The Inflammatory State of Psoriasis: New and Emerging Therapies

A NACE Program

NACE

Final Live Outcomes Report

RealCME

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RealCME

Cities and Dates

Emerging Challenges In Primary Care: 2016
*Clinical Updates for Nurse Practitioners and Physician Assistants: 2016

Orlando, Florida*
September 17, 2016

Pittsburg, Pennsylvania
October 1, 2016

Dallas, Texas
October 15, 2016

Phoenix, Arizona
October 22, 2016

Charlotte, North Carolina
October 29, 2016

Columbia, South Carolina
November 11, 2016

Objectives

1. Recognize the clinical presentation and current immunopathophysiology of psoriasis and psoriatic arthritis

2. Identify and discuss the significance of the ever-expanding numbers of co-morbid conditions and emerging biofactors associated with psoriatic disease

3. Discuss current therapeutic protocols for psoriasis and its related disorders

4. Interpret latest evidence-based data on emerging treatment options for psoriatic disease

Report Index

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Outcomes Assessment Methodology

Data collection:
- Data collection:
  - Paired **Pre- and Post-Test** questions
  - **Demographic** questions
  - Learner **Challenge** questions
- Employs **Knowledge, Competence, Confidence**, and **practice strategy** question types
- Appropriate statistics applied to assess change across learning domains

CURRICULUM OUTCOMES PROTOCOL
- Assess Moore's Levels 1–5
- **Learning objective** analysis
- Multi-dimensional **repeated-measure** (Level 5):
  - Prior to activity/after completion of each activity
  - Post-curriculum assessment survey

- Establish a **Target-Gap composite score**
- ALL Post-Test items and demographic variables make-up possible **drivers**
- Algorithms narrow down most important drivers influencing the Target-Gap to be addressed in future content

Possible Drivers (Items influencing the identified Gap)

TARGET-GAP (Extracted from item-level analysis)

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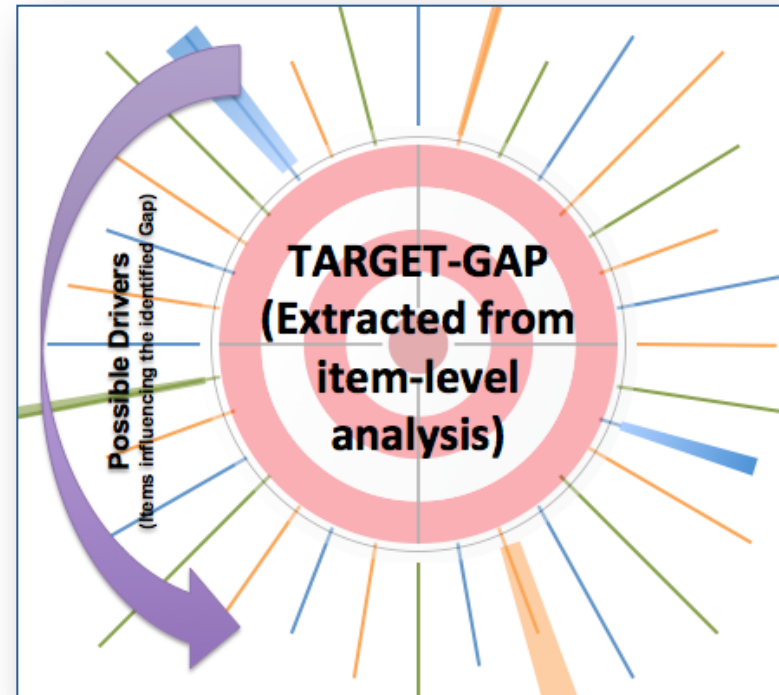
RealCME

RealMeasure® Outcomes Assessment Methodology

The methodology utilized by RealCME, known as RealMeasure ®, utilizes a sophisticated approach to measuring impact on the intended learner cohorts, analyzing pre/post and 4-week follow-up learner data in concert with a curriculum-based, multidimensional, index-based metric that serves as a surrogate marker for performance (the RealIndex). These analyses include paired-samples t-tests, correlations, non-parametric testing, as well as opportunities for advanced analytics.

RealIndex

An **objective** metric (scored from 0% - 100%) that serves as a surrogate measure of performance.

The RealIndex has been validated against EHR data over the past 7 years, producing consistently high alphas of (0.8-0.9) having been assessed on over 200 curricula thus confirming it as a valid and reliable surrogate performance metric.

Knowledge & Competence

Objective assessments that are scored on a scale of 0%-100%.

These metrics measure evidenced-based knowledge, application of best clinical practice (s); as well as interpretation and application of clinical trial data to current practice.

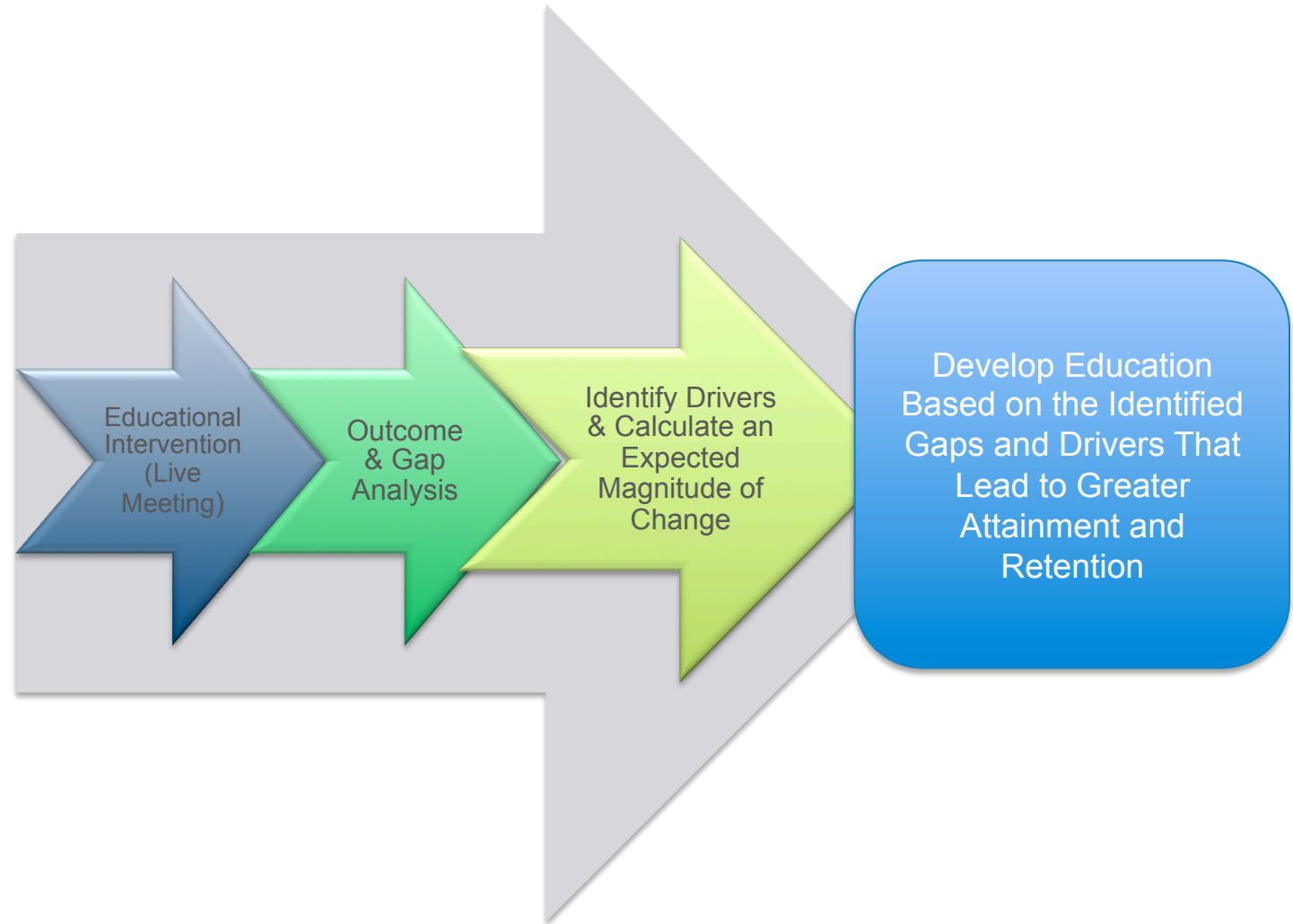## Confidence & Practice Strategy

Subjective assessments measured on a 5-point Likert scale. The learner provides ratings for their confidence and current practice strategy.

 These assessments are correlated with the scored (objective) metrics to provide additional statistical support to any identified gaps or areas of mastery.

RealCME

Predictive Modeling Methodology

Predictive modeling was employed following the live meetings to identify the significant drivers that can be used to address additional educational needs of learners, Post-Test.

This approach enables educators to develop interventions that are more robust; leading to greater attainment and better retention.

Educational Intervention (Live Meeting) → Outcome & Gap Analysis → Identify Drivers & Calculate an Expected Magnitude of Change → Develop Education Based on the Identified Gaps and Drivers That Lead to Greater Attainment and Retention

Executive Summary
Outcomes at Moore's Levels 1-5

Level 1 (Participation):

Live Meeting Location (Date)	Attendees	Simulcast	Started Pre-Test	Started Post-Test	
Orlando, FL* (Sept. 17, 2016)	185	-	108	120	90%
Pittsburg, PA (Oct. 1, 2016)	82	-	60	63	95%
Dallas, TX (Oct. 15, 2016)	214	134	129	117	91%
Phoenix, AZ (Oct. 22, 2016)	142	-	97	90	93%
Charlotte, NC (Oct. 29, 2016)	101	-	60	63	95%
Columbia, SC (Nov. 11, 2016)	65	299	48	49	98%
Total Learners:	789	1222	502	502	100%

Level 2 (Satisfaction): Participants' comments and self-reports reflect a high level of satisfaction with the curriculum and indicate that the content was relevant to their practice.

Levels 3-5 (Knowledge, Competence, Confidence, and Performance): Statistically significant gains were measured from Pre-Test across the program, in all learning domains.

Outcome Indicator (matched learners only)	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change
Knowledge	21.78% (37.53)	66.18% (44.81)	203.86%*
Competence	40.15% (49.21)	83.33% (37.41)	107.55%*
Confidence	1.76 (0.80)	2.92 (0.97)	65.91%*
Practice Strategy**	3.19 (1.32)	4.86 (0.42)	52.35%*
RealIndex**	64.23% (34.74)	79.89% (29.53)	24.38%*

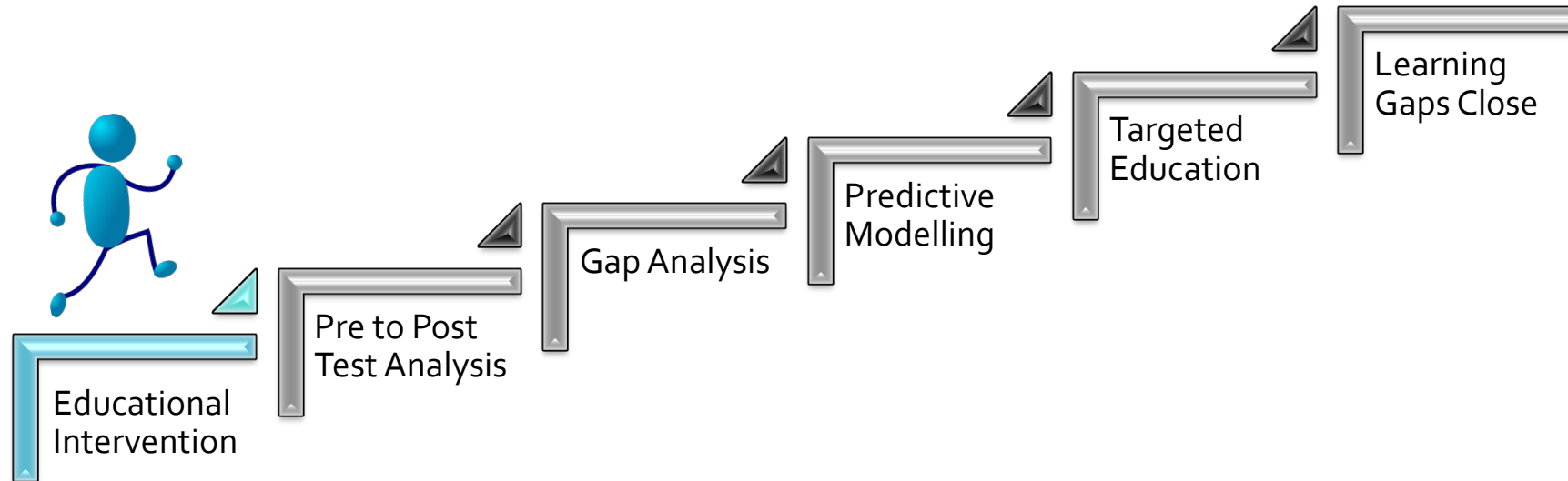* Results are statistically significant $p < .05$, **Performance metric
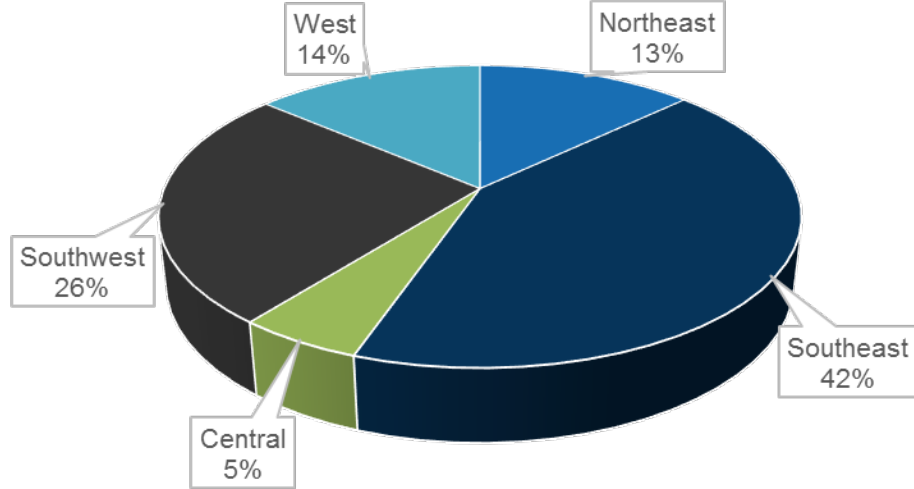
Level 2: Satisfaction

- 100% rated the activity as excellent

- 100% indicated the activity improved their knowledge

- 99% stated that they learned new and useful strategies for patient care

- 99% said they would implement new strategies that they learned in their practice

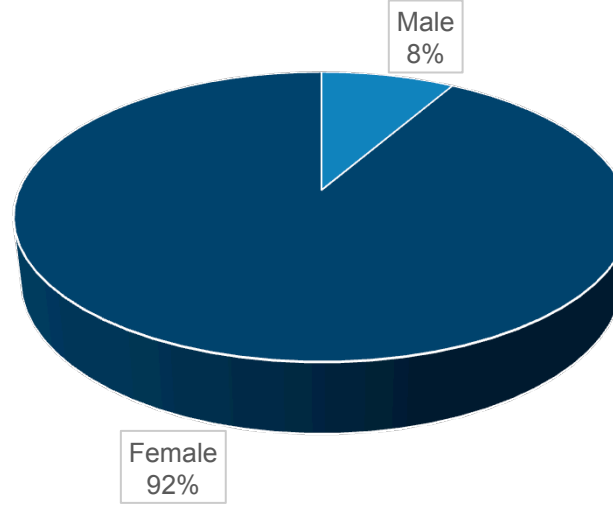- 100% said the program was fair-balanced and unbiased
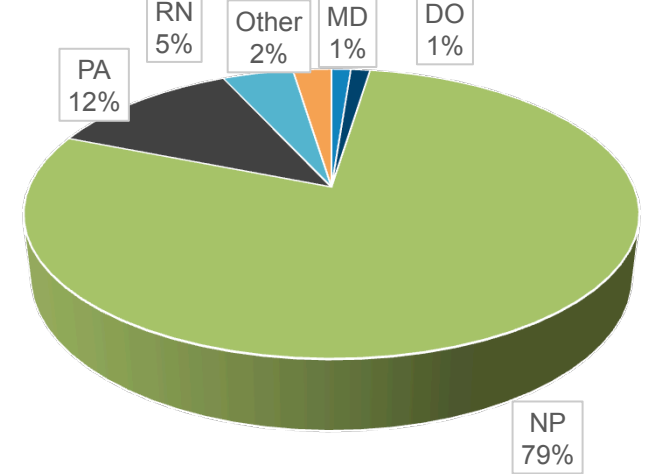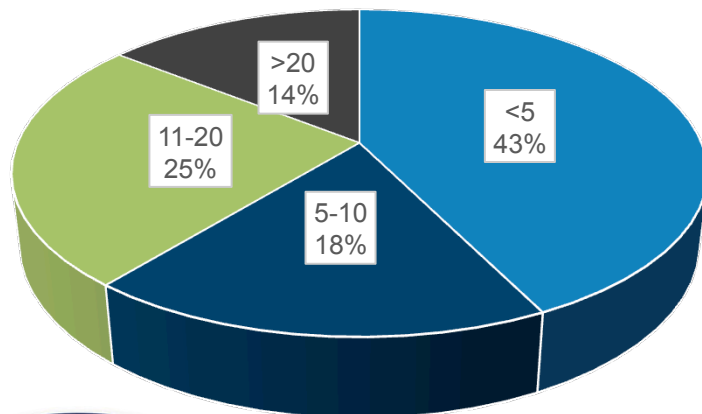
Level 1: Demographics

Educational Intervention

Pre to Post Test Analysis

Gap Analysis

Predictive Modelling

Targeted Education

Learning Gaps Close

Level 1: Participation – Demographics

Level 1: Participation – Demographics

Specialty

- Other 31%
- Pulmonology 2%
- Gastroenterology 2%
- Endocrinology 2%
- Cardiology 7%
- Primary Care 56%

Number of Providers

- Solo 9%
- >11 26%
- 2-5 46%
- 6-10 19%

Patients Seen Per Week

- >75 22%
- <25 27%
- 51-75 23%
- 26-50 28%
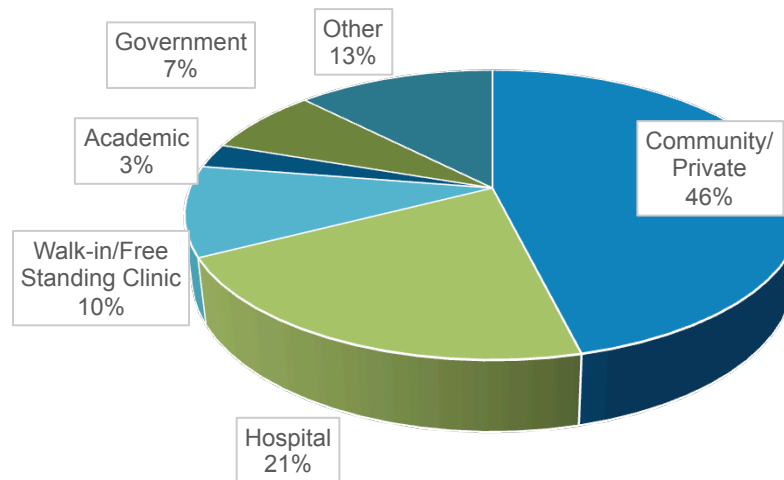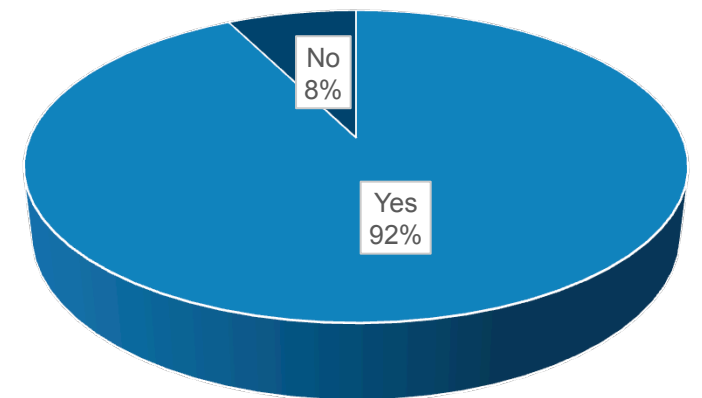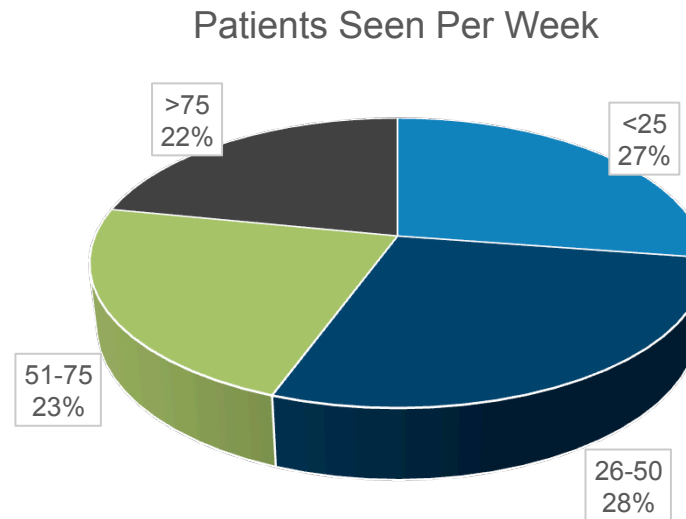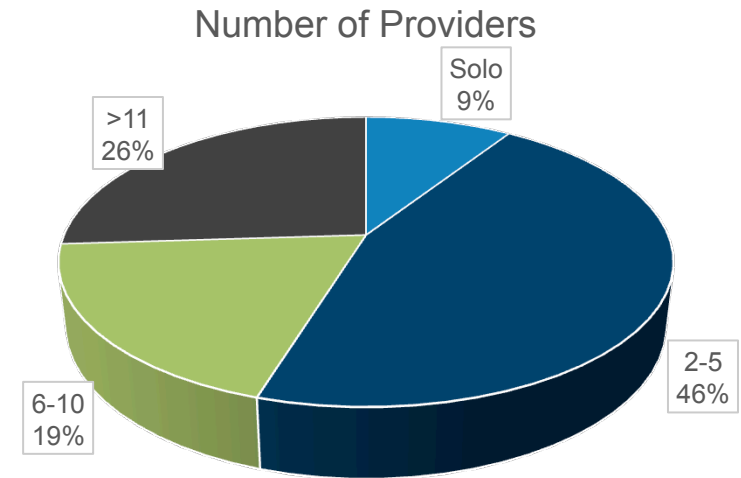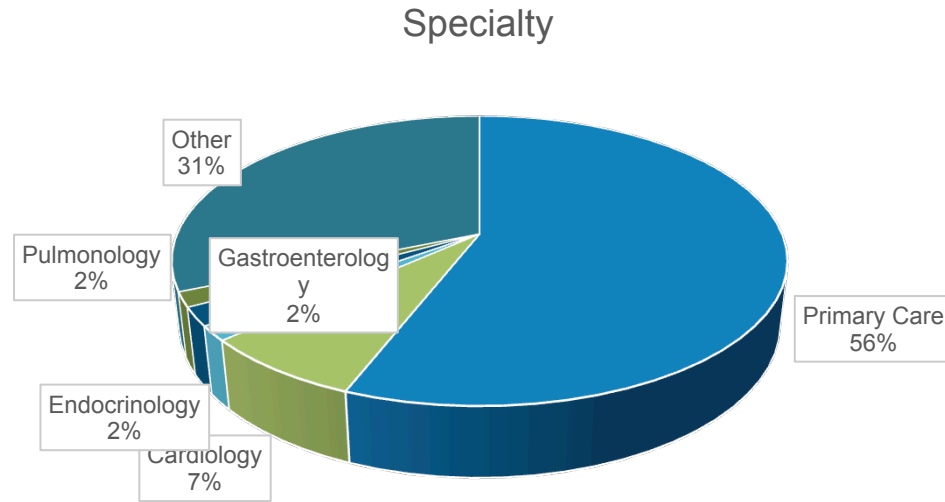
Curriculum Patient Impact

Participants (*N*)	1,014
Patient Reach Range	
Weekly	304-852
Yearly	10,110-28,307

Learners (*N* = 1,014) were asked to complete an item approximating the number of patients that they personally see in their practice on a weekly basis that have psoriasis by selecting a range. The estimated ranges were calculated and the results indicate that this curriculum has the potential to impact the care of:

- 304-852 patients on a weekly basis (between 0.3 and 10 patients per/ clinician), and
- 10,110-28,307 patients on an annual basis, based on the assumption that 30% of patients will be seen more than once per year by their clinician.
- Learners who are not actively seeing patients were accounted for in these calculations.

Levels 3-5: Outcomes Metrics

Educational Intervention

Pre to Post Test Analysis

Gap Analysis

Predictive Modelling

Targeted Education

Learning Gaps Close
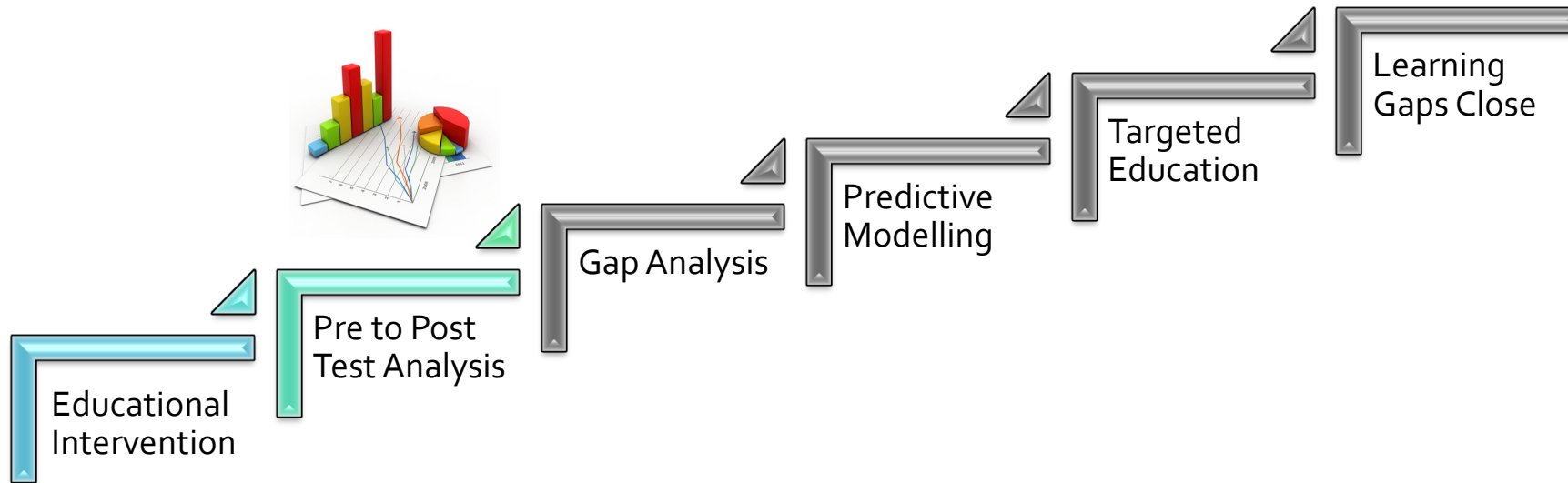
Levels 3-4 - Learning Domain Summary

Outcome Indicator	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
			SDS = Standard Deviation Score	
Knowledge	21.78% (37.53)	66.18% (44.81)	**203.86%**	< .0005
Competence	40.15% (49.21)	83.33% (37.41)	**107.55%**	< .0005
Confidence	1.76 (0.80)	2.92 (0.97)	**65.91%**	< .0005
Practice strategy	3.19 (1.32)	4.86 (0.42)	**52.35%**	< .0005
Additional questions	42.42% (33.16)	-	-	-
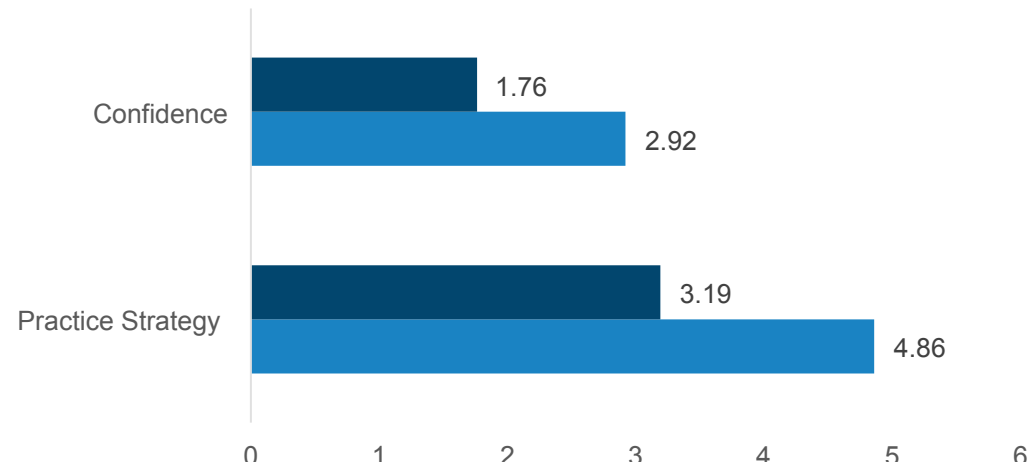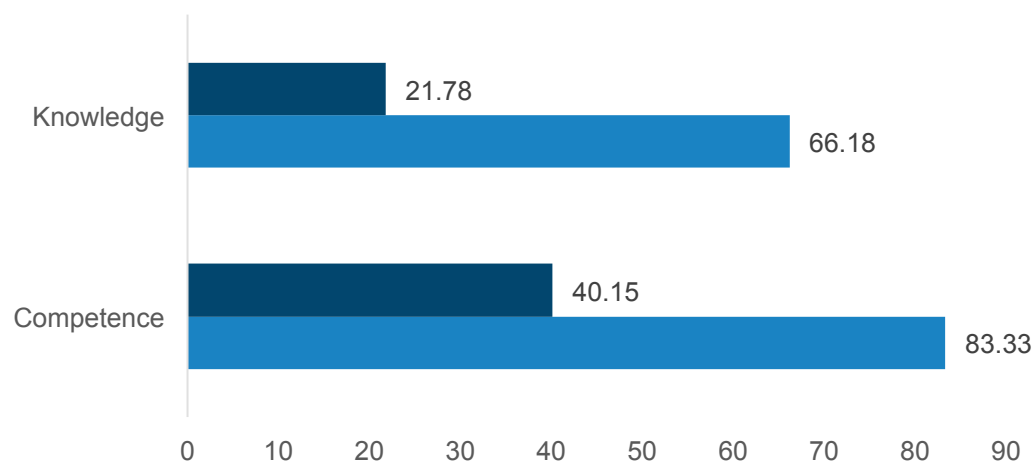
- Statistically significant and substantial gains (p < .0005) were achieved across the curriculum in all domains from relatively low Pre-Test averages.
- Learner score scatter (SDS) improved to more moderate levels by Post-Test suggesting that learners' responses were more consistent with the mean with the exception of Knowledge where the SDS increased.
- These Pre- to Post-Test percentage changes were primarily above established benchmarks, which estimate gains ranging from 15% to 20% by Post-Test.

Level 3 - Learning Objectives

Learning Objective	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
1. Recognize the clinical presentation and current immunopathophysiology of psoriasis and psoriatic arthritis	26.94% (39.47)	74.61% (40.00)	176.95%	< .0005
2. Identify and discuss the significance of the ever-expanding numbers of co-morbid conditions and emerging biofactors associated with psoriatic disease	32.17% (47.00)	72.17% (45.01)	124.34%	< .0005
3. Discuss current therapeutic protocols for psoriasis and its related disorders	13.13% (33.95)	64.65% (48.10)	392.40%	< .0005
4. Interpret latest evidence-based data on emerging treatment options for psoriatic disease	13.13% (33.95)	64.65% (48.10)	392.40%	< .0005

- Statistically significant ($p < .0005$) and substantial gains were measured for all items mapped to the curriculum Learning Objectives. Observed gains by Post-Test ranged from 124% to over 390%.
- LO 1, 3, and 4 demonstrated the greatest gain by Post-Test (177% - 392%) from the lowest Pre-Test averages.
  - LO2 also showed a substantial gain of 88%.
- The Pre- to Post-Test percentage changes observed were above historical benchmarks, which show average estimates of 20% by Post-Test.

Level 5 Performance Metric: The RealIndex

A 34 y/o woman p/w 12-yr history of plaque psoriasis on trunk, elbows, and knees. Exam identifies 20% body surface area affected. No joint swelling, tenderness, or enthesitis. To date, she has used topical steroids, vitamin D analogs and phototherapy, with limited improvement.

Overweight (BMI 28.8 kg/m2), with history of hypertension, dyslipidemia, and prediabetes. Consumes 1 alcohol drink most nights. She is married and would like to consider conception in a few years. Current medications include atorvastatin, hydrochlorothiazide, and an oral contraceptive.

After reviewing the brief scenario above, please rate each of the statements as consistent with or not consistent with best clinical practice:

Consistent	Not Consistent
Discuss risks for cardiovascular disease and lymphoma with patient	Consider systemic treatment with acitretin
Consider initiating methotrexate and counseling patient to discontinue alcohol	Because she is considering pregnancy in the future, avoid use of biologic agents
Consider initiating biologic agent	

Level 5 - Performance Change: RealIndex

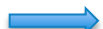|	Curriculum Intervention				Intervention Effect		
N	Baseline Avg. Score (SDS)	Final Avg. Score (SDS)	% Change	P - Value	Average Effect Size	% Non-Overlap Baseline - Final	Power
431	64.23% (34.74)	79.89% (29.53)	**24.38%**	<.0005	.483	32.70%	1.00
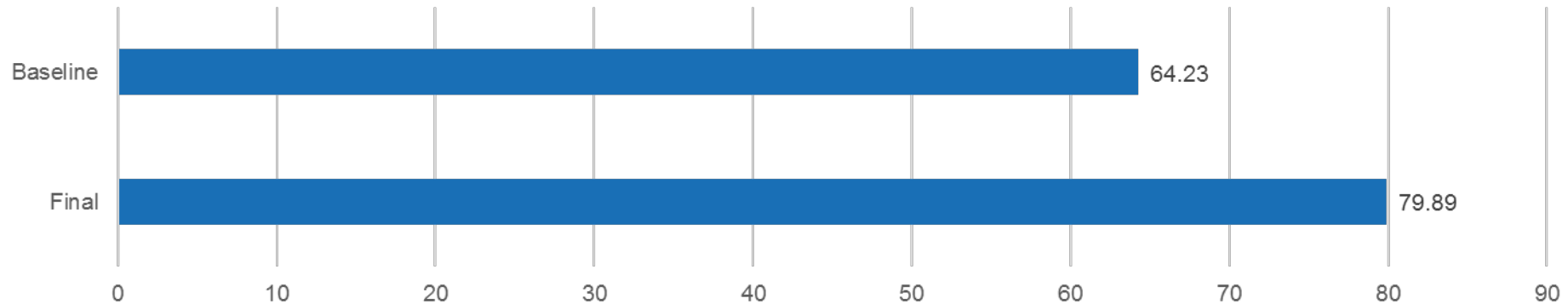
A substantial and significant gain (24%, *p* < .0005) was measured from baseline to the final RealIndex which resulted in a moderate effect size (*d* = .483) with a non-overlap of 32.70%. This result demonstrated a high degree of statistical power (1.00).
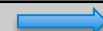
- This improvement is above historical benchmarks that show Performance gains ranging from 5%-10% from baseline.
- Standard deviation scores (SDSs) also improved, indicating that the majority of learners demonstrated greater performance consistency in addition to overall improvement.

Levels 3-5 - Learning Domain Summary: By Location

Charlotte (N = 53)

Outcome Indicator	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
Knowledge	20.31% (37.80)	78.13% (40.03)	284.69%	< .0005
Competence	41.18% (50.73)	82.35% (39.25)	99.96%	< .004
Confidence	1.65 (0.70)	2.76 (1.03)	62.27%	< .0005
Practice**	2.50 (0.97)	4.70 (0.48)	88.00%	< .0005
RealIndex**	65.57% (37.02)	86.48% (27.74)	29.91%	< .001

Columbia (N =47)

Outcome Indicator	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
Knowledge	22.06% (37.31)	82.35 (32.29)	273.30%	< .0005
Competence	52.94% (51.45)	82.35% (39.30)	55.55%	< .05
Confidence	1.38 (0.51)	2.69 (0.75)	94.93%	< .0005
Practice**	3.45 (1.37)	4.55 (0.69)	31.88%	< .0005
RealIndex**	61.03% (32.62)	88.05% (27.42)	44.27%	< .0005

Dallas (N = 100)

Outcome Indicator	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
Knowledge	23.00% (41.91)	68.00% (44.90)	44.27%	< .0005
Competence	44.44% (50.64)	85.19% (36.20)	160.03%	< .0005
Confidence	1.71 (0.77)	3.00 (0.86)	75.43%	< .0005
Practice**	2.76 (1.20)	5.00 (-)	44.27%	< .0005
RealIndex**	67.18% (36.20)	81.17 (26.50)	20.82%	< .0005

Orlando (N =93)

Outcome Indicator	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
Knowledge	19.32 (37.70)	55.68% (47.20)	188.20%	< .0005
Competence	34.48% (48.37)	89.66% (31.00)	160.03%	< .0005
Confidence	1.86 (0.83)	3.09 (1.07)	66.13%	< .0005
Practice**	3.43 (1.43)	4.95 (0.22)	44.31%	< .0005
RealIndex**	66.68% (34.62)	79.68% (31.28)	19.50%	< .02

Levels 3-5 - Learning Domain Summary: By Location

Phoenix (N =83)

Outcome Indicator	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
Knowledge	25.96% (36.37)	61.54% (47.09)	140.91%	< .0005
Competence	26.92% (45.23)	69.23% (47.10)	157.17%	< .0005
Confidence	2.12 (0.93)	2.94 (1.03)	38.68%	< .0005
Practice**	3.63 (1.15)	5.00 (-)	37.74%	< .0005
RealIndex**	66.97% (31.50)	80.32% (28.50)	19.93%	< .0005

Pittsburgh (N =55)

Outcome Indicator	Pre-Test Avg. Score (SDS)	Post-Test Avg. Score (SDS)	% Change	P - Value
Knowledge	17.24% (33.48)	55.17% (48.81)	220.01%	< .0005
Competence	50.00% (51.64)	93.75% (25.00)	87.50%	< .0005
Confidence	1.71 (0.95)	3.00 (1.16)	75.43%	< .0005
Practice**	3.13 (1.64)	4.63 (0.74)	47.92%	< .0005
RealIndex**	52.00% (35.16)	63.94% (31.80)	22.96%	< .0005

** Performance metric

Item-Level/Gap Analysis
(Including Analysis of Demographic Correlations)

Educational Intervention

Pre to Post Test Analysis

Gap Analysis

Predictive Modelling

Targeted Education

Learning Gaps Close

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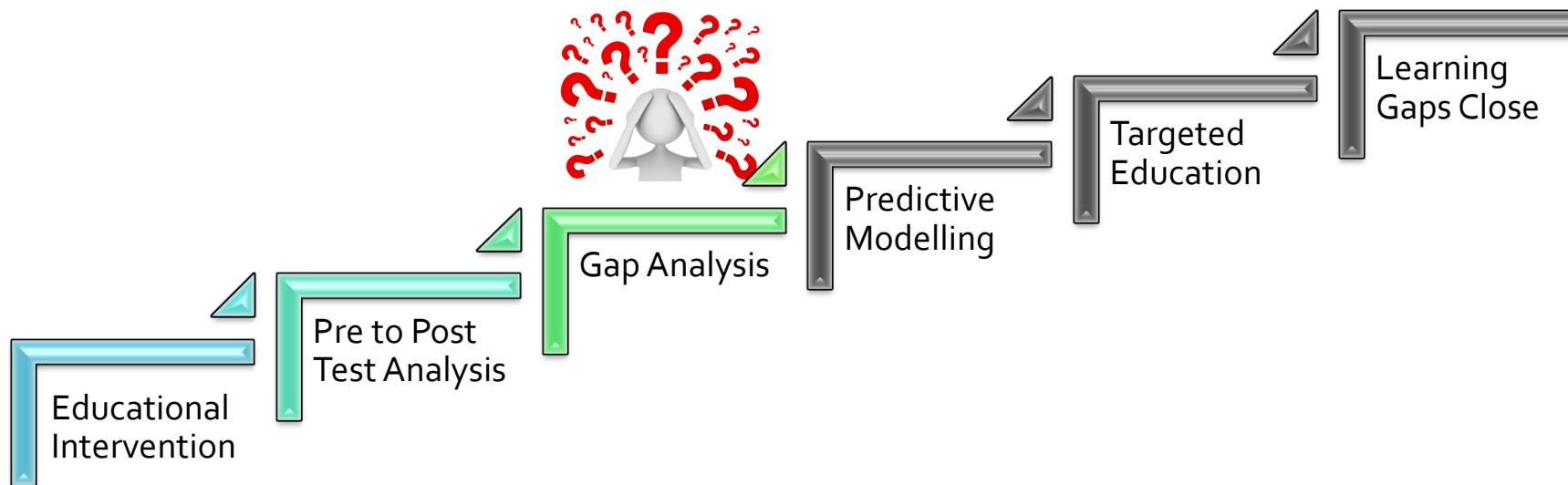
Knowledge

Question Risk for myocardial infarction (LO 2)

According to prospective, population-based data, the relative risk for myocardial infarction in patients with psoriasis is highest in which of the following groups?

Correct Answer	Choice	Pre-Test (N = 240)	Post-Test (N = 266)
	1. Older patients with mild psoriasis	8.3%	1.1%
	2. Older patients with severe psoriasis	60.8%	24.8%
	3. Young patients with mild psoriasis	3.8%	5.3%
X	4. Young patients with severe psoriasis	**27.1%**	**68.8%**

Question Cytokines (LO 1, 3, 4)

All of the following cytokines are central to the pathogenesis of psoriasis, EXCEPT:

Correct Answer	Choice	Pre-Test (N = 227)	Post-Test (N = 246)
X	**1. Interleukin 4 (IL-4)**	**11.9%**	**61.4%**
	2. Interleukin 17 (IL-17)	15.4%	6.5%
	3. Interleukin 23 (IL-23)	15.9%	6.1%
	4. Tumor necrosis factor (TNF)	56.8%	26.0%

Competence

Question Diagnosis of psoriatic arthritis (LO 1)

35 y/o obese man with 9 yr history of plaque psoriasis presents for a checkup. Initial exam identifies 15% body surface area affected by psoriasis and left knee swelling. All of the following findings, if present, might lead to diagnosis of psoriatic arthritis, EXCEPT:

Correct Answer	Choice	Pre-Test (N = 245)	Post-Test (N = 288)
	1. Dactylitis	18.8%	7.6%
	2. Enthesitis	15.9%	2.4%
	3. Nail onycholysis and pitting	24.9%	4.2%
X	**4. Positive test for rheumatoid factor**	**40.4%**	**85.8%**

Confidence

Question Selecting effective therapy

Please rate your confidence in your ability to select effective therapy for individual patients with psoriasis (based on a scale of 1 to 5, with 1= "Not at all confident" and 5= "Very confident").

Choice	Pre-Test (N = 221)	Post-Test (N = 222)
Not at all confident	43.4%	4.5%
Slightly confident	38.5%	29.3%
Moderately confident	14.0%	37.8%
Pretty much confident	3.6%	22.5%
Very confident	0.5%	5.9%

Learners' self-reported Confidence at Pre-Test was very low, with learner responses largely ranging from 'not confident at all' to only 'slightly confident'. Post-Test Confidence improved by 66%, providing evidence that the curriculum met an area of educational need.

Practice Strategy

Question Identify comorbidities

How often do/will you seek to identify comorbidities in your patients with psoriasis? (based on a scale of 1 to 5, with 1= "Never" and 5= "Always")?

Choice	Pre-Test (N = 220)	Post-Test (N = 230)
Never	12.7%	0.4%
Rarely	26.4%	0.0%
Sometimes	21.4%	4.3%
Often	21.4%	11.3%
Always	18.2%	83.9%

At Pre-Test, learners' self-reported practice strategy was quite varied; however, at Post-Test the majority of learners reported that they were very likely or always going to seek to identify comorbidities in patients with psoriasis which represent a 52% change in practice strategy.

A 34 y/o woman p/w 12-yr history of plaque psoriasis on trunk, elbows, and knees. Exam identifies 20% body surface area affected. No joint swelling, tenderness, or enthesitis. To date, she has used topical steroids, vitamin D analogs and phototherapy, with limited improvement.

Overweight (BMI 28.8 kg/m2), with history of hypertension, dyslipidemia, and prediabetes. Consumes 1 alcohol drink most nights. She is married and would like to consider conception in a few years. Current medications include atorvastatin, hydrochlorothiazide, and an oral contraceptive.

After reviewing the brief scenario above, please rate each of the statements as consistent with or not consistent with best clinical practice:

Consistent	Not Consistent
Discuss risks for cardiovascular disease and lymphoma with patient (87.31% BL → 100% FINAL)	Consider systemic treatment with acitretin (78.72% BL → 86.17% FINAL)
Consider initiating methotrexate and counseling patient to discontinue alcohol (61.70% BL → 68.09% FINAL)	Because she is considering pregnancy in the future, avoid use of biologic agents (34.85% BL → 83.33% FINAL)
Consider initiating biologic agent (71.55% BL → 68.10% FINAL)	

Additional Questions (non-matched ARS items presented during meeting):

Question 1 Diagnosis

A 25 year-old male presents with a 15-year history of a chronic pruritic rash on his arms and legs. What is your diagnosis?

Correct Answer	Choice	Internal Item (N = 244)
	Lupus	0.4%
	Psoriasis	34.4%
	Tinea corporis	0.8%
	Eczematous dermatitis	64.3%

Question 2 Comorbidities

A 34 y/o male (BMI 32.4) presents with plaque psoriasis covering 15% of his body surface area. During this visit, you counsel him that her risks of developing all of the following conditions are increased, EXCEPT:

Correct Answer	Choice	Internal Item (N = 254)
	Lymphoma	20.9%
	Hypertension	24.8%
	Hyperlipidemia	22.0%
	Diabetes mellitus	6.3%
	Hashimoto's thyroiditis	26.0%

Additional Questions (non-matched ARS items presented during meeting):

Question 3 — Presence of psoriatic arthritis

41 y/o male with 12-year hx psoriasis presents with plaques covering 15% of body surface area on trunk and extremities. You are assessing for the presence or absence of psoriatic arthritis. All of the following are correct, EXCEPT:

Correct Answer	Choice	Internal Item (N = 246)
	You should be assessing for tender and swolle...	5.3%
	Psoriatic arthritis tends to have a symmetric...	32.1%
	Psoriatic arthritis tends to results in morni...	47.2%
	You should be assessing for nail changes such...	4.1%
	Ask the patient if there is pain in the foot,...	11.4%

Question 4 — Topical agents

23 y/o female presents with plaques on her elbows and knees. You diagnose her with psoriasis and want to prescribe a topical agent. Any of the following agents might be suitable, EXCEPT:

Correct Answer	Choice	Internal Item (N = 279)
	Clobetasol cream	4.7%
	Clotrimazole cream	71.0%
	Triamcinolone 0.1% ointment	10.4%
	A combination product composed of betamethaso...	14.0%

Additional Questions (non-matched ARS items presented during meeting):

Question 5   Appropriate therapies

19 y/o female presents with psoriasis affecting 10% of her body surface area on her arms, legs, and scalp. All of the following may be an appropriate therapy, EXCEPT:

Correct Answer	Choice	Internal Item (N = 275)
	Acitretin	30.5%
	Apremilast	26.9%
	Calcipotriene cream	10.5%
	Phototherapy	16.4%
	Topical steroids	15.6%

Question 6   Use of biologics when comorbidities are present

35 y/o female with 3-year history of psoriasis presents to your office. Initially BSA was 3% and controlled with topical agents. However, psoriasis worsened to a severity of 30% BSA. She was initially treated with methotrexate without improvement. You are considering a biologic agent now. She also has a history of multiple sclerosis. Any of the following may be appropriate, EXCEPT:

Correct Answer	Choice	Internal Item (N = 240)
	Adalimumab	27.9%
	Ixekizumab	23.3%
	Secukinumab	20.0%
	Ustekinumab	28.7%

Summary of Outcomes Analyses (Levels 1-5)

Statistically significant gains were measured across the curriculum from Pre-Test (and baseline) to Post-Test (and final) in all learning domains across the intervention.

•Learners demonstrated a substantial increase in proficiency from Pre - to Post-Test for Knowledge and Competence.

- **Knowledge** achieved gains of 204% from very low Pre-Test average scores of 22%.

- **Competence** achieved gains of 107% from low Pre-Test average scores of 40%.

- **RealIndex** gains were more modest, but reflected an improvement of 25%, at Post-Test, which is well above established benchmarks.

- Learners' **Confidence** ratings were incredibly low at Pre-Test, and while statistically significant gains of 66% were achieved, learners Confidence remained low at Post-Test suggesting an area of further educational need.

- At Post-Test, the majority of learners indicated their **practice strategy** would be to identify comorbidities in patients with psoriasis.

Summary of Gap Analysis

## Level 5 Performance Metric: The RealIndex

A 34 y/o woman p/w 12-yr history of plaque psoriasis on trunk, elbows, and knees. Exam identifies 20% body surface area affected. No joint swelling, tenderness, or enthesitis. To date, she has used topical steroids, vitamin D analogs and phototherapy, with limited improvement.

Overweight (BMI 28.8 kg/m2), with history of hypertension, dyslipidemia, and prediabetes. Consumes 1 alcohol drink most nights. She is married and would like to consider conception in a few years. Current medications include atorvastatin, hydrochlorothiazide, and an oral contraceptive.
After reviewing the brief scenario above, please rate each of the statements as consistent with or not consistent with best clinical practice:

Consistent	Not Consistent
Discuss risks for cardiovascular disease and lymphoma with patient	Consider systemic treatment with acitretin
Consider initiating methotrexate and counseling patient to discontinue alcohol	Because she is considering pregnancy in the future, avoid use of biologic agents
Consider initiating biologic agent	

While learners achieved statistically significant and substantial gains across all domains of the curriculum, there were areas where learners lacked proficiency at Post-Test:

1. **Knowledge** of the cytokines that are central to the pathogenesis of psoriasis proved difficult to learners with nearly 40% incorrectly responding at Post-Test.

2. **Performance behavior (RealIndex)** related to "initiating methotrexate and counseling patient to discontinue drinking alcohol" proved challenging with 32% of learners incorrectly endorsing this as not consistent with clinical performance behavior, at Post-Test.

3. **Performance behavior(RealIndex)** approximately 32% of learners indicated they would not initiate a biologic agent, which is incorrect clinical performance behavior.

4. **Knowledge** of relative risk of myocardial infarction in patients with psoriasis also proved difficult to learners, with over 30% incorrectly identifying the highest risk group, at Post-Test.

5. While **Confidence** improved significantly, learners would benefit from further education that addresses the gaps.
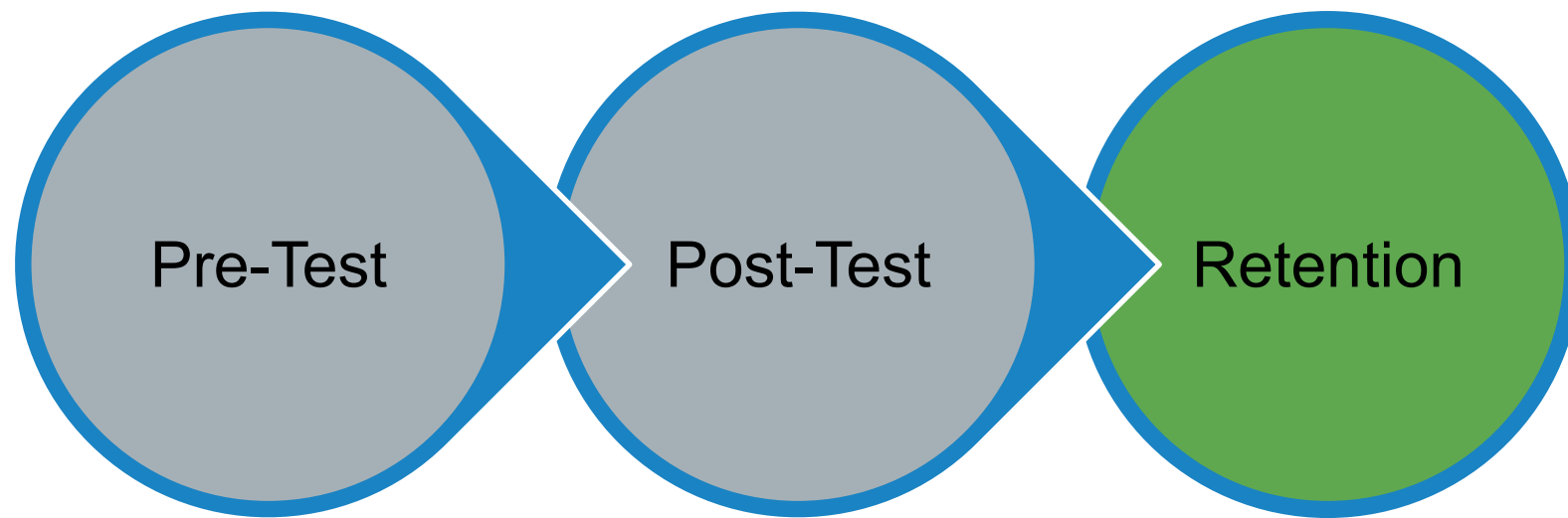
Retention: 4 Weeks Post-Curriculum (*N* = 35)

Knowledge & Competence

- Slippage was observed for Knowledge items related to relative risk of CVD in young patients with severe psoriasis and which cytokines are central to the pathogenesis of psoriasis.

- Slippage from Post-Test was also observed for Competence; learners' struggled to recall which findings do not lead to diagnosis of psoriatic arthritis. More specifically, they struggled with whether a positive result for rheumatoid factor might lead to a diagnosis of psoriasis.

Performance (RealIndex)

- Learners demonstrated excellent retention for items related to risk of CVD and lymphoma, and treatment selection (methotrexate or a biologic).

- Slippage was evident items that are not consistent with current clinical practice, specifically:

  - "For patients who might become pregnant, the use of biologic agents should be avoided" was identified as consistent at the 4 week follow-up, this is incorrect.

  - Systemic treatment with acitretin was identified as consistent with current clinical practice more frequently at the 4 week follow-up; this incorrect.

Persistent Learning Gap

- Learners' retention at the 4 week follow-up was mixed with them performing well on RI items, but not Knowledge and Competence. Learners struggled with Knowledge, and Competence related to:

  - Diagnosis

  - Relative risk of comorbidities

  - Pathogenesis of psoriasis

  - Treatment protocols; including whether or not to prescribe biologics for women who might become pregnant

- The predictive model that follows will identify drivers that can help prevent slippage, facilitate attainment and lead to higher Confidence. This includes the predicted magnitude of change expected if the learning gaps are successfully addressed.

The Inflammatory State of Psoriasis:
New and Emerging Therapies

What specific *skills* or *practice* behaviors have you implemented for patients with Psoriasis since this CME activity?
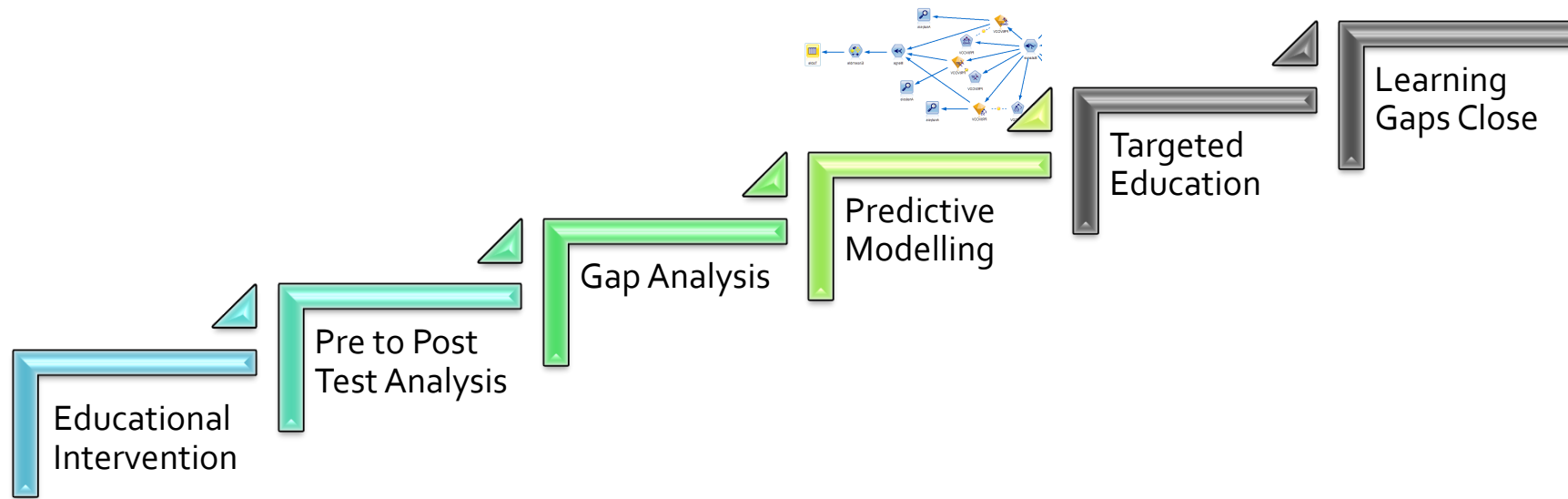(Comments received from attendees at 4 week follow up)

- "I am more aware of signs and symptoms suggestive of psoriasis"
- "I am better able to counsel patients on medications "
- "I will be doing a more comprehensive assessment of psoriasis patients, beyond their skin"
- "I am evaluating patients with psoriasis for heart disease"
- "I am more aware of the appropriate use of biologics and topical meds"

What specific **barriers** have you encountered that may have prevented you from successfully implementing strategies for patients with Psoriasis since this CME activity? (Comments received from attendees at 4 week follow up)

- Insurance Formulary
- Patient compliance
- Medication costs

Predictive Modeling

Educational
Intervention

Pre to Post
Test Analysis

Gap Analysis

Predictive
Modelling

Targeted
Education

Learning
Gaps Close

PredictiveModeling

After an educational intervention takes place, a gap analysis is completed. The gap analysis identifies areas where learners continued to struggle, Post-Test.

The identified gaps are then compiled into a 'target gap score'. This score enables us to target gaps in knowledge, competence, practice strategy, and/or clinical performance, statistically.

Learner demographics, as well as the remaining knowledge, competence, confidence, practice strategy and clinical performance items are modeled against the target gap score (Post-Test) to identify areas that can not only reduce these gaps, but provide guidance on how to develop education proactively. These areas of are identified as drivers.

What benefits does predictive modeling offer?

Gap analysis COMBINED with predictive modeling *enables* educators to go beyond identifying areas of additional educational need. Predictive modeling precisely guides educators in developing more robust educational programs that are targeted to learners' deficits based upon learners' prior performance rather than educated guesswork.

By examining learner strengths and weaknesses statistically, a profile of what contributes to high educational attainment, as well as areas where key deficits remain, can be derived. This profile will provide key indicators for what subject matter should be emphasized, as well as who might benefit most from these educational initiatives.

Not only that, the predictive model can be used to determine how effective future education will be; enabling educators to put their resources to best use.

Educational Intervention

Pre to Post Test Analysis

Gap Analysis

Predictive Modelling

Targeted Education

Learning Gaps Close
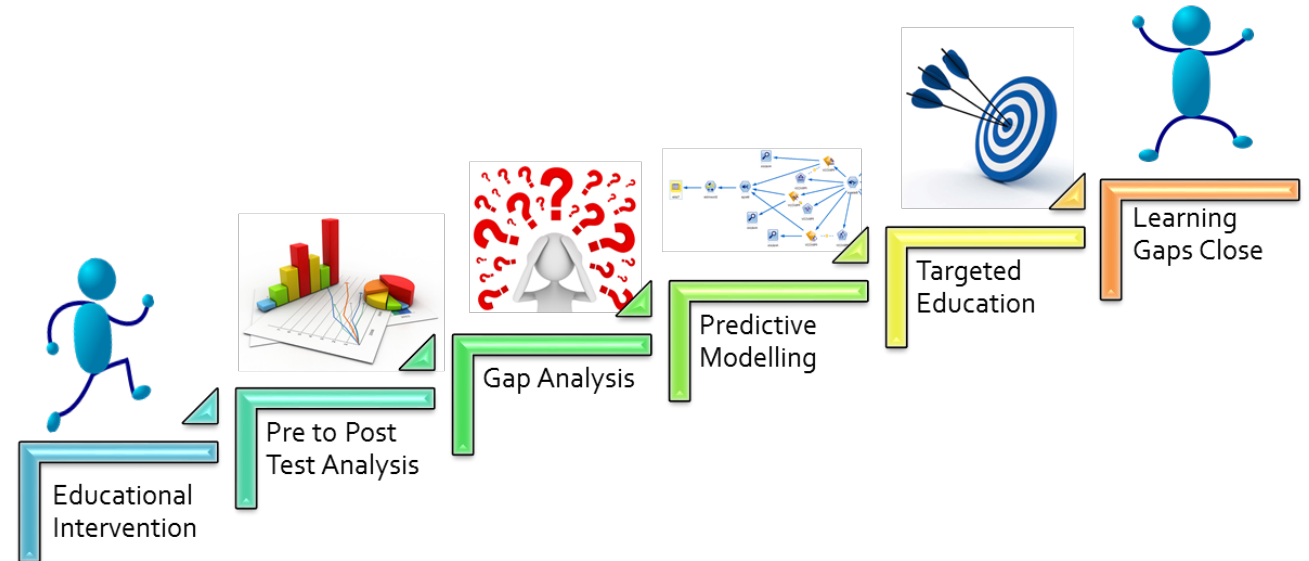
Target Gap Score:

By identifying the lowest scoring items in the curriculum and averaging the overall score, we obtain the target gap score. This score is used as the target in the predictive model to determine what is driving the gap.

The Composite Gap Score serves as the **Target: Treatment Selection**

Total_Score

Mean = .76
Std. Dev. = .267
N = 550

Learning Gap

Gap_Score

Mean = .68
Std. Dev. = .407
N = 475
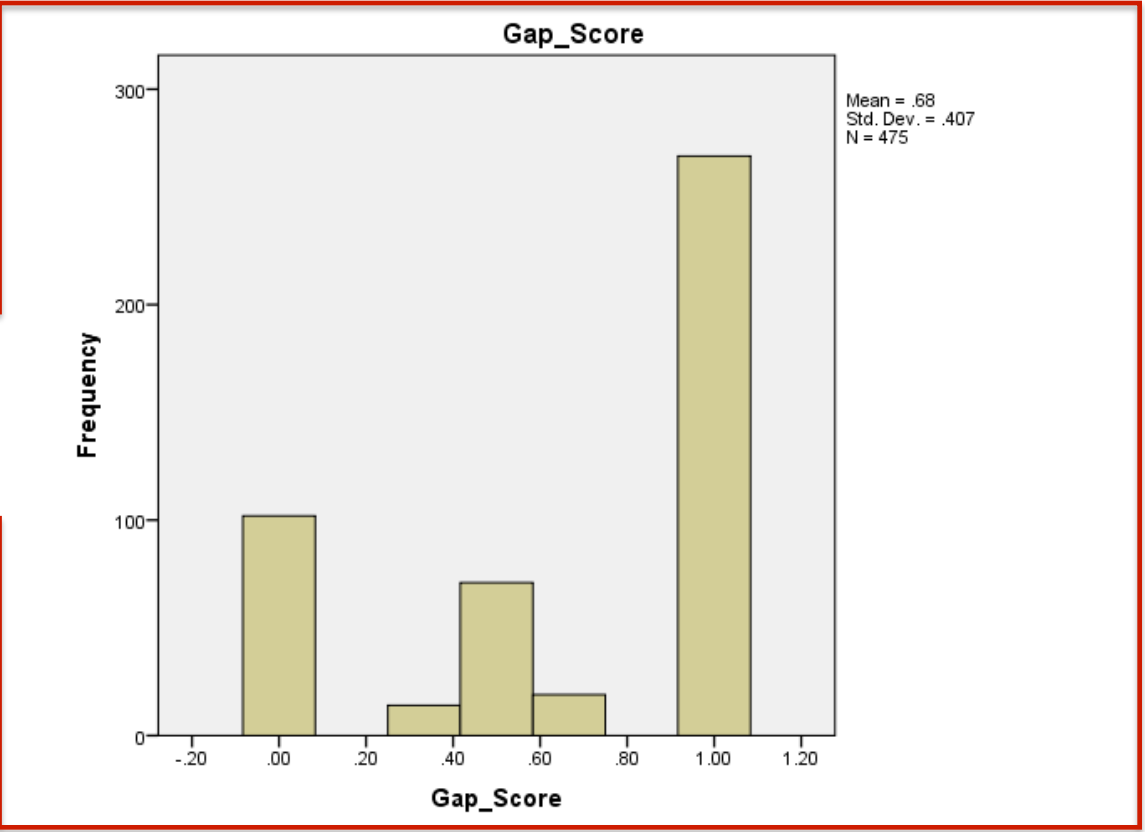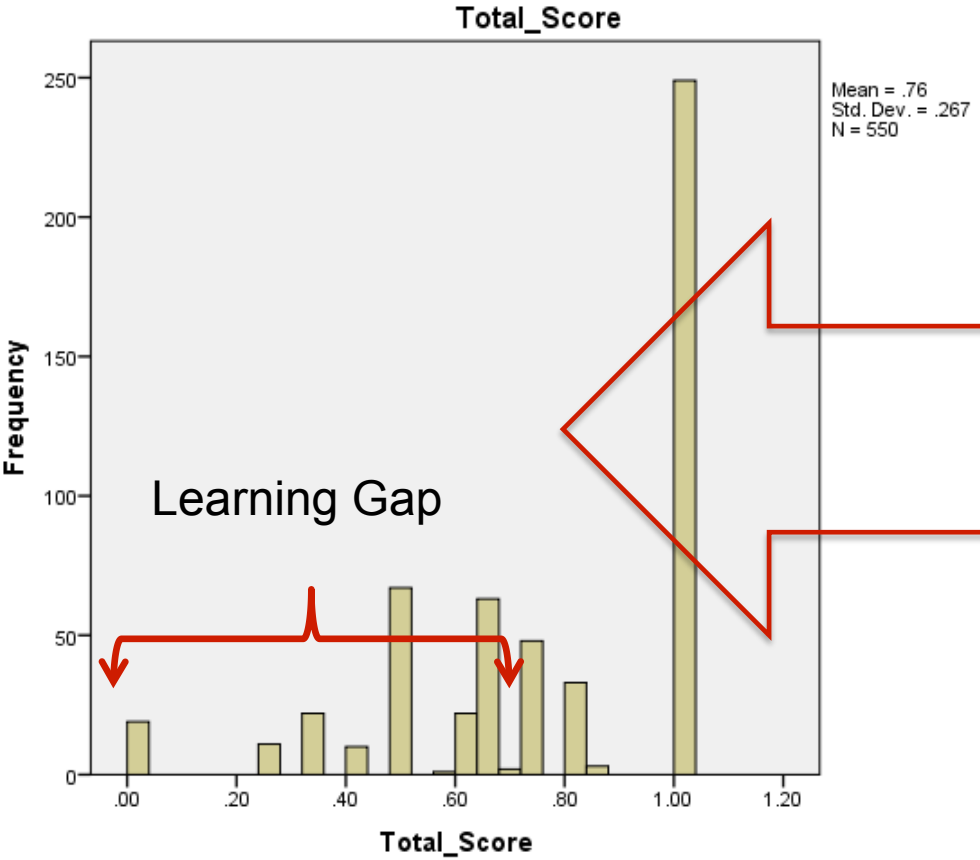
The Model: Identifying Significant Drivers

All questions across the learning domains (including knowledge, competence, confidence, and practice strategy), as well as learner demographics were analyzed to identify positive and/or negative predictors of learners' target (or gap).

4 statistically significant drivers were identified that include Knowledge, Performance, and demographics.

It is important to note that drivers can *facilitate* or *hinder* learners' performance. This means they can have either a positive or a negative influence on performance.
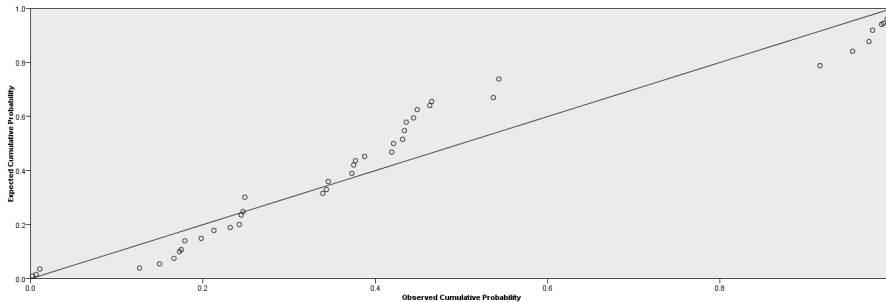
Profession

Region

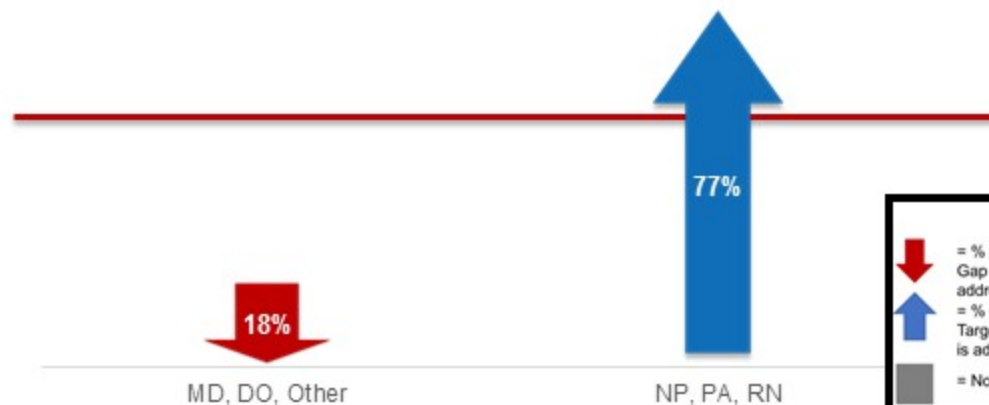Confidence

Performance: Biologics
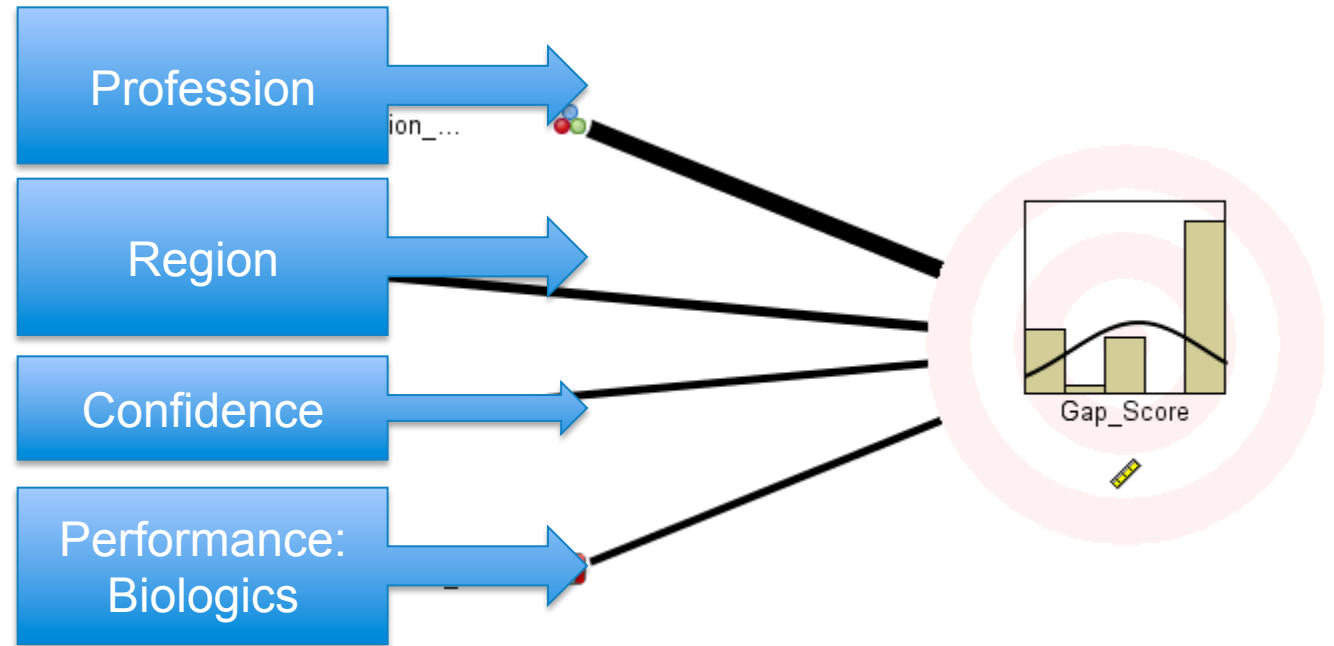
Gap_Score

Educational Drivers

📈 Confidence: Treatment selection

⌀ Performance: Use of biologics

Gap Score: 68%

77%
↑
Confident

30%
↓
Not Confident

30%
↓
Incorrect

83%
↑
Correct
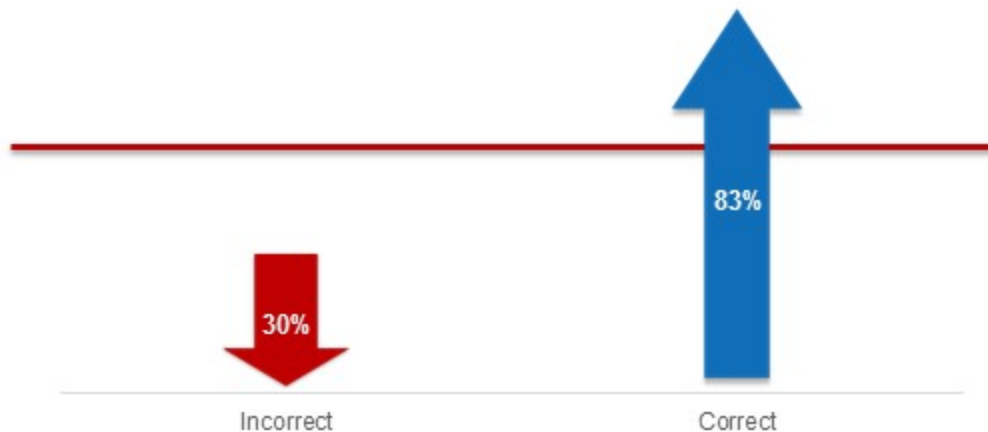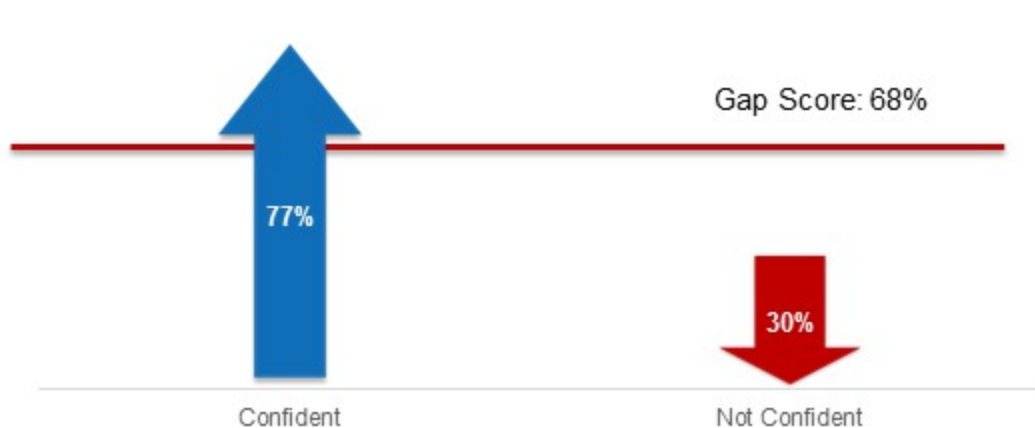
Demographic Drivers

✦ Region

▱ Profession: MD, DO, & Other

Gap Score: 68%

22%
↓
Northeast

77%
↑
Southeast, Central,Southwest, West

18%
↓
MD, DO, Other

77%
↑
NP, PA, RN
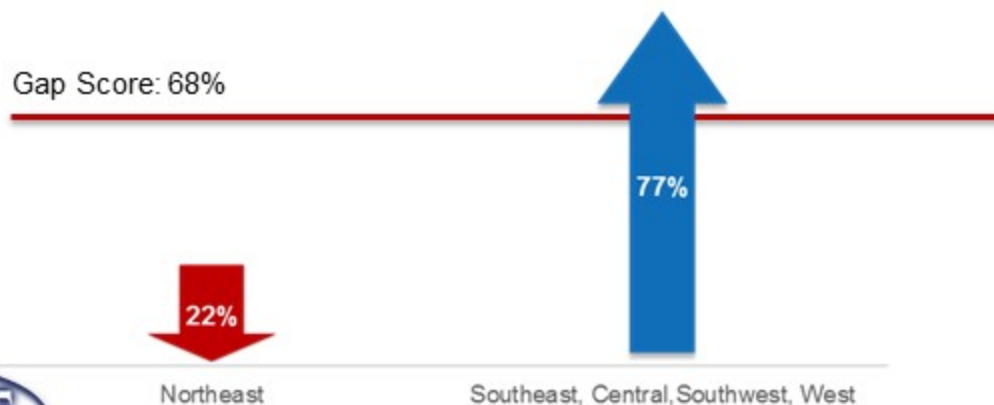
Driver Influence

↓ = % predicted **decrease** in Target Gap Score (TGS), if driver is **not** addressed

↑ = % predicted **improvement** in Target Gap Score (TGS), if driver is addressed

▪ = No effect

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Predicted Magnitude of Change

By addressing these drivers a 25**% magnitude of change** can be achieved.

Targeted learning that focuses not only on the identified learning gap, but also incorporates the drivers, will facilitate higher educational attainment, retention and increased Confidence.

Predicted 25% Magnitude of Change can be achieved by closing the learning gap
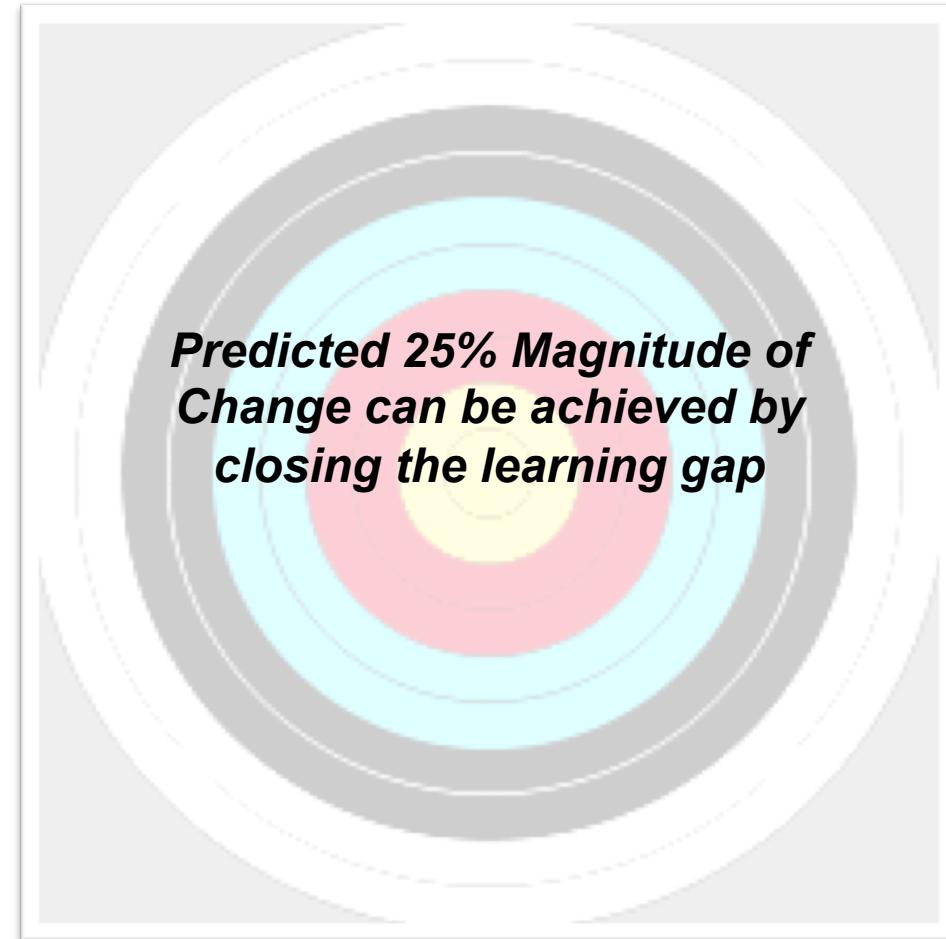
Psoriasis Predictive Model: Summary of Findings

- Results from the final advanced analysis revealed an educational gap **regarding treatment selection for psoriasis.**

- The final predictive modeling procedure identified 4 drivers that, if addressed in future education, will lead to an estimated **25% (magnitude of change) improvement in learners' overall proficiency in this area**.

  – <u>Drivers</u> (areas of focus to improve identified gap):

    1. **Performance Behavior** – use of biologics for women considering conceiving
    2. **Confidence** – low confidence adversely impacts performance
    3. **Profession** – MD, DO, & Other
    4. **Region** – Northeast

Psoriasis Application of Findings – Applying the Outcomes
Addressing the identified learning gap & drivers

Demographic Targeting

- Profession – MD, DO, & Other
- Region – Northeast

Content Focus

- Knowledge and performance behaviors related to clinical presentation, disease pathogenesis, comorbidities, and therapeutic protocols for psoriasis including:

  - Relative risk of CVD
  - Cytokines
  - Use of biologics

Instructional Design

- Incorporate case-based activities that emphasize differential diagnosis of disease type, appropriate therapies including topical treatments and biologics, with a strong emphasis on how to manage psoriasis when comorbidities are present

- Serial reinforcement to address lack of retention as well as persistent low confidence

- Include a team-based approach to diagnosis and treatment including case-based challenges to engage entire care team (profession)

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