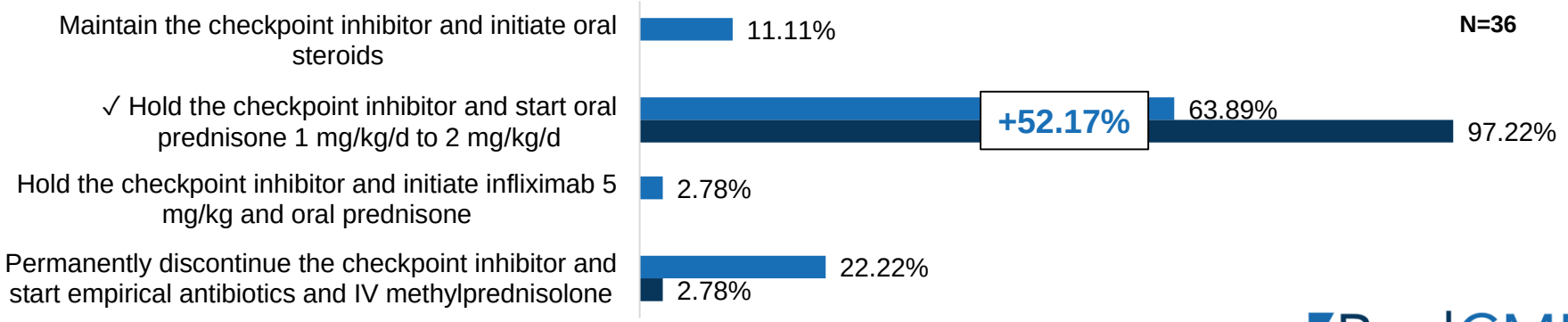
Pre-Test
Post-Test

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 3

A 65-year-old man with a 25 pack-year smoking history presents with symptoms of chest pain, dyspnea, and chronic cough. Workup identifies a mass in his left lung. Pathology identifies adenocarcinoma (NSCLC), with PD-L1 tumor proportion score (TPS) 55% and no EGFR, ALK, BRAF, or ROS1 mutations or rearrangements. His performance status is 1. According to guidelines, which of the following checkpoint inhibitors might be appropriate for first-line treatment of this patient?



A 59-year-old with metastatic melanoma who is being treated with a checkpoint inhibitor presents reporting moderate dyspnea and worsening cough. Examination identifies focal congestion of the right lung fields, temperature of 37° C, normal sinus rhythm, and a resting O2 saturation of 90% on room air. Blood tests identify C-reactive protein (CRP) within normal limits and a normal white blood cell count. A chest computed tomography (CT) scan is performed, the results of which identify inflammation in approximately 50% of lung parenchyma. You diagnose this patient with immune-related pneumonitis. Based on these findings, what approach to the initial management of this patient might be appropriate?



Note: Data is matched
Correct answer is designated by an ✓

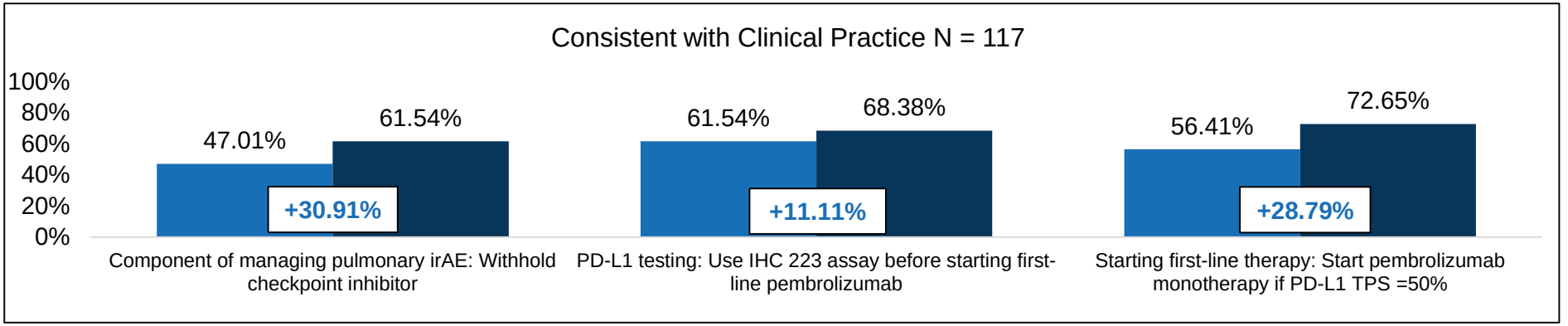
RealCME

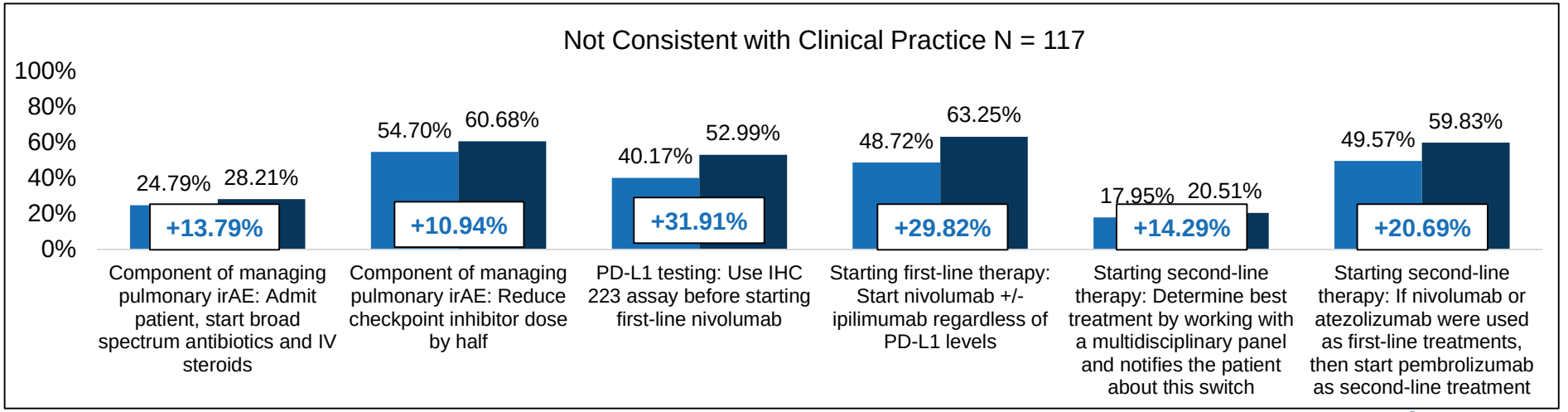
Curriculum RealIndex Measure

Baseline
Final

This curriculum case challenge asks you to sort the statements below regarding these management steps as to whether or not they are consistent with your current practices:

MG is a 63-year-old man who was recently diagnosed with metastatic lung adenocarcinoma by pulmonary biopsies (T2N2M1b; left adrenal gland and bone). He has a 40 pack-year smoking history but stopped smoking 2 years ago. Molecular testing revealed no actionable mutations. PD-L1 testing is ordered. Based on the results of the PD-L1 testing, you start the patient on a checkpoint inhibitor (with or without other agents). MG responds well to treatment. However, about 2 months after initiating therapy, he develops mild dyspnea and cough, but is afebrile. Chest x-ray shows ground glass opacities in the left lung; white blood cell count is within normal limits. Based on these results you treat MG for this irAE. MG recovers from the pulmonary irAE, but, after 2 additional months on checkpoint inhibitor therapy, he is found to have evidence of disease progression (ie, new lesions in the right adrenal gland and lung). You decide to switch therapy at this time (ie, to second-line treatment). MG responds well to this second-line therapy.



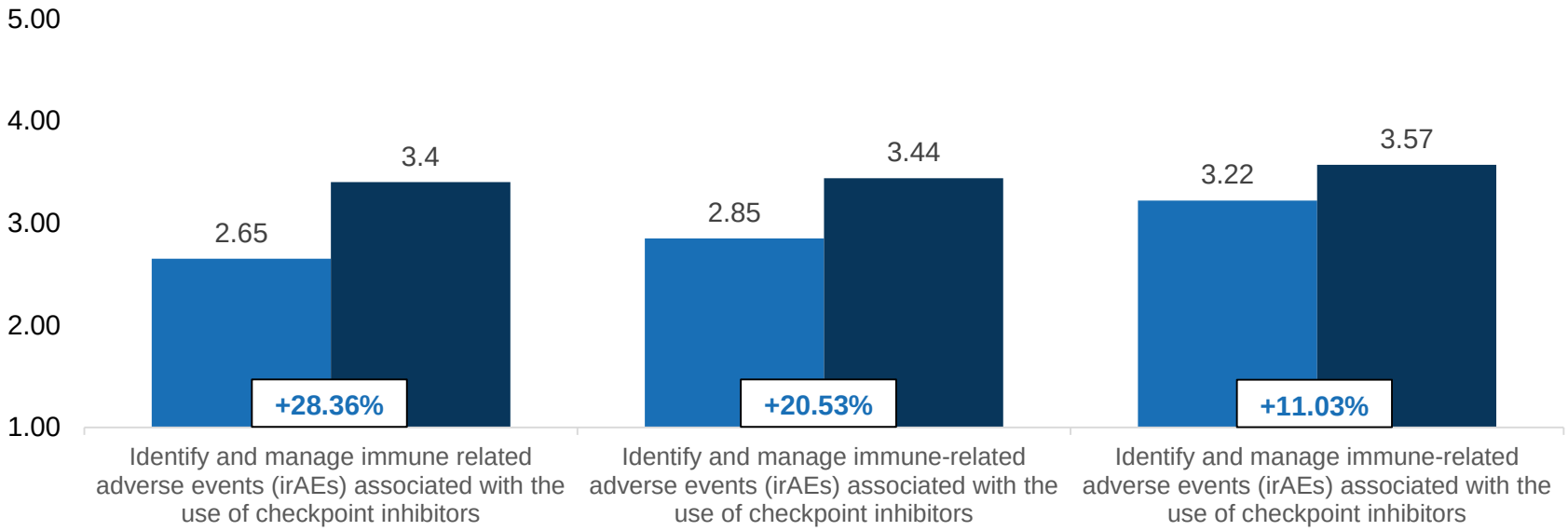


Note. Data is matched

RealCME

Confidence Items

How confident are you in your ability to appropriately (based on a scale of 1 to 5, with 1=”Not at all confident” and 5= “Very confident”):



Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

N=86 –186

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

N=34-62

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 3

N=35-60

Note. Data is unmatched

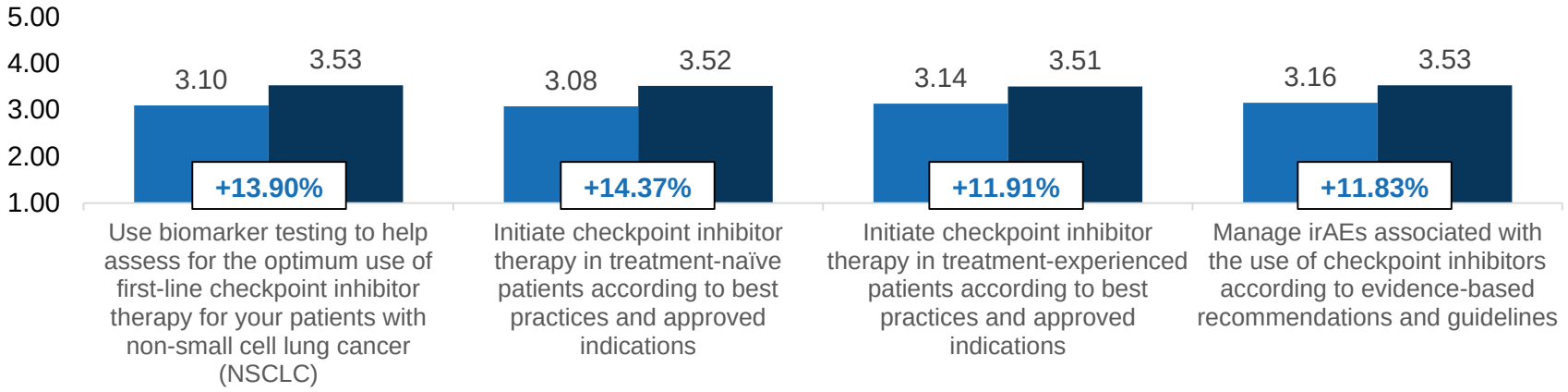
RealCME

Practice Items

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

How often do you (based on a scale of 1 to 5, with 1=”Never” and 5=”Always”):

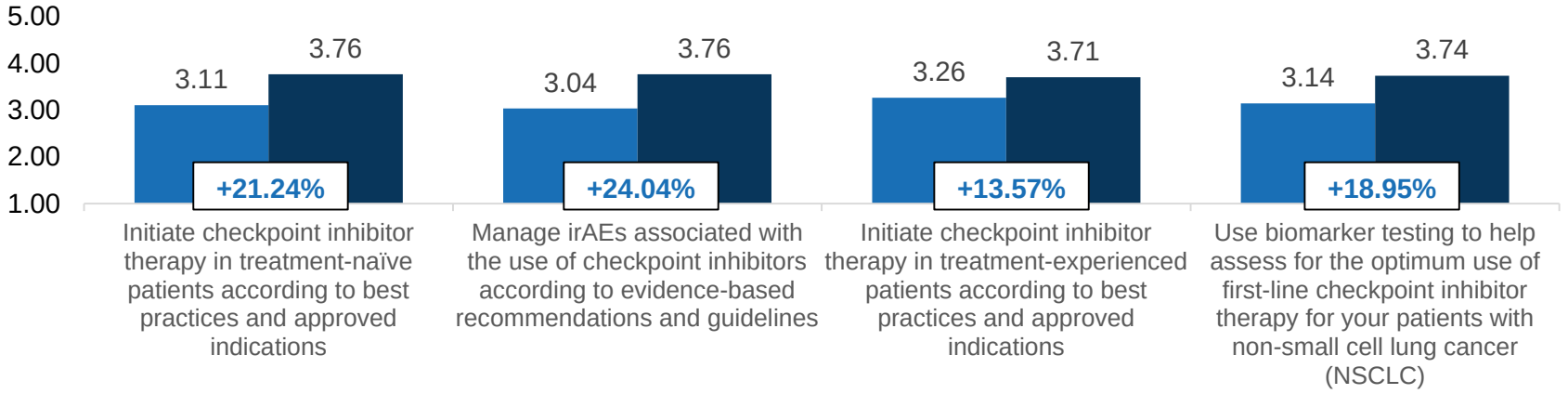
N= 86–186



Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

How often do you (based on a scale of 1 to 5, with 1=”Never” and 5=”Always”):

N = 34 – 57



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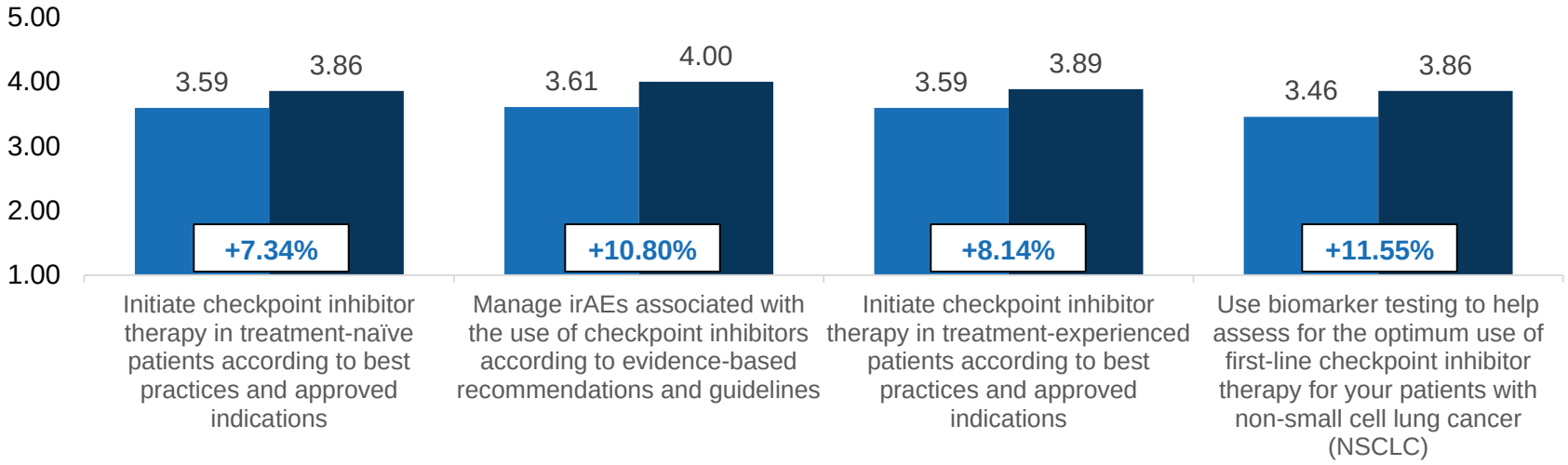
RealCME

Practice Items

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 3

How often do you (based on a scale of 1 to 5, with 1=”Never” and 5=”Always”):

N=35–59



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RealCME

Multidimensional Questions

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

The team conducted a chart audit of patients receiving checkpoint inhibitor therapy. A sample of the cases they reviewed are listed below. Please sort appropriately, based on your clinical experience, the treatment decisions made below to the left (Consistent with best practices in use of checkpoint inhibitor therapy) or right (Not consistent with best practices in the use of checkpoint inhibitor therapy) columns.

N = 153

Statement	Not Selected	Not Consistent	Consistent
Ordered PD-L1 testing for a patient with metastatic NSCLC at the Eastern Group, but if there is a delay in obtaining results, start pembrolizumab monotherapy and adjust treatment, as needed, after PD-L1 testing results are available.	24.84%	**37.25%** ✓	37.91%
Started pembrolizumab monotherapy for a patient at the City Center group with metastatic NSCLC, with PD-L1 of 65%.	25.49%	18.95%	**55.56%** ✓
Started nivolumab monotherapy for a patient at the Southern Group with unresectable melanoma who was no longer responding to other treatments.	27.45%	28.76%	**43.79%** ✓
Started nivolumab/ipilimumab to treat a patient with advanced NSCLC at the Northern Group with progression on or after platinum-based chemotherapy.	27.45%	**27.45%** ✓	45.10%
Started pembrolizumab for a patient at the Northern Group with locally advanced urothelial carcinoma that progressed within 4 months of initiating platinum-containing chemotherapy.	27.45%	22.88%	**49.67%** ✓
Started avelumab as first-line therapy for a patient at the Western Group with Merkel cell carcinoma.	28.10%	26.80%	**45.10%** ✓
Started nivolumab for a patient at the City Center Group with Hodgkin lymphoma who progressed after autologous hematopoietic stem cell transplantation.	28.10%	**30.07%** ✓	41.83%

Note: Data is unmatched
Correct answer is designated by an ✓

RealCME

Multidimensional Questions

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

An additional chart audit on patients seen in the clinic who were receiving immunotherapy was conducted. A sample of these cases are itemized below. Based on your clinical experience, please sort the following clinical situations to the left (Consistent with best practices in the management of irAEs) or right (Not consistent with best practices in the management of irAEs) columns.

N = 141

Statement	Not Selected	Not Consistent	Consistent
A patient from the Eastern Group experiencing rash covering approximately 8% body surface area: Continued immune checkpoint inhibitor therapy; topical steroids; supportive management.	19.15%	21.99%	**58.87% ✓**
A patient from the Northern Group started on an anti–PD-1 agent: Monitored thyroid function tests every cycle for the first 6 months, then every second cycle thereafter.	22.70%	**21.28% ✓**	56.03%
A Western Group patient with 8-10 liquid stools per day (over baseline) for the past 2 days: Held checkpoint inhibitor therapy; hospitalized and isolated (until infection can be excluded); IV (methyl)prednisolone (1.0 mg/kg).	20.57%	20.57%	**58.87% ✓**
A City Center patient with grade 3 pneumonitis and concurrent hepatotoxicity: Discontinued checkpoint inhibitor therapy; hospitalized; IV (methyl)prednisolone (2 mg/kg/d); empiric antibiotic treatment; infliximab 5 mg/kg.	21.28%	25.53%	**53.19% ✓**
A patient from the Southern Group experiencing hepatoxicity initially grade 2 now grade 1: Began steroid taper over 4 weeks.	20.57%	**32.62% ✓**	46.81%
A patient from the Western Group with ground glass changes in the right lung on chest x-ray, with dyspnea and cough: Reduced dose of checkpoint inhibitor by 50%; started antibiotics; start oral prednisolone (1 mg/kg/d).	21.99%	**43.26% ✓**	34.75%

Note: Data is unmatched
Correct answer is designated by an ✓

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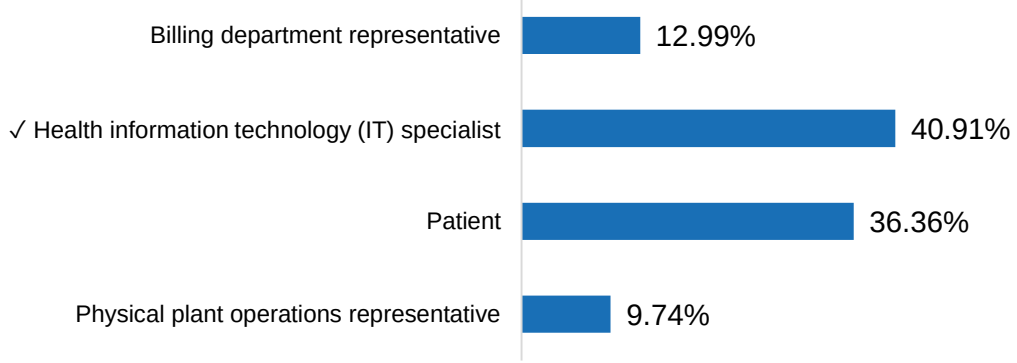
In-Activity Questions

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 1

Based on the current team's make up, which of the following potential QI team members would be most important to add to the group for this current initiative?

N= 54



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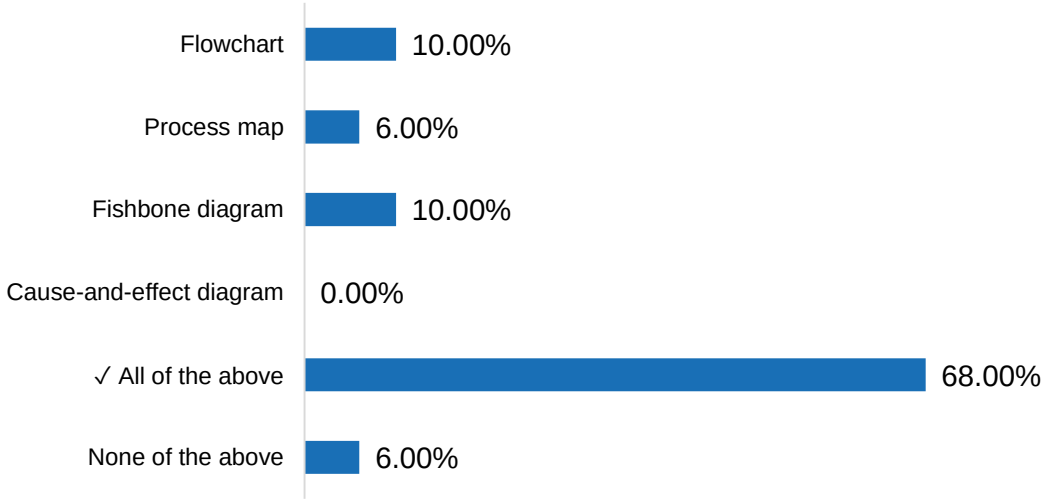
Correct answer is designated by an ✓

RealCME

In-Activity Questions

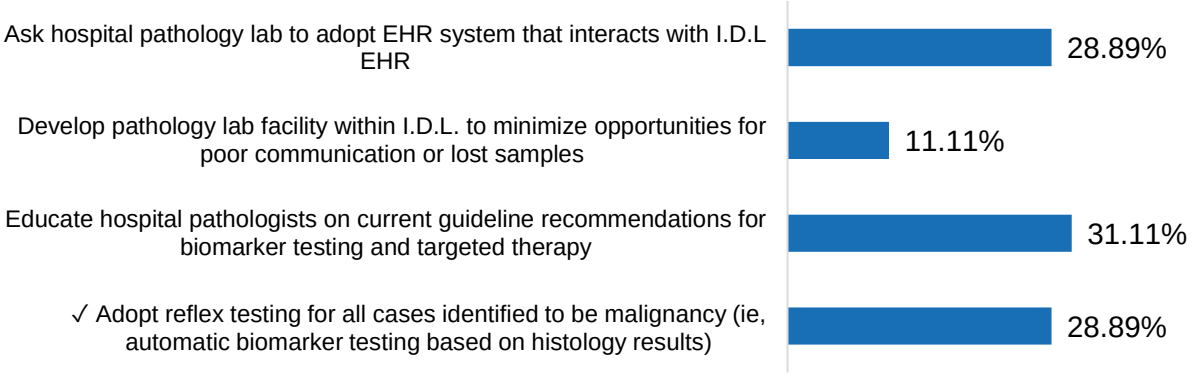
Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

Which of the following tools can the QI team use to aid in their gap analysis of current work processes, as part of the PDSA cycle?



N=50

How might the QI team address the gaps identified in the biomarker process map?



N=45

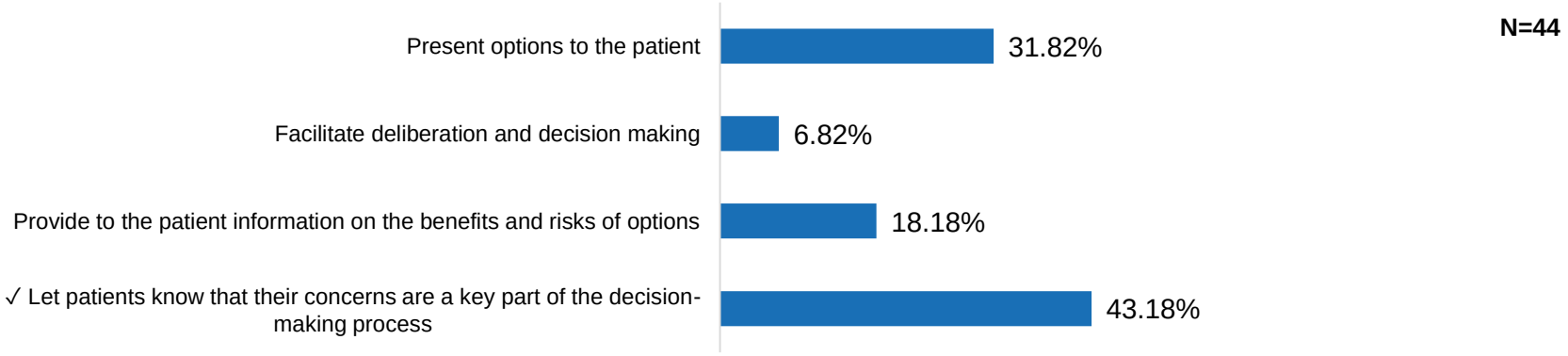
Note: Data is unmatched
Correct answer is designated by an ✓

RealCME

In-Activity Questions

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

Which of the following is the first step in the process of SDM?



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Correct answer is designated by an ✓

RealCME

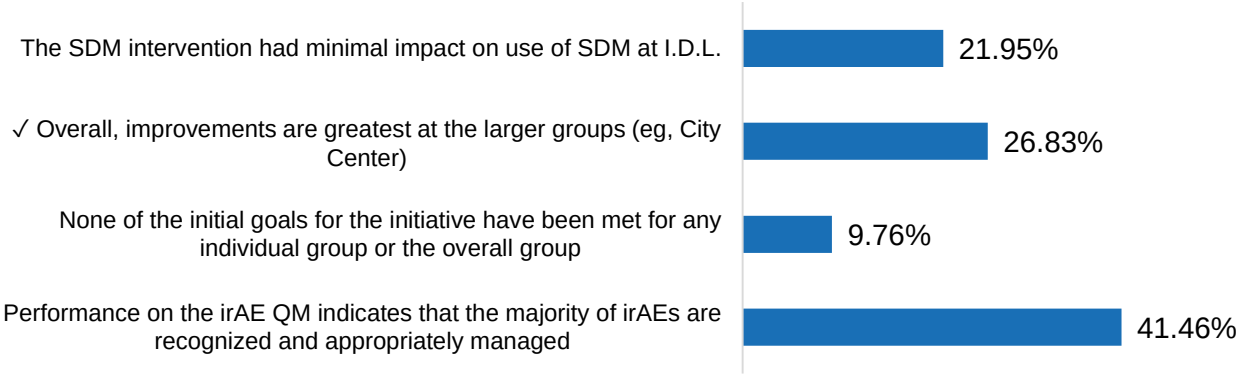
In-Activity Questions

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 2

Which of the following conclusions can be drawn from the updated data dashboard?

	City Center	Northern	Southern	Western	Eastern	Total Group
Biomarker testing/ Interpretation Initial Goal: 50% improvement	54% (39%)	41% (32%)	38% (33%)	37% (30%)	35% (29%)	44% (35%)
Treatment initiation Initial Goal: 20% improvement	92% (75%)	80% (66%)	76% (68%)	81% (69%)	67% (62%)	80% (67%)
irAE management Initial Goal: 30% improvement	73% (58%)	62% (51%)	61% (50%)	56% (47%)	52% (49%)	66% (53%)
SDM Initial Goal: use of SDM in 50% of clinical encounters	9% (3%)	5% (1%)	3% (1%)	4% (2%)	1% (0%)	5% (2%)

N=41



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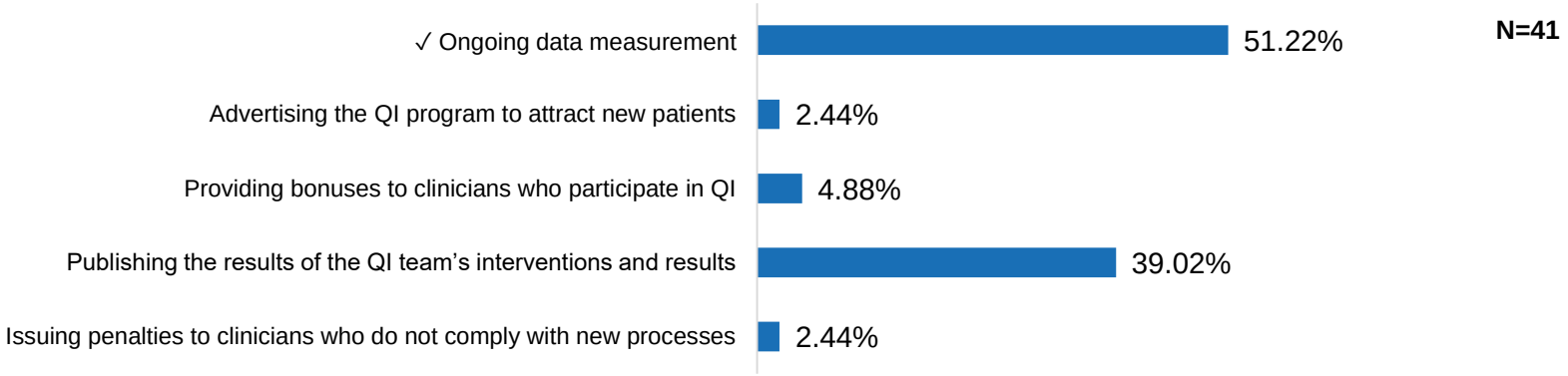
Correct answer is designated by an ✓

RealCME

In-Activity Questions

Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 3

Which of the following approaches may help the QI team sustain the changes they've achieved?



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Correct answer is designated by an ✓

RealCME

In-Activity Questions

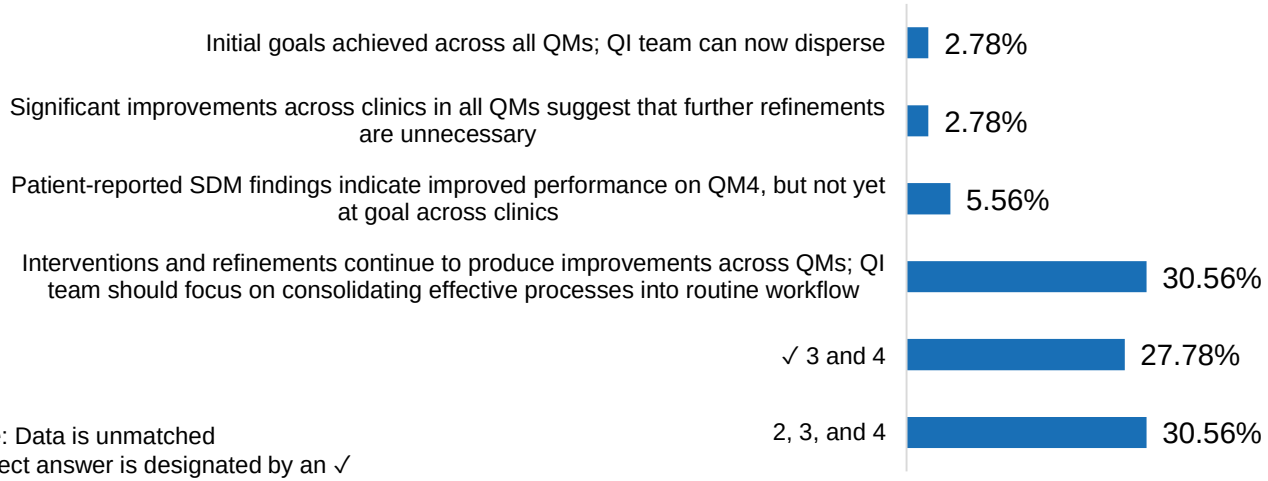
Improving Healthcare Delivery in Immuno-Oncology: A Global Quality Improvement Initiative-Module 3

Six months after the registry data are analyzed and presented to the overall group (a total of 1 year since the last data dashboard was presented), the QI team updates the data dashboard. How should the QI team interpret the updated data dashboard?

N=36

Table. Updated Performance on QMs, by Group Practice, With Previous Values in Parentheses (Baseline and 6 Months Ago) and Initial Goals for Each QM

	City Center	Northern	Southern	Western	Eastern	Total Group
Biomarker testing/ Interpretation Initial Goal: 50% improvement	72% (39%, 54%)	64% (32%, 41%)	57% (33%, 38%)	63% (30%, 37%)	53% (29%, 35%)	64% (35%, 44%)
Treatment initiation Initial Goal: 20% improvement	94% (75%, 92%)	86% (66%, 80%)	88% (68%, 76%)	84% (69%, 81%)	79% (62%, 67%)	87% (67%, 80%)
irAE management Initial Goal: 30% improvement	80% (58%, 73%)	69% (51%, 62%)	67% (50%, 61%)	61% (47%, 56%)	58% (49%, 52%)	70% (53%, 66%)
SDM Physician-documented Patient-documented Initial Goal: use of SDM in 50% of clinical encounters	12% (3%, 9%) 75%	7% (1%, 5%) 62%	6% (1%, 3%) 53%	7% (2%, 4%) 49%	3% (0%, 1%) 38%	7% (2%, 5%) 59%



Note: Data is unmatched
Correct answer is designated by an ✓

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