

# Clinical Updates for Nurse Practitioners and Physician Assistants: 2017

## Using Concentrated Insulins: A New Strategy for the Insulin Resistant Patient



### Final Live Outcomes Report

April 23, 2018

Sanofi Grant ID: 2017-11032

# Executive Summary

- ❖ This curriculum focused on utilizing concentrated insulin on insulin resistant patients within the primary care setting.
- ❖ Significant improvements were seen across all learning domains within the curriculum, ranging from 24-47%.



**1,756**  
Total Attendees



**10 Cities**

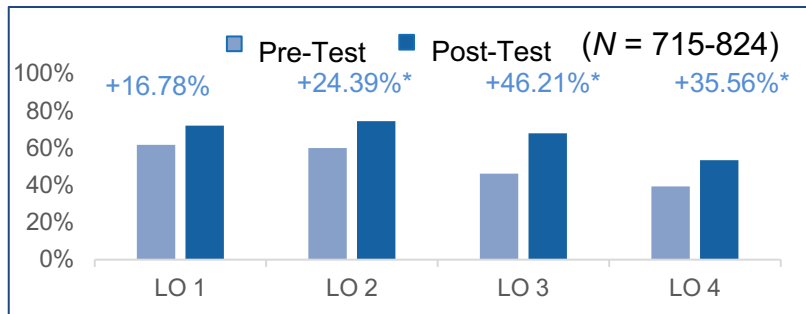


**1061**  
On Site



**695**  
Remote Simulcast

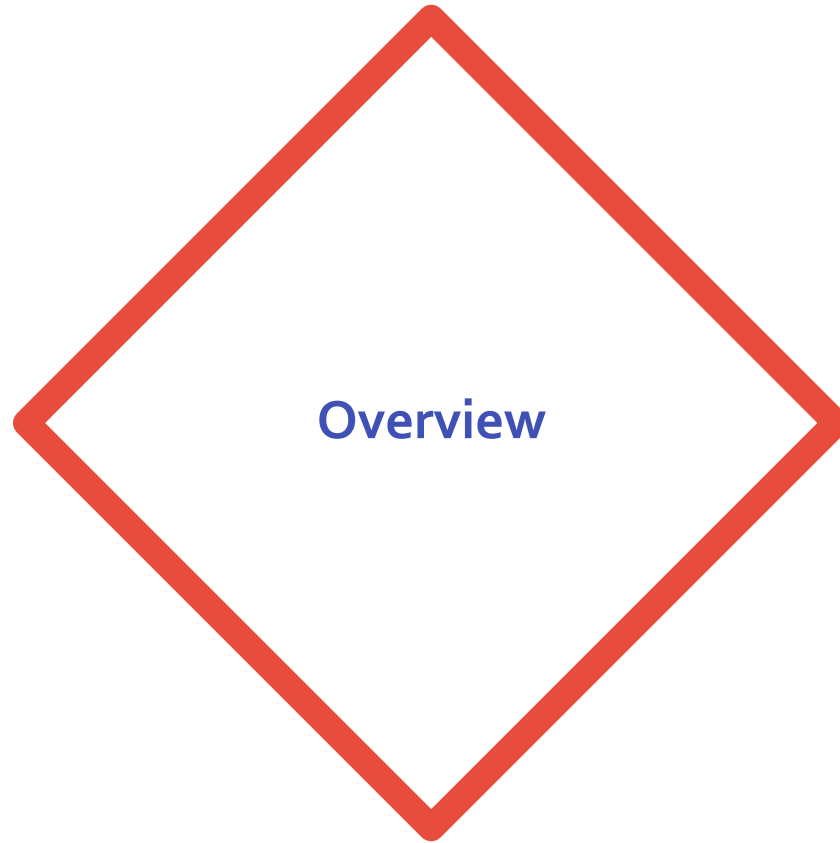
## Pre to Post Test Results By Learning Objective



- ❖ **16.78% Improvement:** Describe the role of insulin therapy in patients with T2DM not meeting glycemic goals.
- ❖ **24.39% Improvement:** Discuss the need for concentrated insulins in T2DM management.
- ❖ **46.21% Improvement:** Discuss the pharmacokinetic – pharmacodynamic profiles and other considerations for the use of concentrated insulin preparations.
- ❖ **35.56% Improvement:** Recognize the need for counseling patients about concentrated insulins to minimize dosing errors.

## Impact

- ❖ At 4 weeks, learners reported change in practice behaviors surrounding increased knowledge about newer concentrated insulin therapy and how to incorporate them into diabetes care.
- ❖ Future education should focus on the identified persistent learning gap: Differentiation among specific long-acting basal insulins (i.e. glargine and degludec).



# Curriculum Overview

- ◆ Accredited Live Regional Symposia: September 16, 2017 - December 7, 2017
  - ❖ The live symposia was held in 10 cities with simulcasts from 3 cities.
- ◆ Non-Accredited “Clinical Highlights” - The program content was reinforced to participants with a document containing key teaching points from the program and was distributed 1 week after each meeting.
- ◆ Enduring Symposium Monograph, Launch Date: January 15, 2018 End Date: January 14, 2019
  - ❖ [http://naceonline.com/CME-Courses/course\\_info.php?course\\_id=942](http://naceonline.com/CME-Courses/course_info.php?course_id=942)

# Learning Objectives

- ❖ Describe the role of insulin therapy in patients with T2DM not meeting glycemic goals.
- ❖ Discuss the need for concentrated insulins in T2DM management.
- ❖ Discuss the pharmacokinetic and pharmacodynamic profiles and other considerations for the use of concentrated insulin preparations.
- ❖ Recognize the need for counseling patients about concentrated insulins to minimize dosing errors.

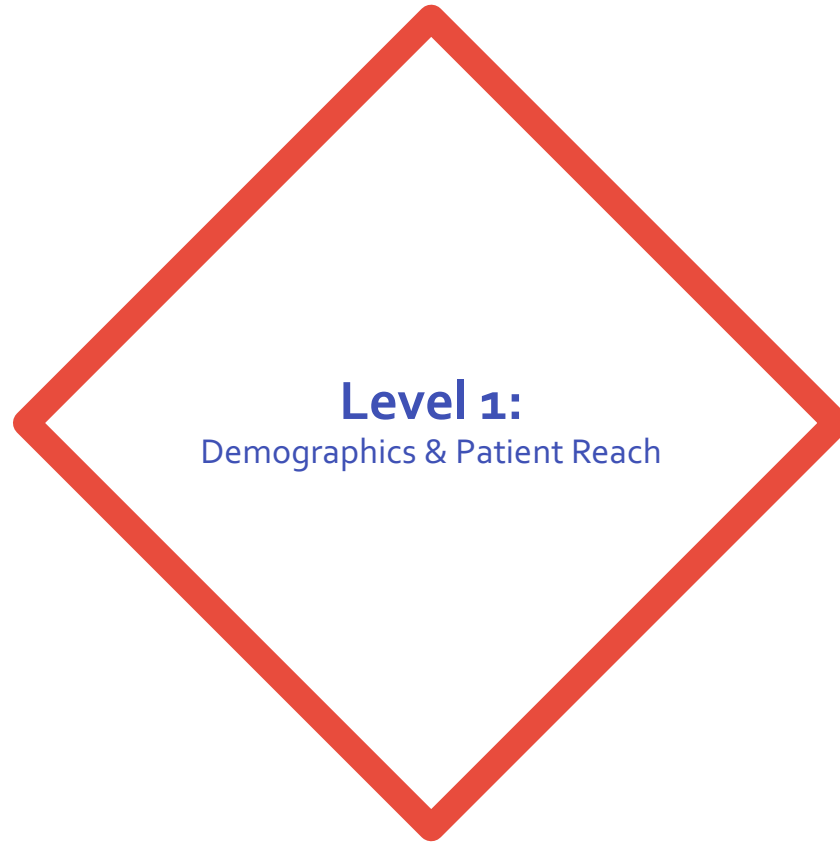
# Outcomes Methodology

Learning outcomes were measured using matched Pre-Test and Post-Test scores for four learning domains (Knowledge, Competence, Confidence, and Practice Strategy) and across all of the curriculum's Learning Objectives.

Outcomes Metric	Definition	Application
<b>Percentage change</b>	This is how the score changes resulting from the education are measured. The change is analyzed as a relative percentage difference by taking into account the magnitude of the Pre-Test average.	Differences between Pre-Test, Post-Test, and PCA score averages
<b>P value (p)</b>	This is the measure of the statistical significance of a difference in scores. It is calculated using dependent or independent samples t-tests to assess the difference between scores, taking into account sample size and score dispersion. Differences are considered significant for when $p \leq .05$ .	Significance of differences between Pre-Test, Post-Test, and PCA scores and among cohorts; significance of drivers in predictive modeling
<b>Effect size (d)</b>	This is a measure of the strength/magnitude of the change in scores (irrespective of sample size). It is calculated using Cohen's d formula, with the most common ranges of d from 0-1: $d < .2$ is a small effect, $d = .2-.8$ is a medium effect, and $d > .8$ is a large effect.	Differences between Pre-Test, Post-Test, and PCA score averages
<b>Power</b>	This is the probability (from 0 to 1) that the "null hypothesis" (no change) will be appropriately rejected. It is the probability of detecting a difference (not seeing a false negative) when there is an effect that is dependent on the significance (p), effect size (d), and sample size (N).	Differences between Pre-Test, Post-Test, and PCA score averages
<b>Percentage non-overlap</b>	This is the percentage of data points at the end of an intervention that surpass the highest scores prior to the intervention. In this report, it will reflect the percentage of learners at Post-Test who exceed the highest Pre-Test scores.	Differences between Pre-Test, Post-Test, and PCA score averages

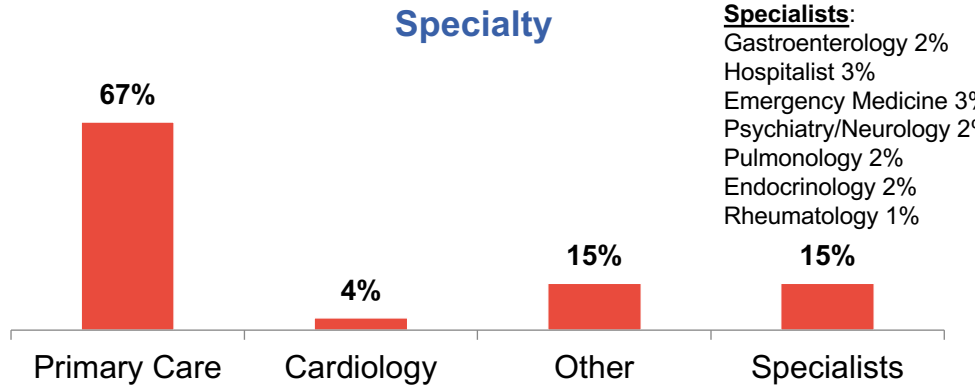
# Participation

2017 Meeting/Simulcast	Date	Attendees	Assessment Participants	Percentage Participants
Orlando	09/16/17	148	118	80%
Cincinnati	09/23/17	56	51	91%
Seattle	10/07/17	74	55	74%
Philadelphia	10/14/17	57	45	79%
Philadelphia Simulcast	10/14/17	209	77	37%
Dallas	10/21/17	202	185	92%
Miami	10/28/17	131	101	77%
Charlotte	11/04/17	107	56	52%
Phoenix	11/11/17	123	97	79%
Phoenix Simulcast	11/11/17	259	122	47%
White Plains	11/18/17	90	67	74%
White Plains Simulcast	11/18/17	227	85	37%
Costa Mesa	12/02/17	73	56	77%
		<b>1,756</b>	<b>1,115</b>	<b>63.4%</b>



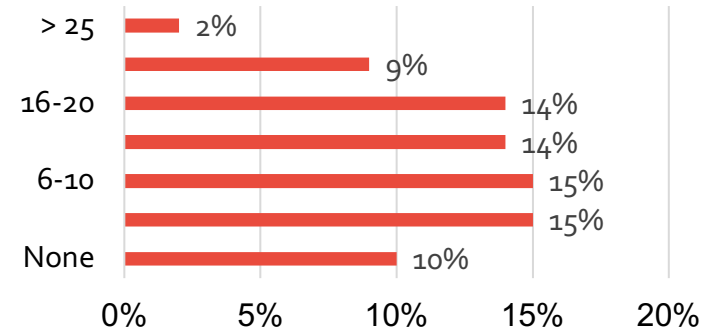


# Level 1: Participation



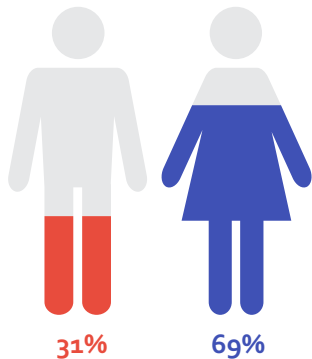
Diabetic patient reach = 9,890 patients per week

## Patients visits with Diabetes seen each week in a clinical setting:

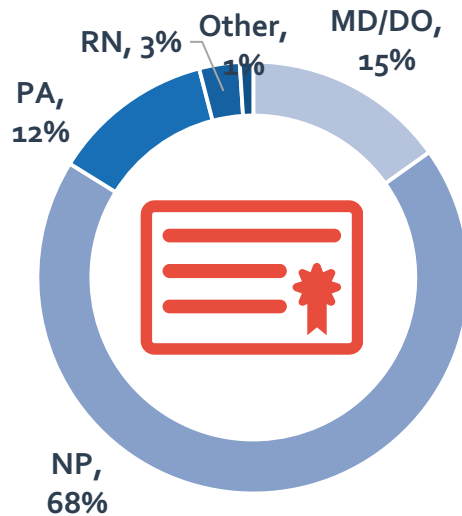


Patient Care Focus: 93%

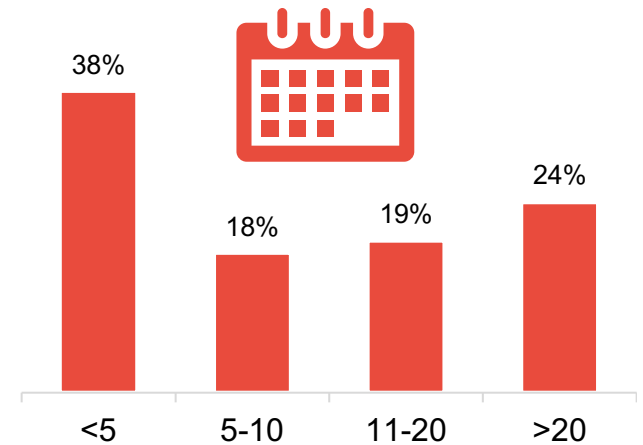
### Gender



### Profession



### Years in Practice





**Level 2-5:**  
Outcomes Metrics

## Level 2 (Satisfaction)



**99%** rated the activity as excellent



**99%** indicated the activity improved their knowledge



**97%** stated that they learned new and useful strategies for patient care

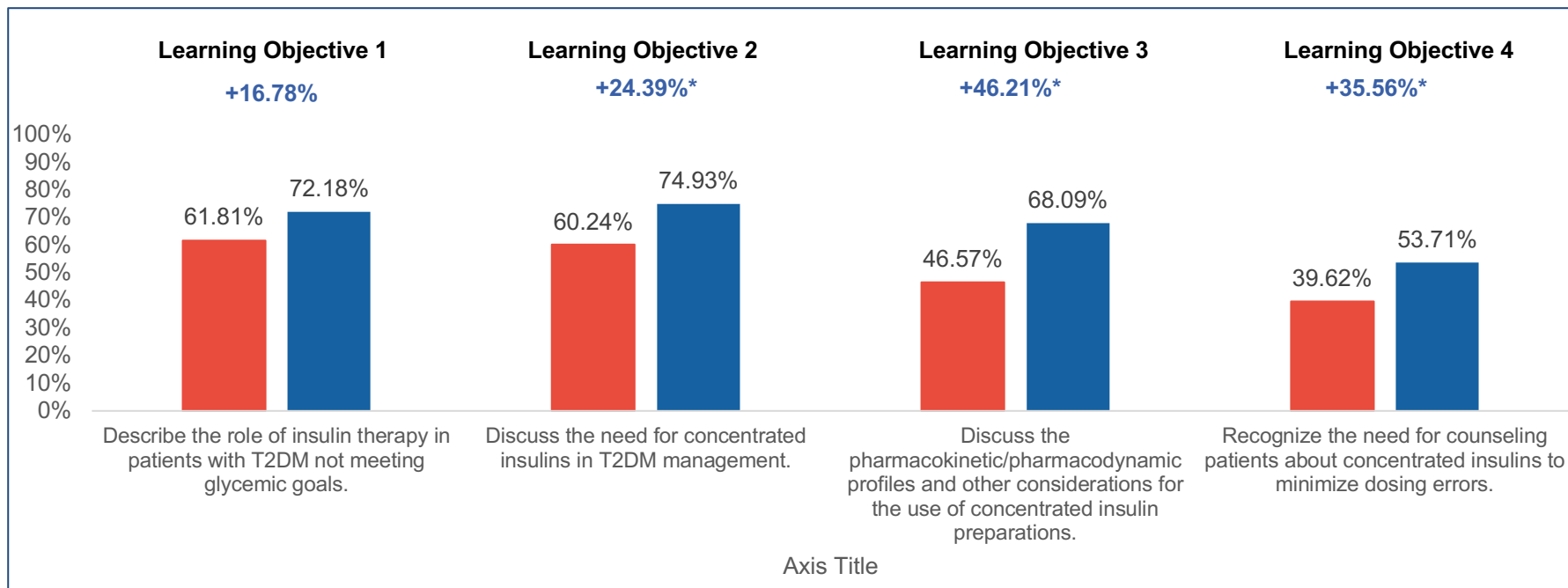


**90%** said they would implement new strategies that they learned



**99%** said the program was fair-balanced and unbiased

# Learning Objectives Analysis



■ Pre-Test ■ Post-Test

(N = 715-824)

*\*significant at the  $p \leq 0.05$  level*

- ❖ Substantial gains (ranging from 17%-46%) were achieved on all Learning Objectives; the gains on Learning Objectives 2, 3, and 4 were significant.
- ❖ Learning Objectives 3 and 4 showed the lowest Post-Test scores.
  - Learners demonstrated difficulty with the pharmacokinetic profiles for preparing concentrated insulin.
  - Learners had difficulty with recognizing patients that require counseling to minimize dosing errors.

# Learning Objectives Analysis - Live vs. Simulcast Audience

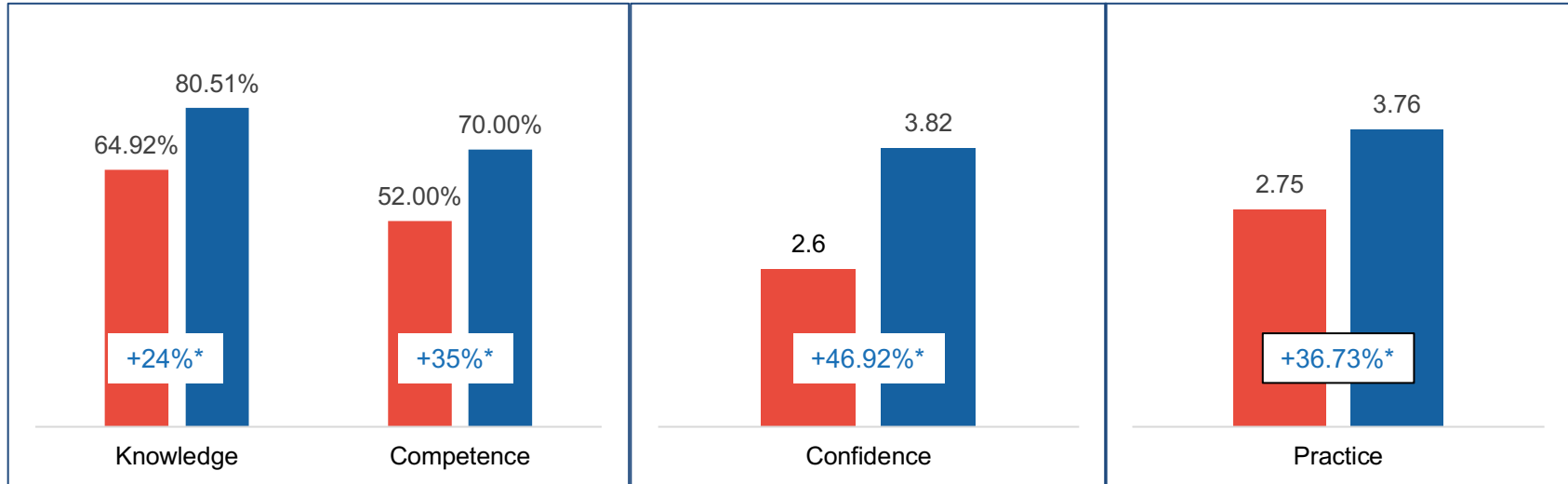
Learners who attended live meeting vs simulcast demonstrated comparable scores and gains

Learning Objective	Live Meeting (N = 851)			Simulcast (N = 301)		
	Pre-Test	Post-Test	% Change	Pre-Test	Post-Test	% Change
Describe the role of insulin therapy in patients with T2DM not meeting glycemic goals.	62.45%	71.62%	<b>+14.68%</b>	62.11%	73.40%	<b>+18.18%</b>
Discuss the need for concentrated insulins in T2DM management.	60.82%	74.72%	<b>+22.85%</b>	58.44%	75.27%	<b>+28.80%</b>
Discuss the pharmacokinetic and pharmacodynamic profiles and other considerations for the use of concentrated insulin preparations.	47.55%	69.85%	<b>+46.9%</b>	42.87%	62.87%	<b>+46.65%</b>
Recognize the need for counseling patients about concentrated insulins to minimize dosing errors.	41.25%	51.78%	<b>+25.53%</b>	34.62%	58.37%	<b>+68.60%</b>

❖ Subtle differences between the cohorts include:

- Simulcast learners achieved moderately higher scores at Post-Test on Learning Objectives 1, 2, and 4; participants in the live meetings achieved a higher Post-Test score on Learning Objective 3.
- On Learning Objective 4, simulcast participants showed the greatest gain from the lowest Pre-Test average, resulting in a Post-Test score that surpassed that of live meeting participants.

# Learning Domain Analysis



Pre-Test Post-Test (N = 714-826)

*\*significant at the  $p \leq .05$  level, matched data*

- ❖ Significant gains (24-47%) were achieved in all learner domains from Pre-Test to Post-Test.
- ❖ Despite the substantial 35% gain, learners remained challenged by the Competence case questions, as demonstrated by the Post-Test score of 70%.
- ❖ Learners substantially (46%) increased their reported Confidence in their ability to utilize concentrated insulin on insulin resistant patients.
- ❖ There was substantial (37%) increase in their reported intent to use concentrated insulin in their patients.

# Curriculum/Activity Intervention Effect

Learning Domain	Effect Size*	% Non-Overlap
Knowledge	0.758	45.08%
Competence	0.916	52.15%

- The activity had a large impact on learners' Knowledge and Competence with over 45% of learners exceeding the highest Pre-Test scores at Post-Test.

Effect Size Definition: This is a measure of the strength/magnitude of the change in scores (irrespective of sample size). It is calculated using Cohen's d formula, with the most common ranges of d from 0-1:  $d < .2$  is a small effect,  $d = .2-.8$  is a medium effect, and  $d > .8$  is a large effect.

# Learning Domain by Professional Cohort

Learning Domain	Physician Assistant				Nurse Practitioner			
	N	Pre Test	Post Test	% Change	N	Pre Test	Post Test	% Change
Knowledge	63	66.86%	84.15%	+25.86%*	367	66.21%	82.95%	+25.28%*
Competence	61	66.33%	68.85%	+3.8%	349	53.18%	71.08%	+33.66%*
Confidence	62	2.62	3.53	+34.73%*	373	2.62	3.47	+32.44%*
Practice	64	2.58	3.75	+45.35%*	350	2.81	3.88	+38.08%*

*\*significant at the  $p \leq .05$  level*

- ❖ Physician Assistants and Nurse Practitioners demonstrated statistically significant gains in all learning domains, with the exception of Competence for Physician Assistants.
- ❖ Comparable scores were observed by both cohorts in Knowledge, Confidence, and Practice Strategy.



# Learning Domains - Live vs. Simulcast Audience

Learners who attended live meeting vs simulcast demonstrated comparable scores and gains

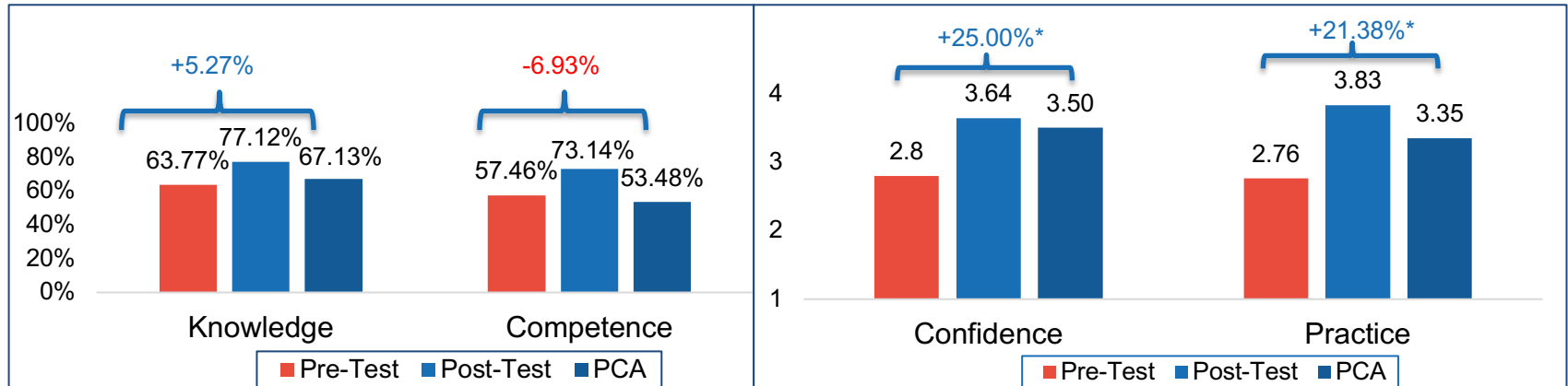
Learning Domain	Live Meeting (N = 911)				Simulcast (N = 473)			
	N	Pre Test	Post Test	% Change	N	Pre Test	Post Test	% Change
Knowledge	609	64.73%	82.37%	<b>+27.25%*</b>	216	65.55%	75.31%	<b>+14.89%*</b>
Competence	584	53.39%	70.73%	<b>+32.48%*</b>	209	47.59%	69.08%	<b>+45.16%*</b>
Confidence	536	2.65	3.52	<b>+32.83%*</b>	212	2.47	3.31	<b>+34.01%*</b>
Practice	510	2.76	3.79	<b>+37.32%*</b>	213	2.78	3.77	<b>+35.61%*</b>

*\*significant at the  $p \leq .05$  level*

❖ Subtle differences between the cohorts include:

- Knowledge - participants in the live meetings achieved the greater gain,
- Competence - simulcast learners demonstrated the greater gain from a lower Pre-Test score, minimizing Post-Test score differences.
- Confidence and practice strategy ratings - comparable gains were measured.

# 4 Week Retention Analysis



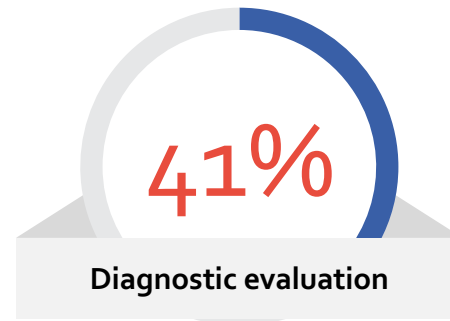
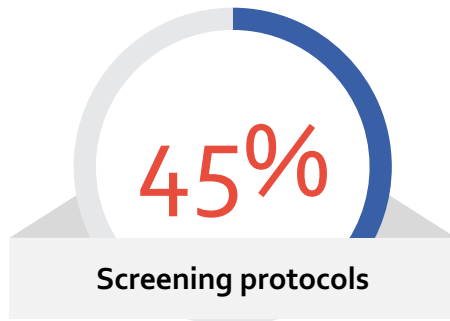
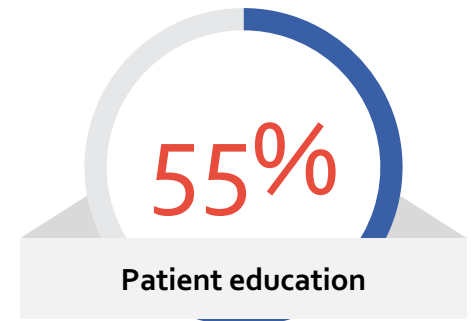
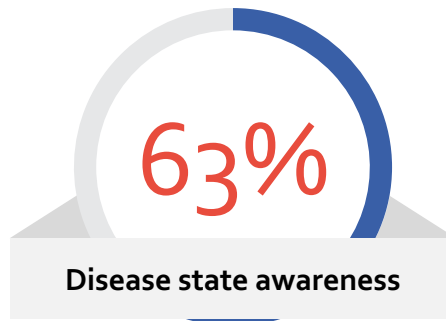
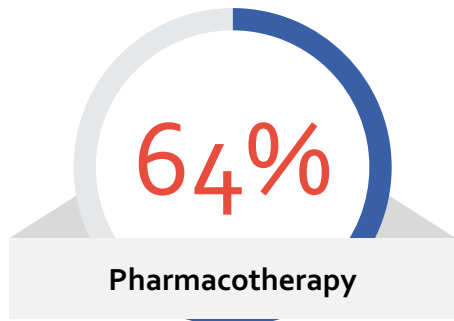
*\*significant at the  $p \leq .05$  level*

At follow-up (N=76):

- ❖ Net gains were measured from Pre-Test to post curriculum assessment (PCA) in Knowledge, Confidence, and practice strategy.
  - Unmatched t-test showed that the net gains on the Confidence and practice strategy ratings were significant.
- ❖ Score slippage was observed in all domains from Post-Test to PCA.
- ❖ In Competence, a non-significant net decrease was observed.

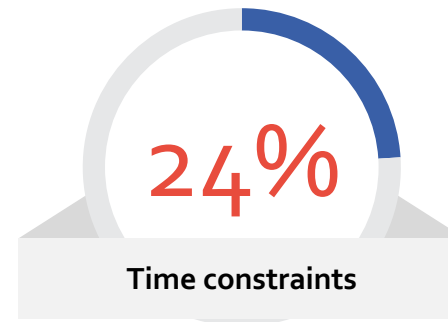
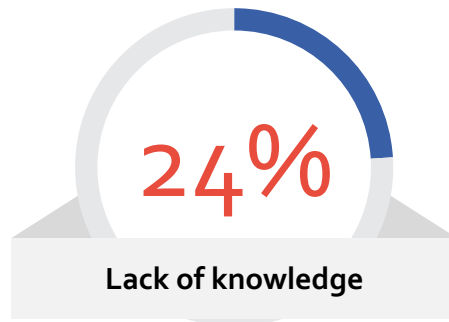
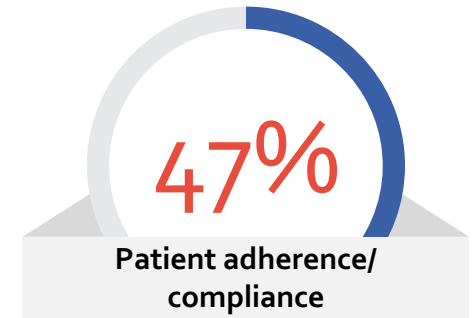
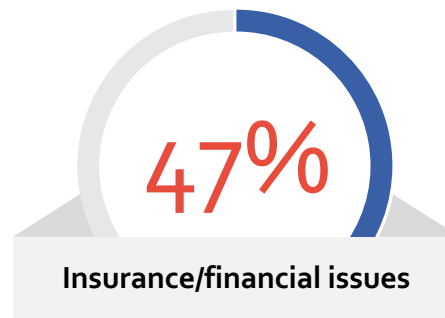
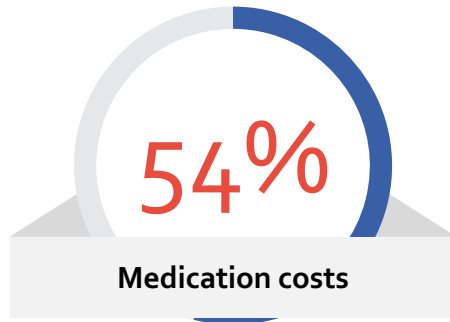
# Learner Reported Improvements – 4 Weeks Post Activity

Specific areas of skills or practice behaviors that learners reported improvements for the treatment of patients with T2DM



# Learner Reported Barriers – 4 Weeks Post Activity

Specific barriers that learners reported in the treatment of patients with T2DM



# New Specific Behaviors Reported at 4 weeks



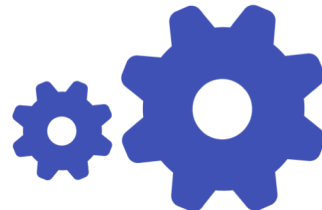
I am more knowledgeable about basal insulins

I have a better approach to using the newest long-acting insulins

I feel more confident educating patients and managing diabetes

I am more confident switching patients from older to newer insulin therapies

I am doing a better job at achieving tighter control of A1C



NACE

# Identified Learning Gap:

## *Differentiation among specific long-acting basal insulins*

Low scoring questions in the curriculum included Knowledge and Competence questions that related to the use of specific long-acting basal insulins such as degludec U-100 and glargine U-300.

### **Knowledge Question:**

*Which of the following basal insulins has the longest duration of action? Results:*

- At Post-Test, 65% of learners correctly answered: “Degludec U-100”.
- At Post-Test, 31% of learners incorrectly answered “Glargine U-300”.

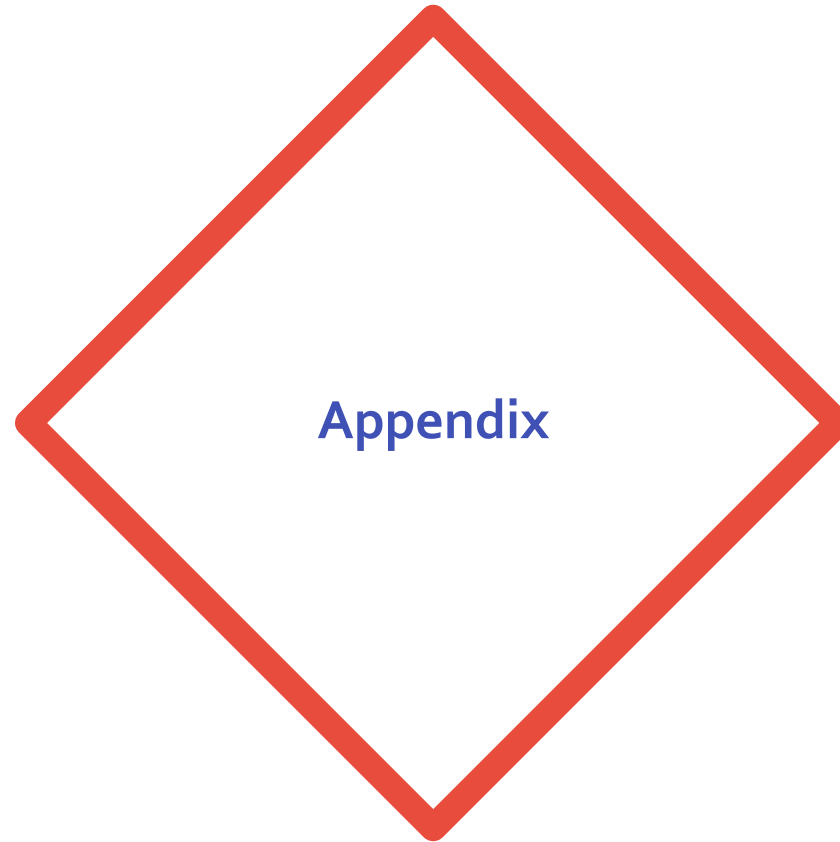
### **Competence Question:**

*A 53 y/o obese man with 9-year history of T2DM has A1C 8.9%. Current medications include metformin 1000 mg bid, sitagliptin 100 mg qd, and insulin glargine 100 U qhs. His PCP wants to improve glycemic control but is concerned about the volume of insulin being used. Which of the following might be appropriate at this time? Results:*

- At Post-Test, 53% of learners correctly answered: “Replace basal insulin with 100 U glargine U-300.”
- At Post-Test, 16% of learners incorrectly answered “Advise patient to recalculate basal insulin dose following switch to glargine U-300.”

# Overall Educational Impact

- ❖ This curriculum focused on utilizing concentrated insulin on insulin resistant patients within the primary care setting.
- ❖ Significant improvements were seen across all learning domains, ranging from 24-47%.
  - Highlighting the magnitude of these score increases, there was a large effect on learners' Knowledge and Competence with over 45% of Post-Test scores exceeding the highest Pre-Test scores.
  - Physician Assistants and Nurse Practitioners demonstrated improvement in all learning domains.
  - There was comparable improvements in all learning domains demonstrated by simulcast and live meeting learners.
- ❖ Significant improvements were seen across all Learning Objectives, ranging from 17-46%.
- ❖ The analysis of the Knowledge and Competence domains identified one primary **persistent learning gap related to the differentiation among specific long-acting insulins.**
  - The Knowledge question concerning the duration of action for specific basal insulins was one of the reasons Learning Objective 3 (relating to the profiles of concentrated insulin preparations) demonstrated a low Post-Test score (54%).
  - 30% of learners incorrectly selected glargine U-300 as the drug with the longest duration of action.

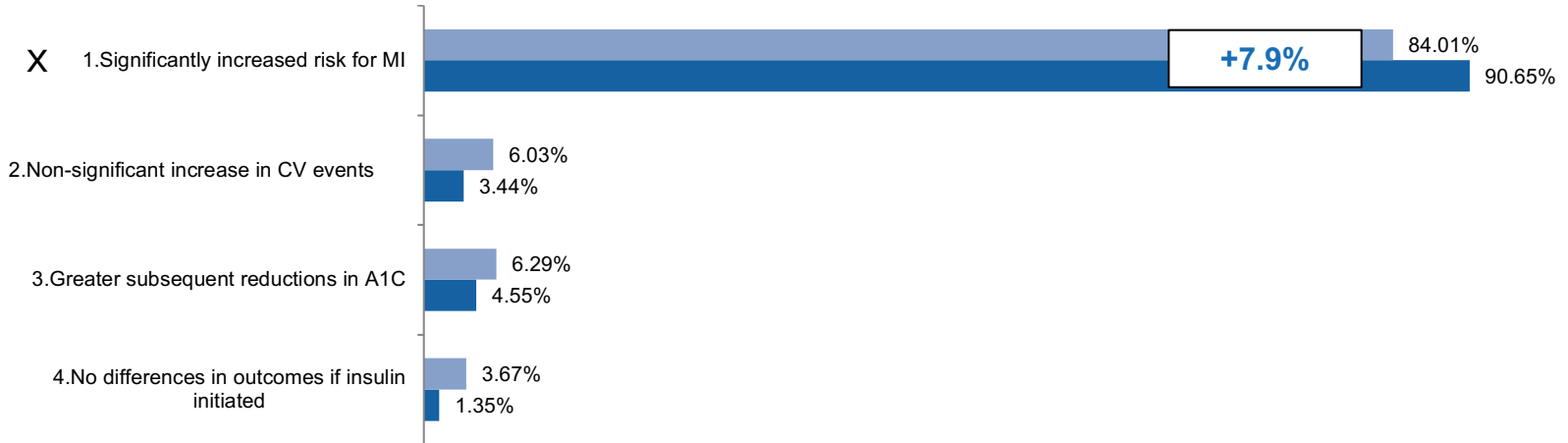




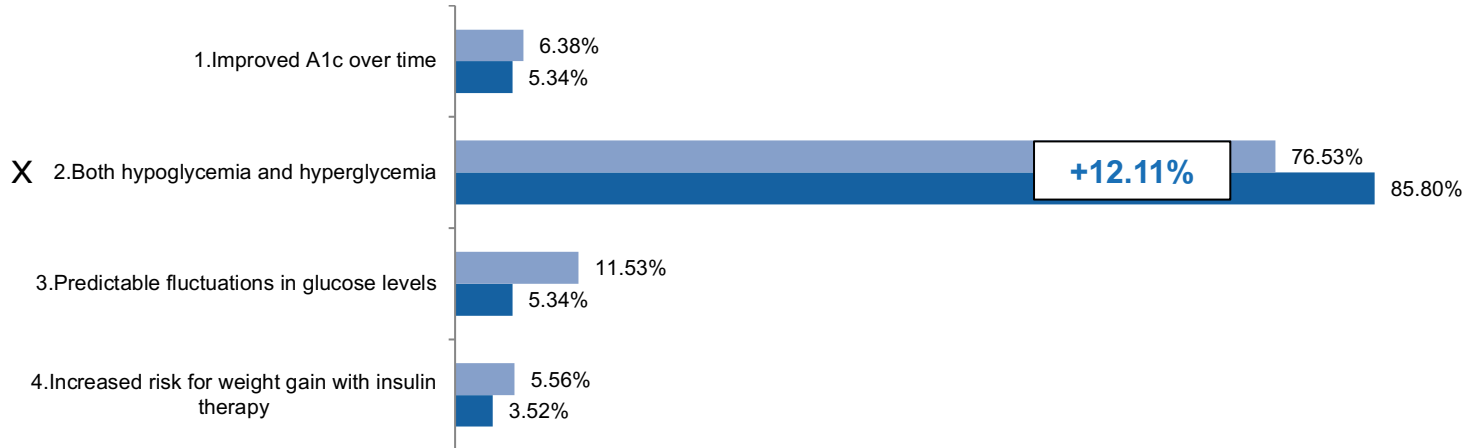
# Knowledge Questions

N = (737-824)

In patients with A1C  $\geq 7\%$ , a 1-year delay in treatment intensification was associated with which of the following outcomes, compared to patients with A1C  $< 7\%$ ?



Greater glucose variability is associated with which of the following?



Pre-Test Post-Test

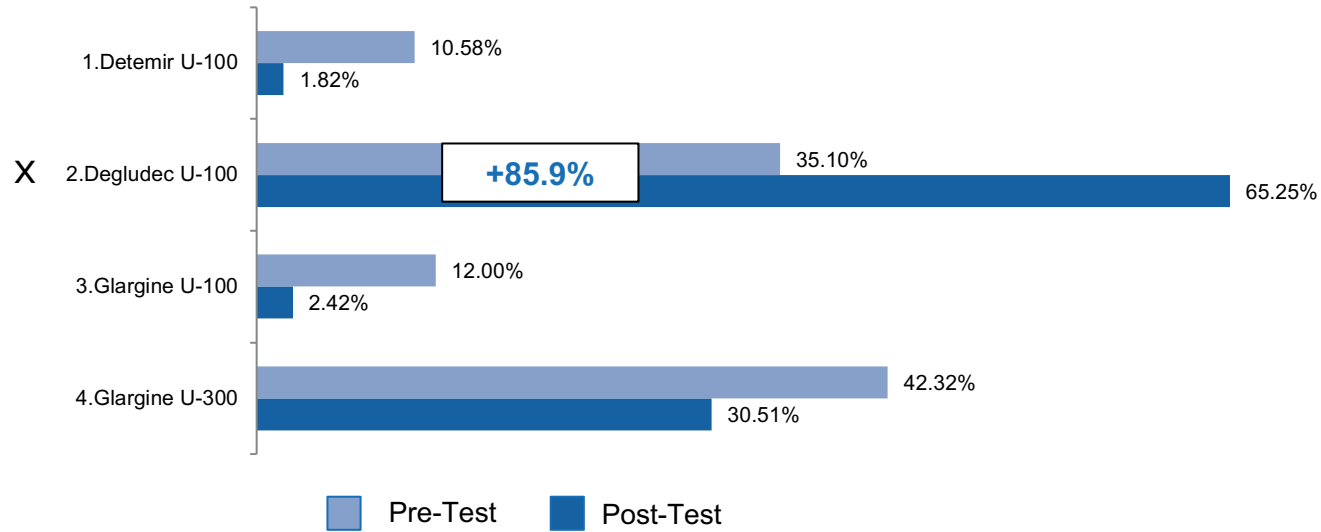
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# Knowledge Questions

N = (775-826)

Which of the following basal insulins has the longest duration of action?



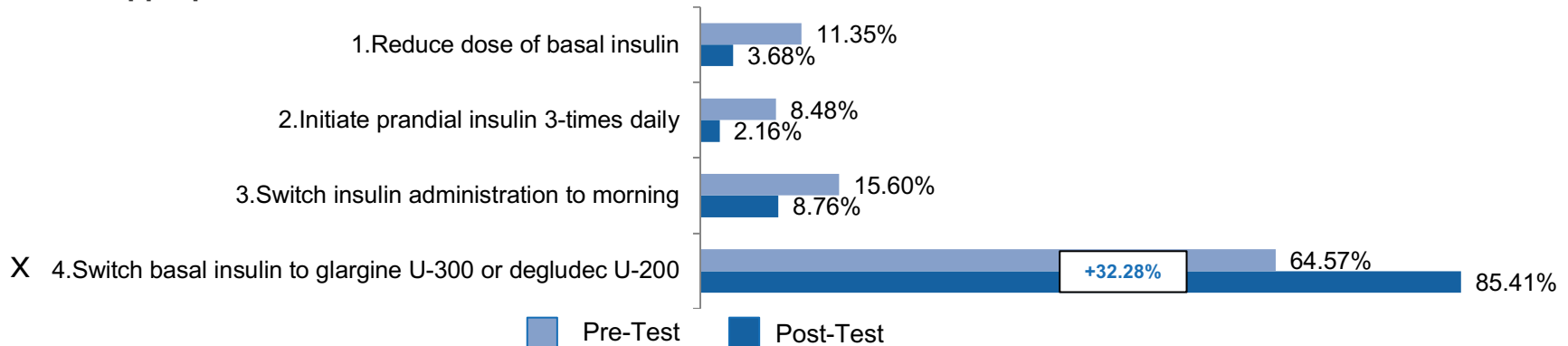
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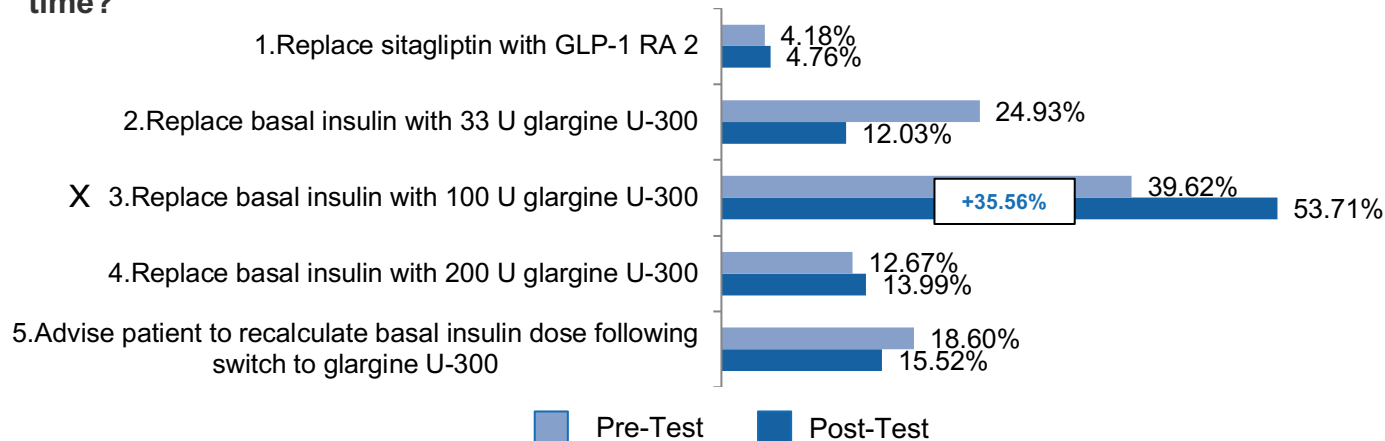
# Competence Questions

N = (715-788)

A 49 y/o woman with 12-year history of T2DM reports episodes of nocturnal hypoglycemia ~1/week (50-70 mg/dL). BG levels are 120-180 mg/dL fasting and 180-200 at bedtime. A1C today is 7.8%. Medications include metformin 1000 mg bid, empagliflozin 10 mg qd, and insulin glargine 70 U qhs. Which of the following might be appropriate at this time?



A 53 y/o obese man with 9-year history of T2DM has A1C 8.9%. Current medications include metformin 1000 mg bid, sitagliptin 100 mg qd, and insulin glargine 100 U qhs. His PCP wants to improve glycemic control but is concerned about the volume of insulin being used. Which of the following might be appropriate at this time?



Note: Data is unmatched

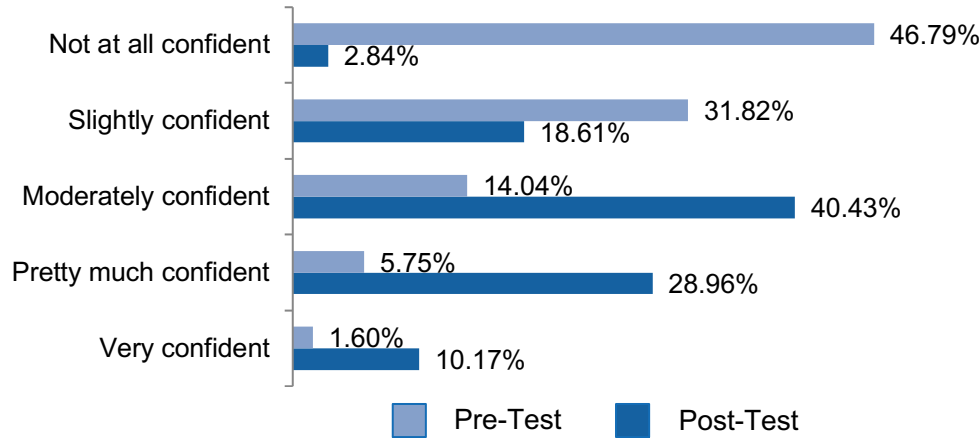


# Confidence & Practice Questions

N = (740-846)

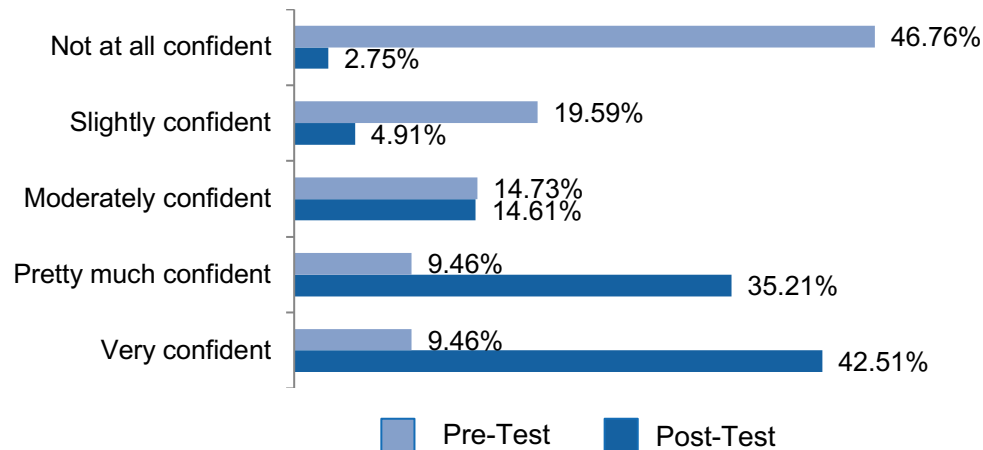
## Confidence Question:

Please rate your confidence in your ability to identify patients with T2DM who may benefit from concentrated insulins:



## Practice Question:

How often will you consider using concentrated insulin therapy in patients with T2DM who are not achieving treatment targets with standard insulin regimens?



Note: Data is unmatched

