

SUCCESS OF CONTINUING MEDICAL EDUCATION ON APPROPRIATE CLINICAL USE OF INHALED INSULIN THERAPY

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INTRODUCTION

Rapid-acting insulin analogs increase insulin bioavailability and reduce interpatient and intrapatient variability; however, they are still absorbed too slowly to replicate the rapid and transient postprandial spike of endogenous insulin.^[1,2] The faster time course and less-prolonged action of ultra-rapid insulin formulations more accurately recapitulate physiologic prandial insulin release, thereby reducing hypoglycemia risk and limiting postprandial glucose excursions.^[3] We sought to determine if participating in a curriculum of educational activities related to the clinical use of a new rapidacting insulin formulation could improve the knowledge, competence, and clinical decision-making of primary care physicians (PCPs) and diabetologists/ endocrinologists (diab/endos) in the United States.

METHODS

Educational Interventions

- PCPs and diab/endos participated in at least 1 of 4 online continuing of inhaled insulin (Table 1).
- All activities were housed as a collection on Medscape Education.
- for each activity.

Outcomes Analyses

- The effects of education were assessed using 4 knowledge- and casebased matched pre- and post-education questions for each activity.
- McNemar's chi-squared test was used to assess whether the mean *P* values <.05 are statistically significant.
- Questions from all 4 activities were grouped together in domains according to topics as follows:
- Individualizing Therapy in Diabetes Patients
- of Inhaled Insulin
- and Past Inhaled Insulin Products
- Clinical Use of Modern Inhaled Insulin

Source of Support

This curriculum of CME activities was supported by an independent educational grant from Sanofi.

Notes

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TABLE 1. Curriculum of educational activities

Activity Number in Curriculum	Activity Title	Activity Format Activity URL		Launched Online	Data Collected Through	
1	Inhaled Insulin: Overcoming Past Obstacles with Advances in Understanding	Video expert lecture with 1 faculty	http://www.medscape.org/ viewarticle/840611	April 21, 2015	June 4, 2015	
2	Postprandial Glucose Control in Patients with Diabetes	Interactive, text- based case activity	http://www.medscape.org/ viewarticle/842625	April 20, 2015	June 28, 2015	
3	Advances in Insulin Therapy: Improving Outcomes by Engaging Patients	Video curbside consult discussion between 2 faculty	http://www.medscape.org/ viewarticle/842644	June 25, 2015	September 11, 201	
4	Deciphering the Data on Inhaled Insulin: Implications for Practice	Video roundtable panel discussion among 3 faculty	http://www.medscape.org/ viewarticle/845829	June 26, 2015	September 11, 201	

RESULTS

Overall

Improved knowledge, competence, and clinical-decision making were seen across the curriculum for both PCPs (n=2040; P <.05 all activities) and diab/endos (n=815; P <.05 all activities).

TABLE 2. Individualizing Therapy in Diabetes Patients (37% increase by PCPs and 52% increase by diab/endos in selecting strategies to improve patient adherence) Frank is a 52-year-old Italian American man with T2D. He is 6'2" and weighs 270 lb, with a BMI of 34.7 kg/m². He takes metformin 2000 mg/d, insulin detemir 85 U/d, and glipizide extended release 15 mg/d. His HbA₁, has risen from 6.8% to 8.4%. Over the past 2 weeks, his morning fasting glucose has ranged from 106 to 128 mg/dL. His glucose readings after dinner have ranged from 207 to 245 mg/dL. What is the best way to initiate necessary changes to Frank's medication regimen? (Correct answer is highlighted in orange.) Ask him to track his blood glucose more closely and come Increase the glipizide dosage and see him in 1 week Ask him more targeted questions to find the right answer D Divide his insulin detemir into morning and evening doses
TABLE 3. Understanding MOA, Safety, and Efficacy Data of Inhaled Insulin

 (37% increase by PCPs and 40% increase by diab/endos in recognizing the mechanism of action of inhaled insulin) Which of the following is true regarding the mechanism of action of inhaled insulin? (Correct answer is highlighted in orange.)

		PCPs (n=235)		Diab/Endos (n=95)	
		Pre-Assessment % (n)	Post-Assessment % (n)	Pre-Assessment % (n)	Post-Assessment % (n)
А	Larger particle sizes result in enhanced absorption	6% (13)	5% (11)	4% (4)	3% (3)
В	Smaller particle sizes result in decreased absorption	4% (9)	1% (3)	3% (3)	1% (1)
С	Pulmonary delivery of insulin allows for a marked increase in bioavailability	49% (116)	86% (202)*	49% (47)	89% (85)**
D	Pulmonary delivery of insulin addresses needle phobia but has low bioavailability	41% (97)	8% (19)	43% (41)	6% (6)
		<u>.</u>	·		*P<.05, **P<.05

TABLE 4. Differentiating Modern Inhaled Insulin From Injectable Prandial Insulin and Past Inhaled

 Insulin Products (30% increase by PCPs and 19% increase by diab/endos in differentiating inhaled insulin and other forms of rapid acting insulin)

A patient with type 2 diabetes has not responded to oral antihyperglycemic medication therapy but is highly motivated and wants to "control her high sugar levels after meals." She expresses interest in inhaled insulin because she has needle phobia. After seeing an advertisement on television, she asks how inhaling insulin is different from injecting insulin. Of the following, which would be the most appropriate response? (Correct answer is highlighted in orange.)

		PCPs (n=235)		Diab/Endos (n=95)	
		Pre-Assessment % (n)	Post-Assessment % (n)	Pre-Assessment % (n)	Post-Assessment % (n)
A	When you inhale insulin, it has a greater effect on fasting hyperglycemia	11% (27)	5% (12)	5% (5)	2% (2)
В	When you inhale insulin, it is absorbed more rapidly than injected human insulin	53% (124)	83% (196)*	75% (71)	94% (89)**
С	Inhaled insulin can be used in type 1 diabetes without a basal insulin	7% (17)	3% (8)	4% (4)	1% (1)
D	The decision to use inhaled insulin should be based only on how much glucose lowering is needed	29% (67)	8% (19)	16% (15)	3% (3)

medical education (CME) activities within a curriculum on the clinical use

Content was developed with input from a steering committee consisting of expert faculty in the field of diabetes management as well as faculty

post-assessment score differed from the mean pre-assessment score;

Understanding mechanism of action (MOA), Safety, and Efficacy Data

Differentiating Modern Inhaled Insulin From Injectable Prandial Insulin

	PCPs (I	n= 1551)	Diab/Endos (n=570)			
	Pre-Assessment % (n)	Post-Assessment % (n)	Pre-Assessment % (n)	Post-Assessment % (n)		
e back in	16% (247)	7% (110)	24% (138)	6% (36)		
	8% (123)	5% (76)	7% (39)	1% (6)		
	48% (738)	85% (1321)*	38% (218)	90% (514)**		
S	29% (443)	3% (44)	31% (175)	2% (14)		
				*P <.05, **P <.05		

After you discuss her options for prandial insulin, Katie says that although she generally likes the idea of inhaled insulin, she has some concerns. First, she says that several years ago, she saw an inhaled insulin delivery device and it was huge. She says she would be embarrassed to be seen using it and would find it inconvenient to carry around. In addition, she has concerns about the impact of inhaled insulin on her long-term pulmonary health. Which of the following would be an accurate, appropriate statement to counsel Katie about her concerns? (Correct answer is highlighted in orange.)

Because of her concerns about inconvenien choice for her B The inhaled insulin currently available is deliv There is no concern whatsoever about the pu

D None of the above statements is accurate and

		PCPs (n=219)		Diab/Endos (n=94)	
		Pre-Assessment % (n)	Post-Assessment % (n)	Pre-Assessment % (n)	Post-Assessment % (n)
А	Order a spirometry test to measure forced expiratory volume in 1 second (FEV ₁)	75% (164)	95% (209)*	77% (72)	96% (90)**
В	Order a chest radiograph	14% (30)	3% (7)	9% (8)	1% (1)
С	Refer the patient to a smoking cessation program at least 1 week before starting treatment	11% (23)	1% (2)	12% (11)	3% (3)
D	Order a computed tomography scan of the chest	1% (2)	O% (1)	3% (3)	0% (0)

CONCLUSIONS

This study demonstrates the success of a targeted educational intervention with multiple educational components in multiple formats on improving knowledge, competence, and clinical decision-making of PCPs and diab/ endos regarding a new rapid-acting insulin formulation. Improvements were seen with regard to each theme, with the areas needing additional education falling under the topics of Individualizing Therapy in Diabetes Patients and Understanding MOA, Safety, and Efficacy Data of Inhaled Insulin.

*P <.05, **P <.05

TABLE 5. 24% increase by PCPs and 21% increase by diab/endos understanding how modern inhaled insulin differs from older inhaled insulin formulations

	PCPs (n=1551)		Diab/Endos (n=570)		
	Pre-Assessment % (n)	Post-Assessment % (n)	Pre-Assessment % (n)	Post-Assessment % (n)	
nce and embarrassment, perhaps inhaled insulin is not the best	10% (152)	6% (93)	6% (36)	4% (23)	
ivered by a much smaller device than the one she saw earlier	65% (1004)	89% (1388)*	73% (418)	94% (534)**	
oulmonary safety of inhaled insulin	7% (105)	3% (43)	3% (19)	1% (5)	
nd appropriate	19% (290)	2% (27)	17% (97)	1% (8)	
				*P <.05, **P <.05	

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TABLE 6. Clinical Use of Modern Inhaled Insulin (20% increase) by PCPs and 19% increase by diab/endos in making correct clinical decisions about the clinical use of inhaled insulin)

Areas identified as needing additional education include:

- 31% of PCPs and 41% of diab/endos remain unclear on strategies for engaging the patient in his/her care plan
- 33% of PCPs and 32% of diab/ endos remain unclear on the efficacy of modern inhaled insulin
- 22% of PCPs and 24% of diab/ endos remain unclear on the safety profile of modern inhaled insulin

References

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