



**NACE**

LIVE CONFERENCE SERIES

# Advances in Insulin Therapy: Another Step Closer to a More Physiological Strategy



## Final Live Activities Outcomes Report

Prepared for: Sanofi US • Grant ID 11727

January 22, 2019

# Executive Summary

- ❖ This curriculum focused on the use of concentrated insulin therapies in the management of diabetes, including treatment barriers, the impact of hypoglycemia, and optimal selection of therapy.
- ❖ Substantial improvements were measured in learners' awareness of the prevalence of unrecognized hypoglycemia among diabetic patients.



**2,365\***  
Total Attendees



**9 Cities**

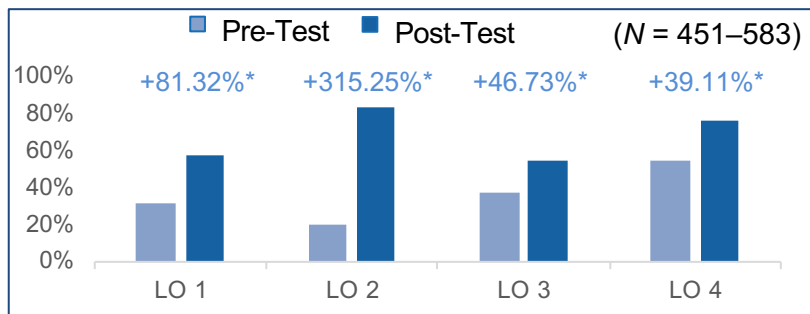


**1,288\***  
On Site



**1,077\***  
Simulcast / Virtual  
Symposium

## Pre to Post Test Results By Learning Objective



- ❖ **+81.32%\* Improvement:** Discuss clinician and patient barriers to initiation and intensification of insulin therapy
- ❖ **+315.25%\* Improvement:** Recognize the prevalence and clinical impact of hypoglycemia in special populations at risk
- ❖ **+46.73%\* Improvement:** Discuss the pharmacology and clinical differences between existing and new long-acting and concentrated insulins
- ❖ **+39.11%\* Improvement:** Discuss how to incorporate new basal and concentrated insulins into clinical practice while minimizing the risk of adverse events

## Impact

- ❖ 2,365 attendees were reached via both online and live formats, with significant gains observed across modalities from Pre-Test to Post-Test.
- ❖ Despite their substantial improvements, learners remain challenged in their abilities to select appropriate concentrated insulin therapies for patients experiencing nocturnal hypoglycemia and to identify the leading barriers to insulin initiation.
- ❖ Learners demonstrated net increases on all scored items in the 4-week Post Curriculum Assessment (PCA). However, score decreases from the Post-Test to the PCA reinforce the need for further education.

\*These numbers represent the total number of attendees, irrespective of assessment participation

# Curriculum Patient Impact

In the evaluation, learners (N = 2,365) were asked to report how many patients with type 2 diabetes they see in any clinical setting per week by selecting a range. The resulting distribution of learner responses was then extrapolated to reflect the total number of learners who have attended the onsite and online meetings.

The findings reveal that this education has the potential to impact

**1,352,780**

patients on an annual basis.

**23,650–28,380 patients  
on a weekly basis**

23,650–  
28,380

## Course Directors

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### **Mark Stolar, MD**

Associate Professor of Clinical Medicine  
Northwestern University Medical School  
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## Activity Planning Committee

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Sandy Bihlmeyer M.Ed

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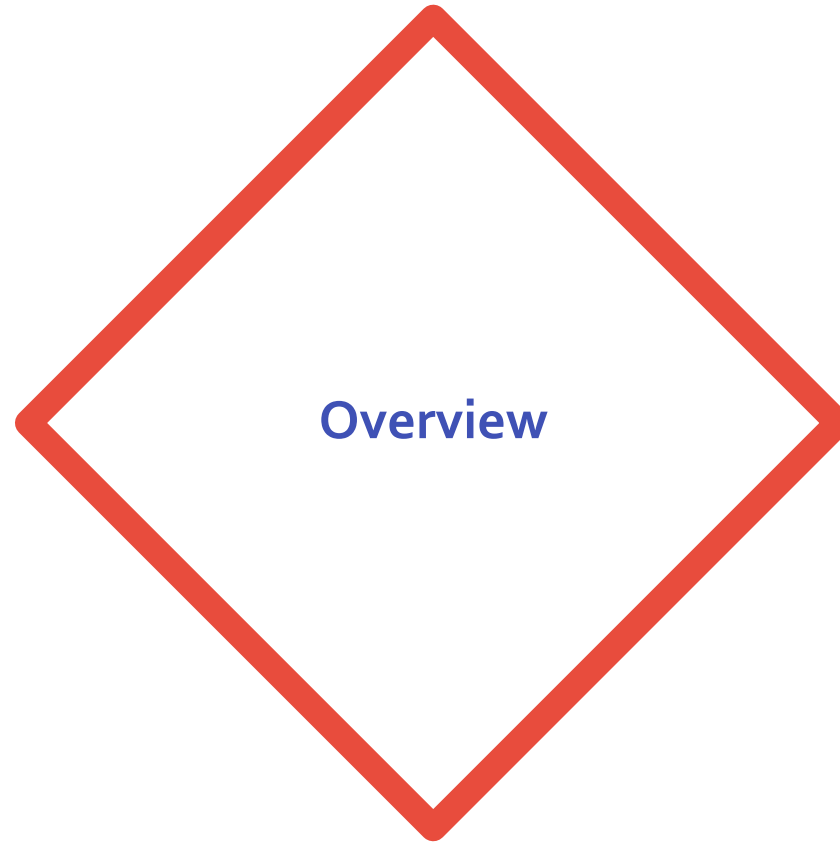
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Unger Primary Care Medical Group  
Rancho Cucamonga, CA



## Commercial Support

The Clinical Updates for Nurse Practitioners and Physician Assistants: 2018 series of CME activities were supported through educational grants or donations from the following companies:

- ❖ Actelion Pharmaceuticals US, Inc
- ❖ Sanofi US
- ❖ Grifols
- ❖ Novartis Pharmaceuticals Corporation
- ❖ GlaxoSmithKline
- ❖ Ferring Pharmaceuticals, Inc.





# Clinical Updates for Nurse Practitioners and Physician Assistants: 2018

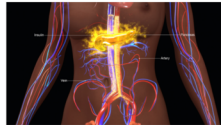
8 Accredited Live Regional Symposia with 1 simulcast  
Sep 8, 2018 – Nov 10, 2018



Online Enduring CME Monograph:

- ❖ Launch Date: Oct 31, 2018
- ❖ End Date: Oct 30, 2019
- ❖ Hosted at: [http://naceonline.com/CME-Courses/course\\_info.php?course\\_id=1054](http://naceonline.com/CME-Courses/course_info.php?course_id=1054)

Title	: <b>Advances in Insulin Therapy: Another Step Closer to a More Physiological Strategy</b>
Activity/Course #:	: NCME366
Cost:	: Free
Release/Start Date:	: Oct 31 2018
Expiration Date:	: Oct 30 2019
Topics:	: Diabetes
Target Audience:	: Primary Care Physicians, Nurse Practitioners, Physician Assistants
Format:	: Monograph



[FREE CME Register Now](#)

1 Accredited Live Virtual Symposium:  
Nov 17, 2018



## Clinical Highlights eMonograph

eMonograph containing key teaching points from the CME Activity was distributed 1 week after the meeting to all attendees.

# Learning Objectives

- ❖ Discuss clinician and patient barriers to initiation and intensification of insulin therapy
- ❖ Recognize the prevalence and clinical impact of hypoglycemia in special populations at risk
- ❖ Discuss the pharmacology and clinical differences between existing and new long-acting and concentrated insulins
- ❖ Discuss how to incorporate new basal and concentrated insulins into clinical practice while minimizing the risk of adverse events



# Outcomes Methodology

Learning outcomes were measured using matched Pre-Test and Post-Test scores for 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
<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 and Post-Test 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 and Post-Test 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 and Post-Test score averages

# Participation

2018 Symposium/Simulcast	Date	Attendees
White Plains, NY	9/8/18	189
Orlando, FL	9/15/18	199
Seattle, WA	9/22/18	103
Philadelphia, PA (King of Prussia)	10/6/18	79
Anaheim, CA	10/13/18	98
Charlotte, NC	10/20/18	115
Phoenix, AZ	10/27/18	116
Phoenix, AZ simulcast	10/27/18	550
Dallas, TX	11/3/18	260
Miami, FL	11/10/18	129
Virtual	11/17/18	527
<b>Total</b>		<b>2,365</b>

**Level 1**  
Participation  
Demographics  
Patient Reach

## Participation



**2,365\*** Total Attendees



**9 Cities**



**1,288\*** On Site



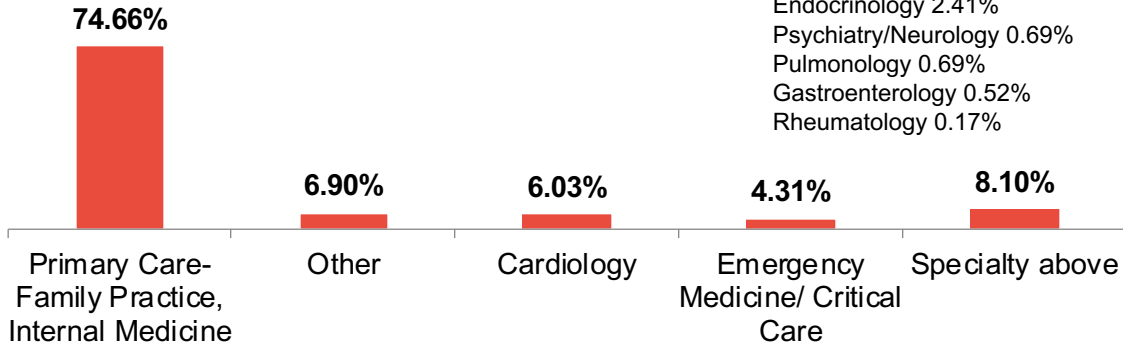
**1,077\***  
Simulcast / Virtual Symposium

# Level 1: Demographics and Patient Reach

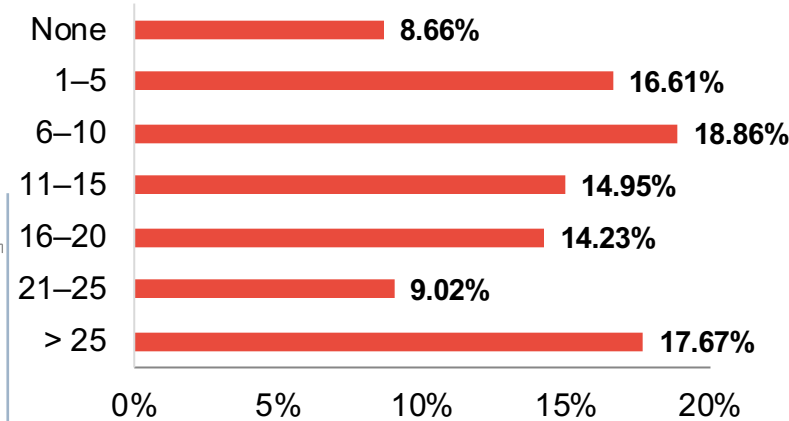
## Specialty

### Specialists:

Hospitalist 3.62%  
 Endocrinology 2.41%  
 Psychiatry/Neurology 0.69%  
 Pulmonology 0.69%  
 Gastroenterology 0.52%  
 Rheumatology 0.17%



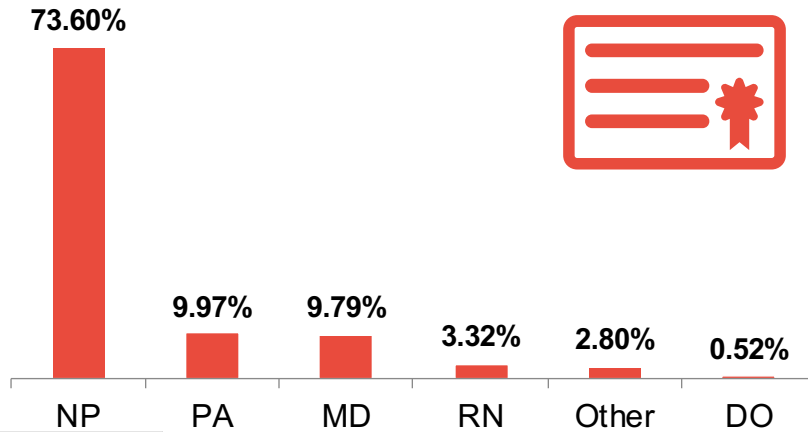
## Patients with T2D seen each week, in any clinical setting:



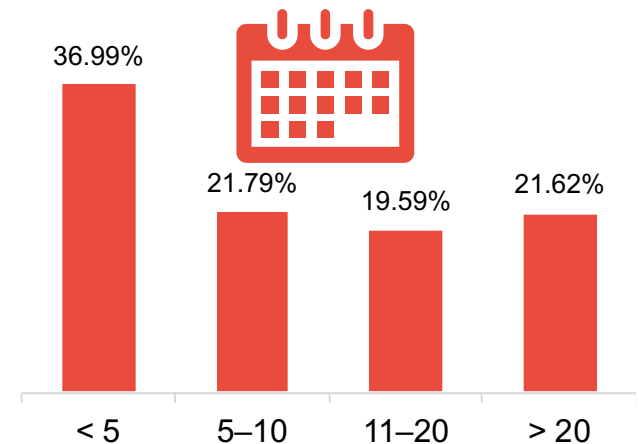
Patient Care Focus: 95%

Average number of patients seen each week with T2D per clinician: 11

## Profession



## Years in Practice

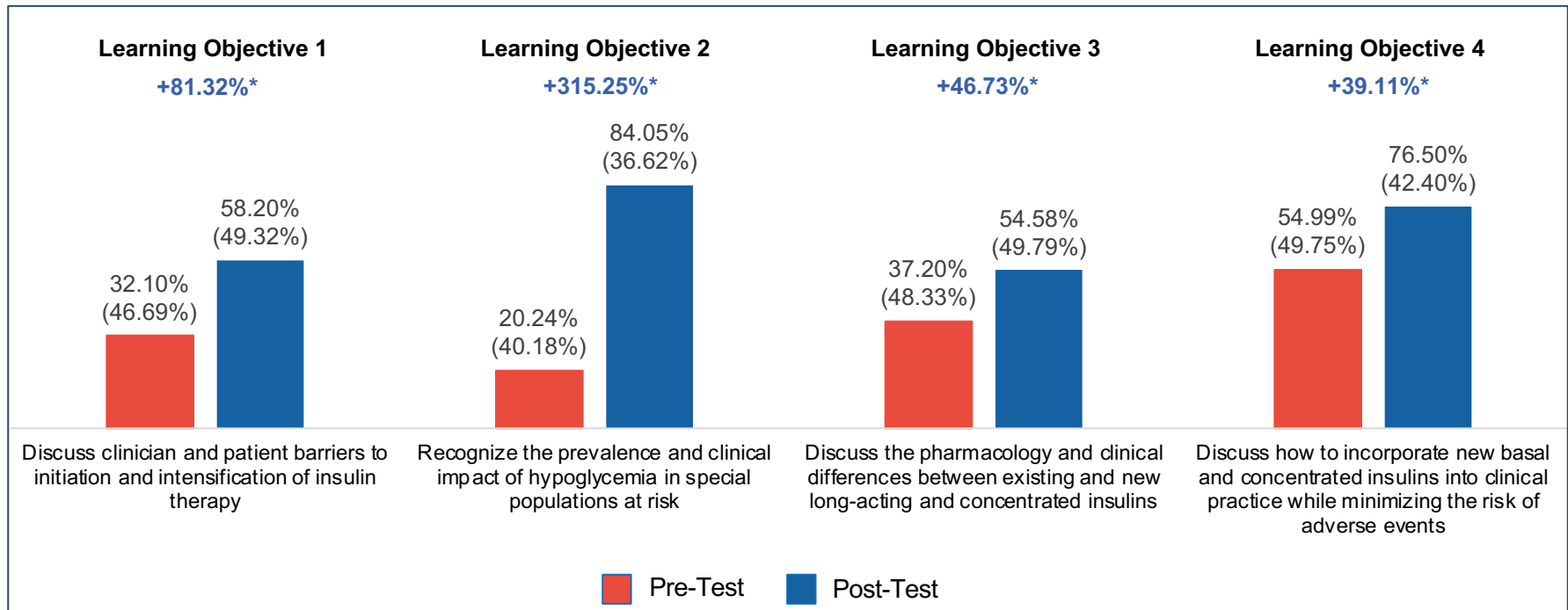




**Level 2-5:**  
Outcomes Metrics

# Learning Objectives Analysis

(N = 451–583)

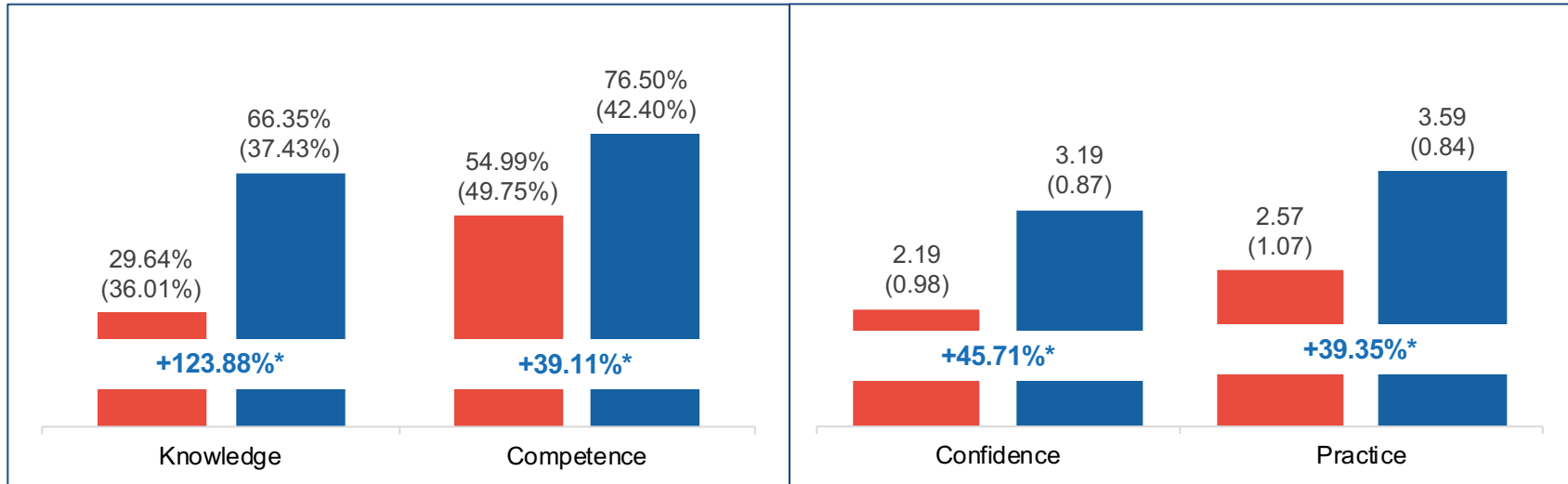


*\*significant at the  $p \leq 0.05$  level*

- ❖ Substantial and significant gains (ranging from 39% to 315%) from low Pre-Test averages were achieved on all Learning Objectives.
- ❖ Post-Test averages remained low (<59%) on the Learning Objectives related to barriers for insulin therapy and the pharmacology and clinical differences between existing and new long-acting and concentrated insulins.
- ❖ A substantial (315%) increase on the Learning Objective related to hypoglycemia in special populations at risk brought learners from the lowest Pre-Test average score (20%) to the highest Post-Test score (84%).

# Learning Domain Analysis

(N = 451–843)



■ Pre-Test ■ Post-Test

*\*significant at the  $p \leq 0.05$  level, matched data*

- ❖ Substantial significant gains (ranging from 39% to 124%) were achieved in all learning domains.
- ❖ The substantial 124% increase in Knowledge was driven by a question that addressed the proportion of patients who experience unrecognized hypoglycemia.
  - ❖ Although this increase was the largest among Knowledge questions, all Knowledge questions demonstrated score increases greater than 50%.
- ❖ Despite the substantial increase in the Knowledge domain, the Post-Test score remained low (66%).
- ❖ The large increases in Confidence and practice strategy reflect the increased reported Confidence of learners to identify patients who might benefit from concentrated insulins and their increased intent to consider concentrated insulin therapy for patients who are not achieving treatment targets with standard insulin regimens.

# Curriculum/Activity Intervention Effect

Learning Domain	Effect Size*	% Non-Overlap
Knowledge	0.999	59.38%
Competence	0.464	35.40%

Effect Size Definition: This is a standardized measure of the strength/magnitude of the change in scores, irrespective of sample size. This metric quantifies the association between outcome and exposure to education, in a way which makes meta-analysis possible. There exist many types of effect size measures, each appropriate in different situations. We select Cohen's  $d$  for this analysis, which is a standardized difference in mean. Most commonly,  $d$  ranges from 0–1:  $d < 0.2$  is a small effect,  $d = 0.2–0.8$  is a medium effect, and  $d > 0.8$  is a large effect.



# Learning Domain by Professional Cohort

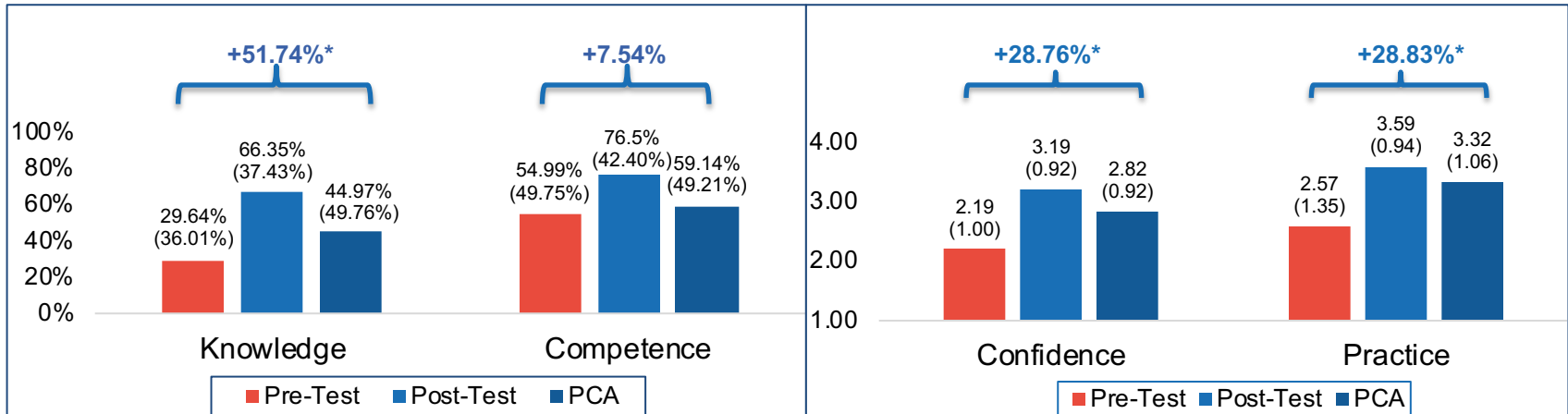
Learning Domain	Nurse Practitioner				Physician			
	N*	Pre-Test	Post-Test	% Change	N*	Pre-Test	Post-Test	% Change
Knowledge	272	30.45% (33.38%)	69.36% (33.04%)	<b>+127.77%*</b>	37	26.58% (28.60%)	61.26% (34.23%)	<b>+130.51%*</b>
Competence	150	53.33% (49.89%)	78.67% (40.97%)	<b>+47.50%*</b>	18	66.67% (47.14%)	66.67% (47.14%)	<b>0.00%</b>
Confidence	180	2.14 (0.90)	3.08 (0.80)	<b>+43.78%*</b>	23	2.70 (0.95)	3.39 (1.01)	<b>+25.81%*</b>
Practice	193	2.45 (1.06)	3.55 (0.81)	<b>+45.13%*</b>	32	2.97 (0.88)	3.69 (1.01)	<b>+24.21%*</b>

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

- ❖ Nurse practitioners (NPs) and physicians demonstrated statistically significant gains in all learning domains, except for Competence, in which physicians showed no change in scores.
- ❖ In Knowledge and Competence, NPs demonstrated higher Post-Test averages compared to physicians.
- ❖ On the Confidence and practice strategy ratings, physicians demonstrated higher Pre-Test and Post-Test averages, but lesser gains.
- ❖ These findings should be interpreted with caution due to the small sample size of physicians.

# 4-Week Retention Analysis

(N = 503)



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

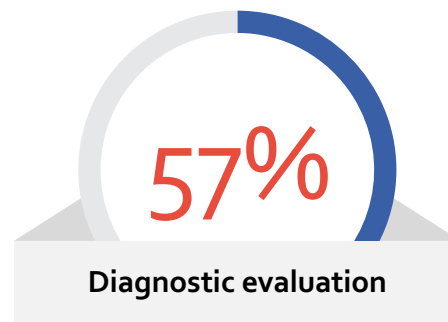
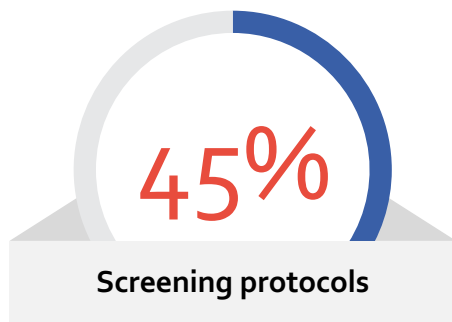
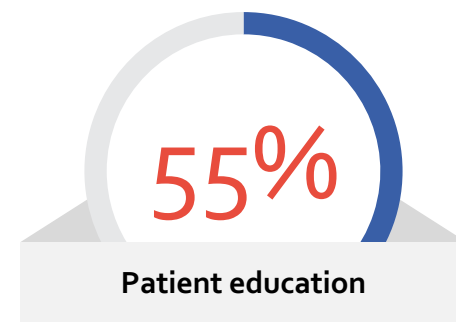
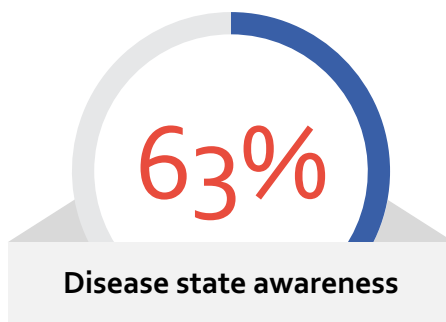
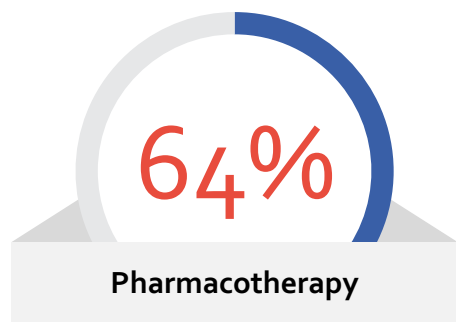
At follow-up:

- ❖ Statistically significant net gains were measured from Pre-Test to the Post Curriculum Assessment (PCA) in all areas except for Competence.
  - ❖ A modest score increase of 8% was measured in Competence.
- ❖ Although net increases were measured in all areas between the Pre-Test and PCA, the consistently low PCA scores demonstrate a need for further education on the use of concentrated insulin therapy and the recognition of hypoglycemia in diabetic patients.

(4-week Post Assessment)

**Please select the specific areas of *skills, or practice behaviors*, you have improved regarding the treatment of patients with type 2 diabetes since this CME activity. (Select all that apply.)**

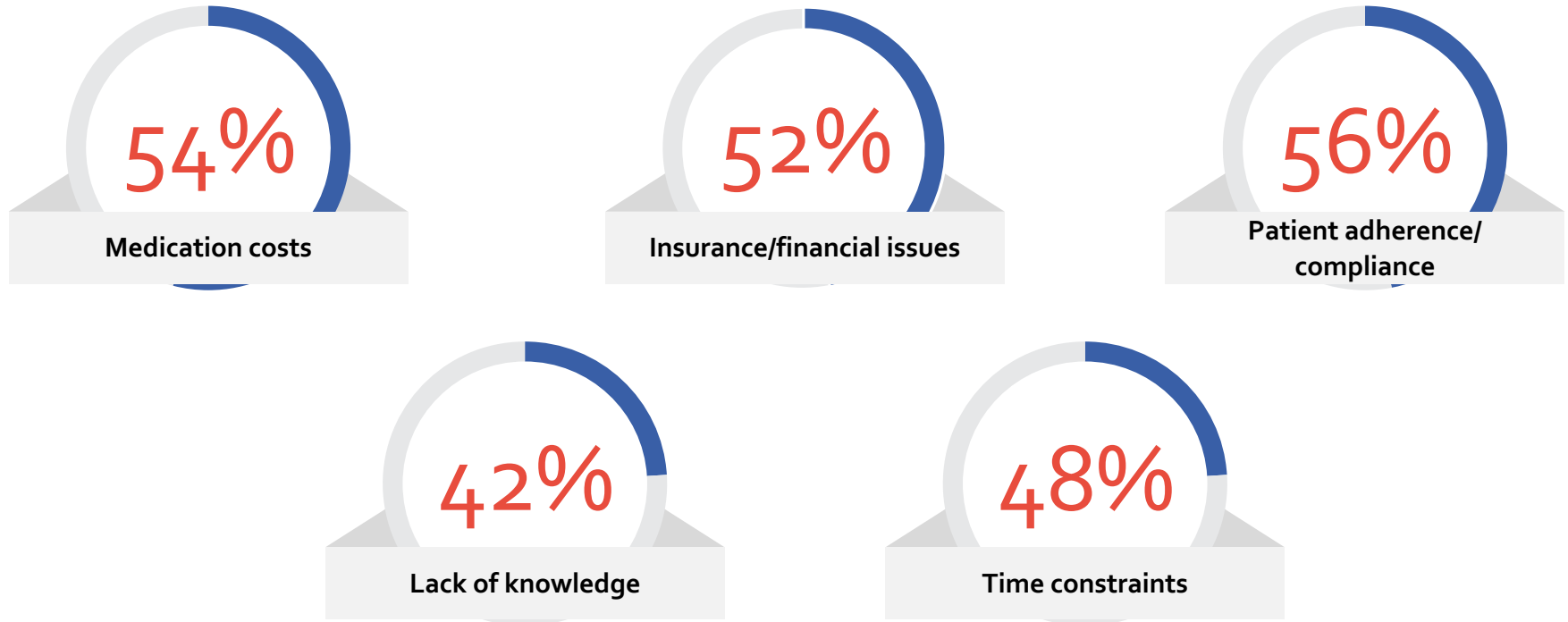
N=503



(4-week Post Assessment)

## What specific *barriers* have you encountered that may have prevented you from successfully implementing strategies for patients with type 2 diabetes since this CME activity? (Select all that apply)

N=503



# Identified Learning Gap 1

## *Selection of specific basal insulins for patients experiencing nocturnal hypoglycemia*

Despite substantial gains (53% and 37%), learners remained challenged at Post-Test on a Knowledge question that addressed the impact of newer concentrated basal insulins on the risk of nocturnal hypoglycemia and on a Competence question asking learners to adjust treatment for a patient with nocturnal hypoglycemia.

### **Knowledge:**

**All of the following statements about basal insulin are true, EXCEPT:**

#### **Results:**

- At Post-Test, 56% of learners correctly answered: “Newer concentrated basal insulins have a longer duration of action but the same risk of nocturnal hypoglycemia as older basal insulins.”

### **Competence:**

**A 51-year-old man with a 13-year history of T2D has had A1C ~7.5% for 2 years. His clinician recommended CGM, which identified occasional nocturnal hypoglycemia. He notes that the basal insulin often leaks out after he injects it. Antidiabetic medications include metformin 1000 mg bid and insulin glargine U100 72 units qhs. What might be appropriate at this time?**

#### **Results:**

- At Post-Test, 74% of learners correctly answered: “Switch from glargine U100 to glargine U300.”

# Identified Learning Gap 2

## *Barriers to insulin initiation in diabetic patients*

Despite a 79% improvement, learners remained challenged on a Knowledge question that addressed provider and patient barriers to insulin initiation.

### **Knowledge:**

**Which of the following is both a leading healthcare provider barrier and a common patient barrier to insulin initiation?**

### **Results:**

- At Post-Test, 58% of learners correctly answered: “Fear of hypoglycemia.”

# Overall Educational Impact

- ❖ Significant improvements (ranging from 39% to 124%) were seen across all learning domains.
  - The cohort analysis of professions showed that NPs demonstrated higher Post-Test scores than physicians in Knowledge and Competence (69% and 79% for NPs vs. 61% and 67% for physicians, respectively), while physicians demonstrated higher Post-Test averages on the Confidence and practice strategy ratings (3.08 and 3.55 for NPs vs. 3.39 and 3.69 for physicians, respectively).
  - Live onsite learners demonstrated substantially higher Post-Test averages than online participants in Knowledge and Competence domains (70% and 79% for live onsite vs. 58% and 67% for live online, respectively), and moderately higher scores in Confidence and practice strategy.
  - Analysis of learning retention in the PCA showed that net gains (ranging from 8% to 52%) from Pre-Test were measured in all learning domains. The greatest net increase was measured in Knowledge, in which a 52% net increase was measured from a very low Pre-Test score of 30% to a PCA score of 45%.
- ❖ Significant improvements (ranging from 39% to 315%) were measured across all Learning Objectives. A high Post-Test score (84%) was measured on the Learning Objective on the impact of hypoglycemia on at-risk populations; low Post-Test scores were measured on the two Learning Objectives on differences between existing and new insulin formulations and barriers to the intensification of insulin therapy.
  - The substantial score increase on the Learning Objective addressing the impact of hypoglycemia was due to a very strong score increase on a Knowledge question addressing the prevalence of unrecognized hypoglycemia.
- ❖ The analysis of the Knowledge and Competence domains identified **two persistent learning gaps**:
  1. **Selection of insulin therapy for patients with nocturnal hypoglycemia:** Low scoring Knowledge and Competence items addressed the impact of newer concentrated basal insulins on the risk of nocturnal hypoglycemia and the adjustment of insulin therapy for a patient with nocturnal hypoglycemia.
  2. **Barriers to insulin initiation:** Learners also remained challenged in the recognition of hypoglycemia as a leading barrier to insulin initiation for both providers and patients.



# Appendix



# Learning Objectives Analysis – Live Onsite vs. Live Online Audience

- “Live onsite learners” include only those attending in-person meetings.
- “Live online learners” include those from both the Simulcast and Virtual Symposium.

Learning Objective	Live Onsite Learners				Live Online Learners			
	N	Pre-Test	Post-Test	% Change	N	Pre-Test	Post-Test	% Change
Discuss clinician and patient barriers to initiation and intensification of insulin therapy	358	30.45% (46.02%)	62.01% (48.54%)	<b>+103.67%*</b>	209	34.93% (47.67%)	51.67% (49.97%)	<b>+47.95%*</b>
Recognize the prevalence and clinical impact of hypoglycemia in special populations at risk	359	22.01% (41.43%)	92.20% (26.82%)	<b>+318.99%*</b>	224	17.41% (37.92%)	70.98% (45.38%)	<b>+307.69%*</b>
Discuss the pharmacology and clinical differences between existing and new long-acting and concentrated insulins	331	35.35% (47.80%)	58.61% (49.25%)	<b>+65.81%*</b>	204	40.20% (49.03%)	48.04% (49.96%)	<b>+19.51%</b>
Discuss how to incorporate new basal and concentrated insulins into clinical practice while minimizing the risk of adverse events	352	58.52% (49.27%)	79.26% (40.54%)	<b>+35.44%*</b>	99	42.42% (49.42%)	66.67% (47.14%)	<b>+57.14%*</b>

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

- ❖ Live onsite and live online learners demonstrated substantial and significant score increases on all Learning Objectives.
- ❖ Onsite learners demonstrated higher Post-Test averages on all Learning Objectives.

# Learning Domain Analysis – Live Onsite vs. Live Online Audience

- “Live onsite learners” include only those attending in-person meetings.
- “Live online learners” include those from both the Simulcast and Virtual Symposium.

Learning Domain	Live Onsite Learners				Live Online Learners			
	N	Pre-Test	Post-Test	% Change	N	Pre-Test	Post-Test	% Change
Knowledge	583	29.45% (37.71%)	70.21% (37.84%)	<b>+138.45%*</b>	260	30.06% (31.88%)	57.69% (34.97%)	<b>+91.90%*</b>
Competence	352	58.52% (49.27%)	79.26% (40.54%)	<b>+35.44%*</b>	99	42.42% (49.42%)	66.67% (47.14%)	<b>+57.14%*</b>
Confidence	320	2.20 (1.03)	3.31 (0.87)	<b>+50.35%*</b>	164	2.17 (0.88)	2.96 (0.80)	<b>+36.52%*</b>
Practice	318	2.65 (1.11)	3.72 (0.80)	<b>+40.38%*</b>	222	2.47 (0.99)	3.40 (0.86)	<b>+37.77%*</b>

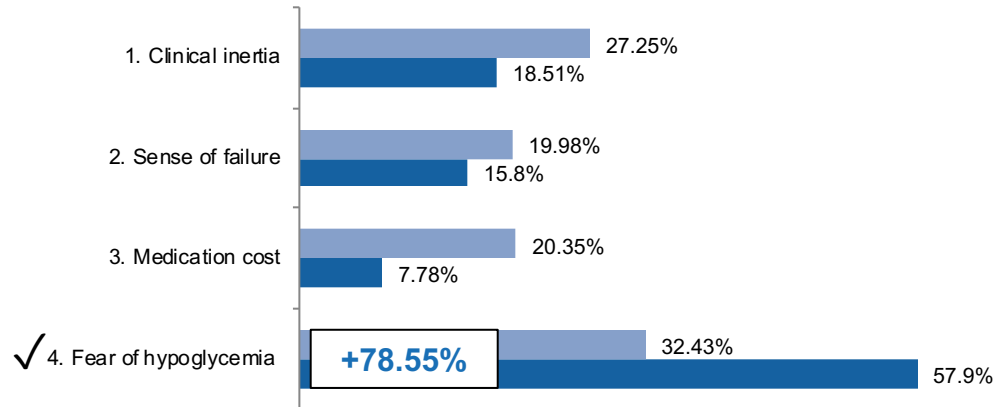
*\*significant at the  $p \leq 0.05$  level*

- ❖ Live onsite and live online learners demonstrated substantial and significant score increases in all learning domains.
- ❖ Live onsite learners also achieved higher Post-Test scores than live online learners.

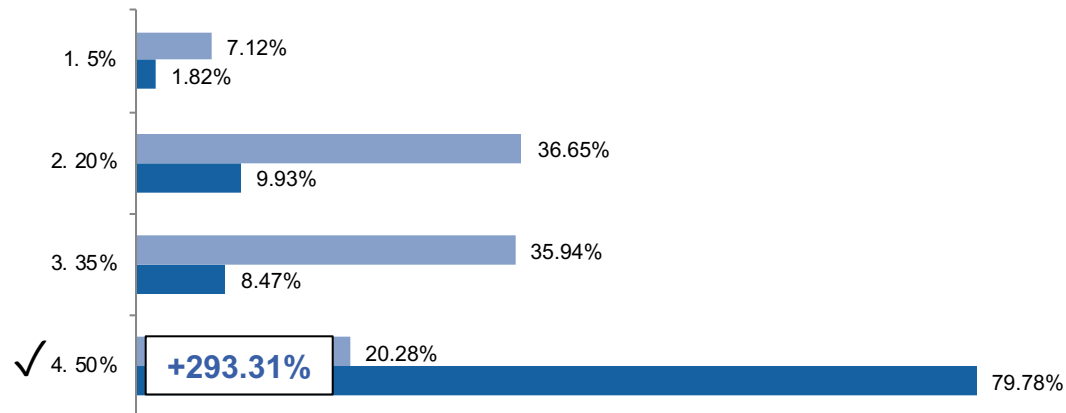
# Knowledge Questions:

N = (811–848)

Which of the following is both a leading healthcare provider barrier and a common patient barrier to insulin initiation?



Approximately what proportion of patients with diabetes experience unrecognized hypoglycemia?



Pre-Test Post-Test

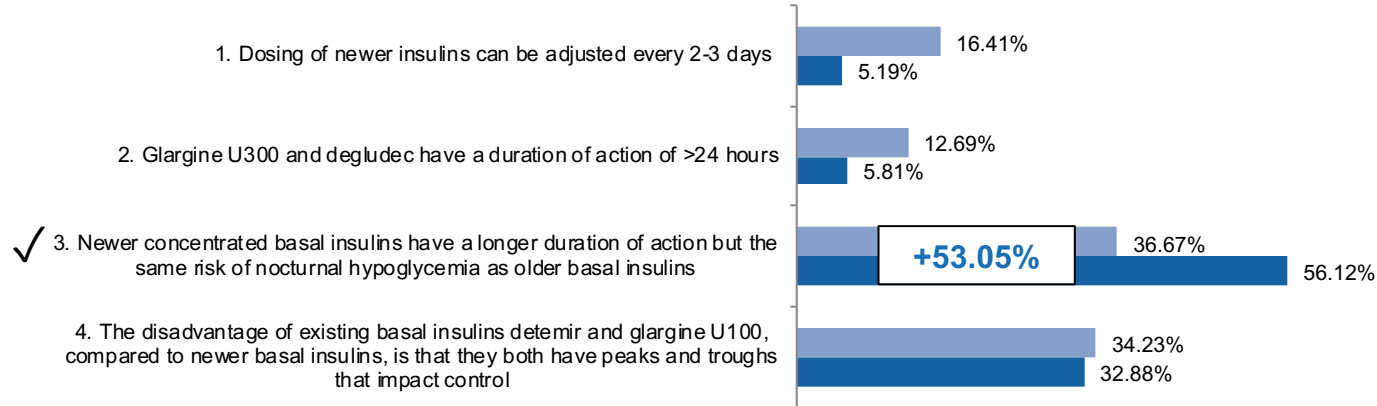
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# Knowledge Questions, continued:

N = (780–809)

All of the following statements about basal insulin are true, EXCEPT:



Pre-Test Post-Test

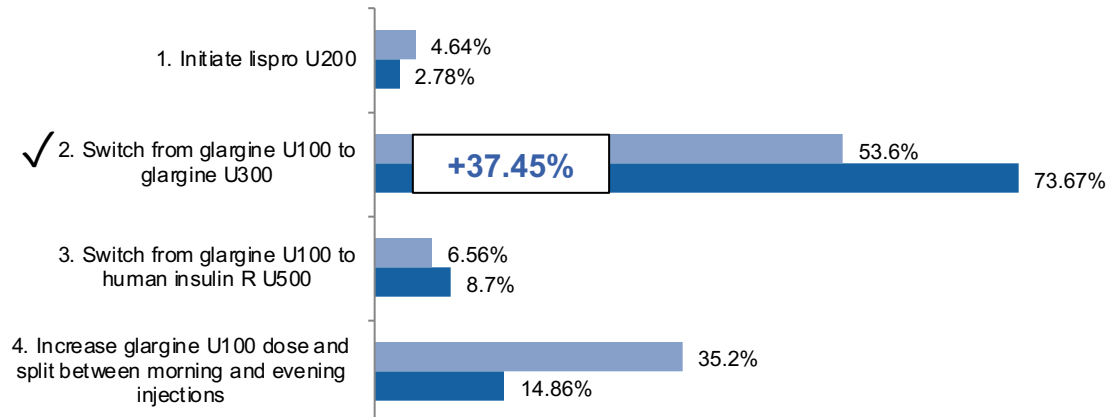
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# Competence Questions

N = (625–828)

A 51-year-old man with a 13-year history of T2D has had A1C ~7.5% for 2 years. His clinician recommended CGM, which identified occasional nocturnal hypoglycemia. He notes that the basal insulin often leaks out after he injects it. Antidiabetic medications include metformin 1000 mg bid and insulin glargine U100 72 units qhs. What might be appropriate at this time?



Pre-Test Post-Test

Note: Data is unmatched

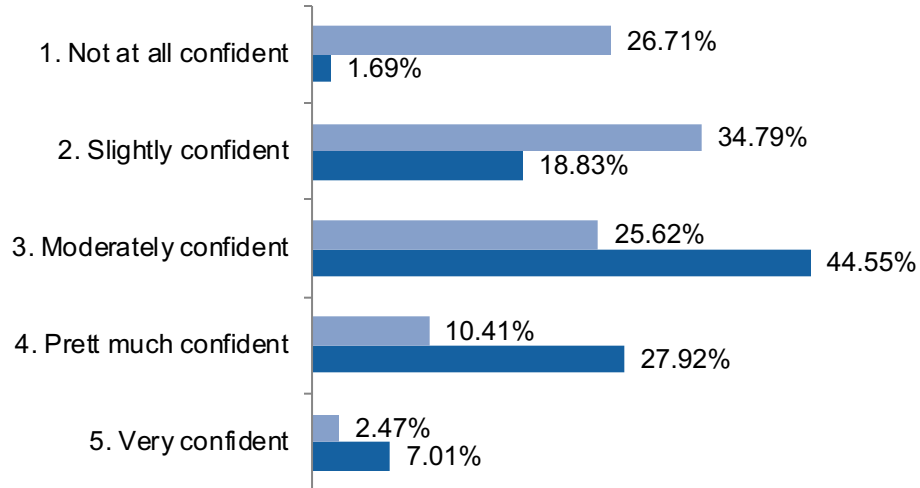


# Confidence & Practice Questions

N = (730–866)

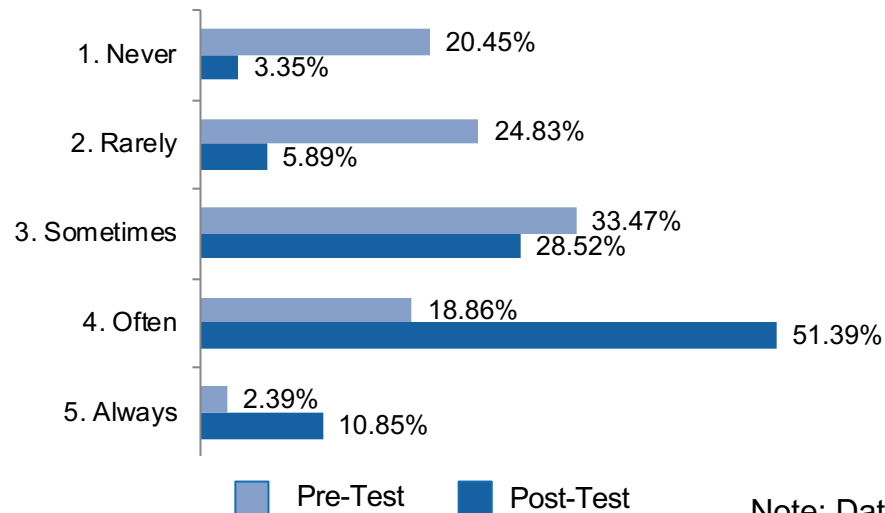
## Confidence Question:

Please rate your confidence in your ability to identify patients with T2D who may benefit from concentrated insulins:



## Practice Question:

How often do you consider using concentrated insulin therapy in patients with T2D who are not achieving treatment targets with standard insulin regimens?



Pre-Test Post-Test

Note: Data is unmatched

