İnsulinin 100. Yılında Portföyümüzde Neler Var?

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MİTLER VE GERÇEKLER! MEYVE HAKKINDA HER ŞEY

Türk Diyabet Cemiyeti'nin yayın organıdır

Diyabet ve sağlıklı yaşam

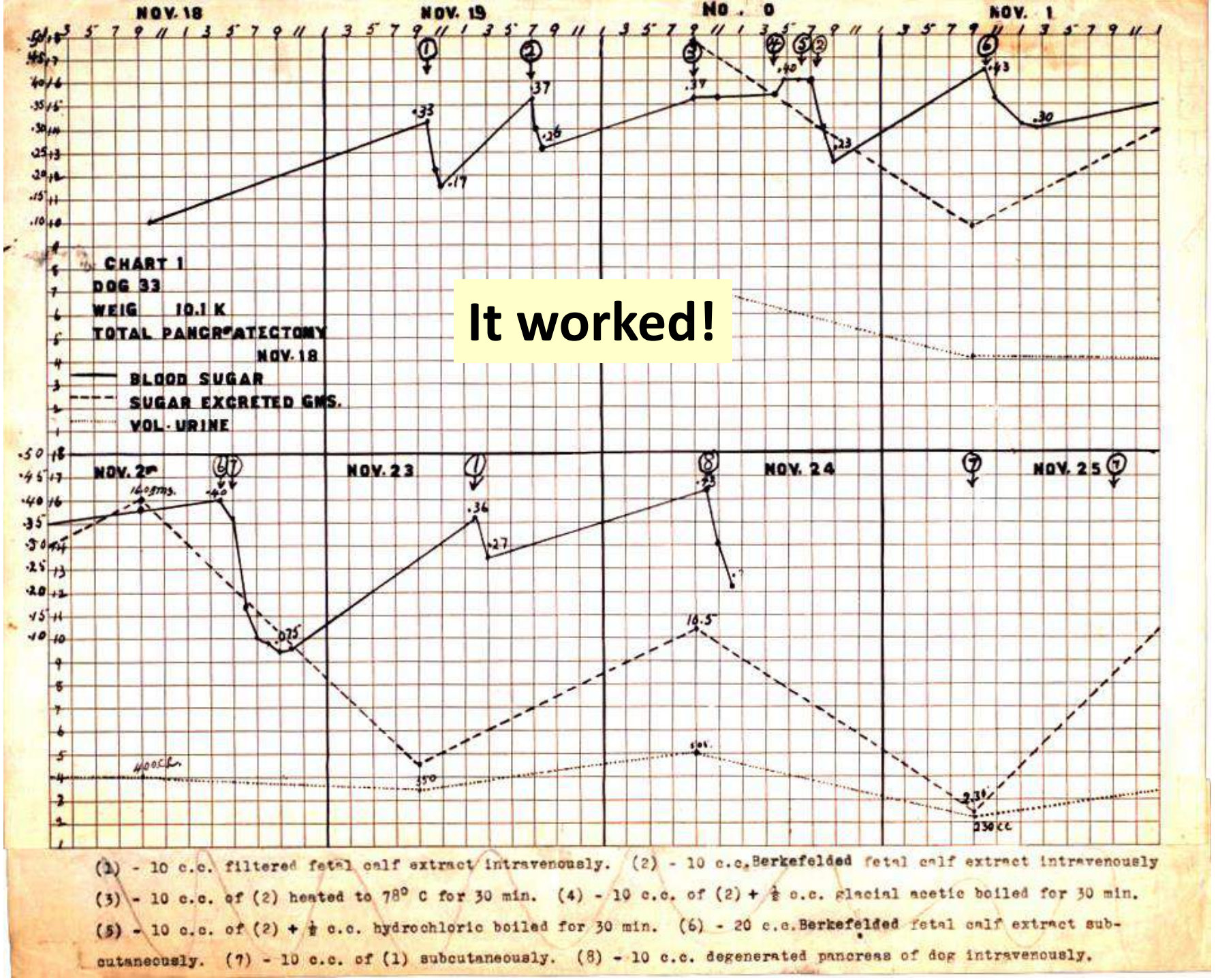
NİSAN2021 SAYI69

İNSÜLİN 100 YAŞINDA!

CORONAVİRÜS AŞILARI HAKKINDA NE BİLİYORUZ?

AĞIZ VE DİŞ SAĞLIĞINIZI İHMAL ETMEYİN!

HAYAD: HASTA VE HASTA YAKINI HAKLARI DERNEĞİ



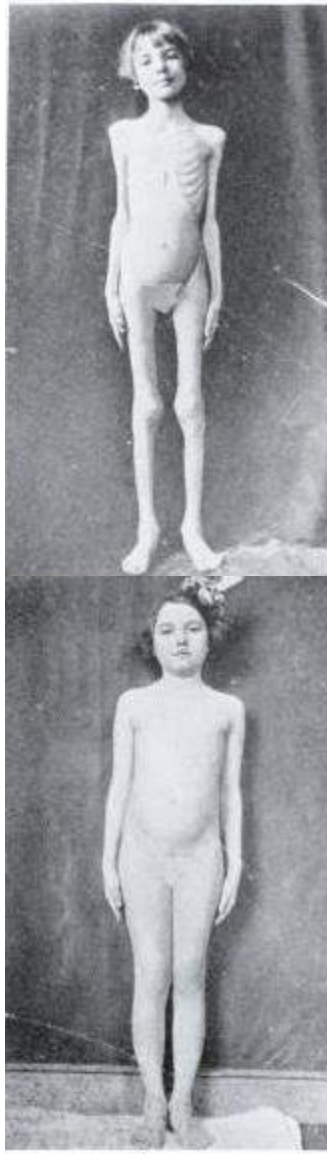
It worked!

(1) - 10 c.c. filtered fetal calf extract intravenously. (2) - 10 c.c. Berkefelded fetal calf extract intravenously (3) - 10 c.c. of (2) heated to 78° C for 30 min. (4) - 10 c.c. of (2) + ½ c.c. glacial acetic boiled for 30 min. (5) - 10 c.c. of (2) + ½ c.c. hydrochloric boiled for 30 min. (6) - 20 c.c. Berkefelded fetal calf extract subcutaneously. (7) - 10 c.c. of (1) subcutaneously. (8) - 10 c.c. degenerated pancreas of dog intravenously.

It also worked for humans, but they very quickly produced a serious allergic reaction against the pancreas extract from the dogs.

Only when insulin was **purified** (i.e. everything but insulin was removed) could it be given repeatedly to humans.

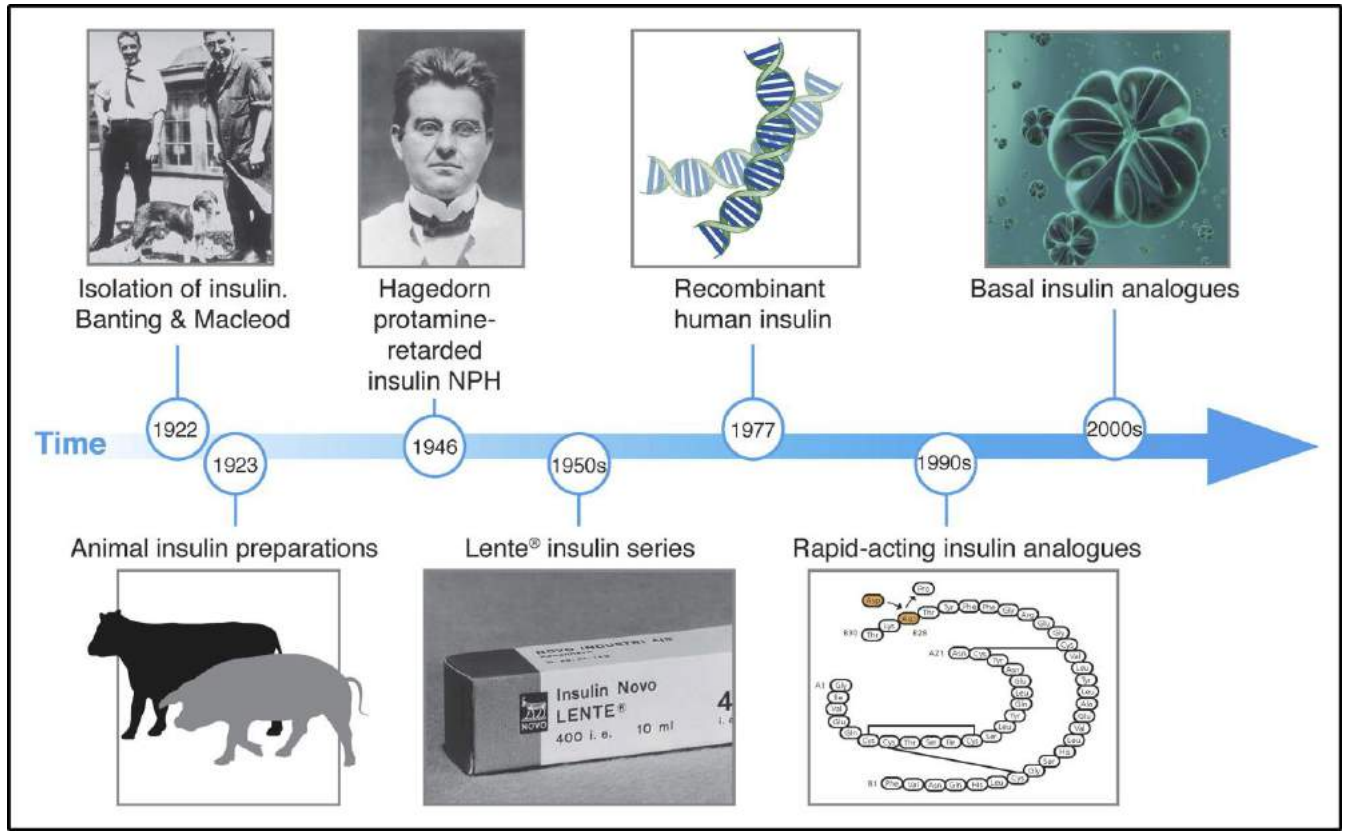
Only minute quantities of insulin could be prepared from tied up dog pancreas.



Elizabeth Evans Hughes.

1922 Date August	URINE Vol. C.C.	~~Di-acetic Acid~~ Acetone	SUGAR Per Cent.	SUGAR Total G.	BLOOD	Insulin	DIET IN GRAMS Carb. (10)	Prot. (10)	Fat. (25)	Cal.	WGT.	DIETARY PRESCRIPTIONS IN GRAMS 20% Cream	Eggs	Butter	Bacon	Meat or fish	Gel	Vegetables	Fruit	Cheese	Oat.
16-17	1312		0.		92	1½ c.c.	30	60	85	1125	45 lbs	140	2 Egg-white	13		R. beef 100; R. lamb 50	4	St. beans 80, Lettuce 20, Tomatoe 20	Peaches 70. Black-berries 30		10
17-18	1560		0 in single spec. tr in 24' am't.		"	1½ c.c.	30	60	85	1125		120	3	10		L. Chop 118		Tomatoe 130, Lettuce 48	Peaches 80. B.B. 40.		10
18-19	1440		0		"	1½ c.c.	30	60	85	1125.		120	3	10		L. Chop 118	4	Onions 80, Lettuce 20, Tomatoe 30	B.B. 40, Peaches 44	16	10
19-20	2040		0 in single spec. tr in 24' am't.		89	1¾ c.c.	30	60	85	1125		130	2	24		R. Lamb 150		St. beans 97. Celery 30. Lettuce 20, Tomato 30	Peaches 38. B.B. 40.	16	10
20-21	1500		0		"	2 c.c.	30	60	85	1125		130	3	27		R. Lamb 100	4	Tomatoe 180. Lettuce 40. Celery 43.	B.B. 40. Peaches 38	10	10
21-22	1800		0		"	2 c.c.	30	50	90	1130		32% 30, 20% 50	3	22		Lamb 85		St. beans 100, Celery 30. Lettuce 20, Tomatoe 30.	B.B. 74		10
22-23	1440		0		"	2 c.c.	30	50	100	1220		32% 120, 20% 40	4	30		lamb 40	4	Onions 60. Lettuce 20. Tomatoe 30.	B.B. 79.		10
23-24	1680	0	0		"	2 c.c.	30	50	100	1220		32% 120, 20% 40	3	27	15	Liver 70	4	Egg-plant 80. Lettuce 20. Tomatoe 30.	B.B. 79		10
24-25	1800	0	0		97	2 c.c.	30	50	100	1220	dressed 52¾ lbs	20% 20, 32% 40	3	34	15	Liver 84	4	Egg-plant 43. Lettuce 20. Tomatoe 80.	B.B. 79		10.
25-26	2400	0	0		"	4 c.c.	60	50	189	2141	clothes weight 2½ lbs	32% 298	4	75		Salmon 50	4	Cauliflower 97.	Lemon-juice 15. B.B. 84. Orange-juice 110	white bread 12	20
Note. - Extract given 2 c.c. a.m. & p.m. Reaction after a.m. dose occurred 4 hrs. Orange-juice 60 — cream 30 given & fats & carb. of evening meal increased. Reaction after p.m. dose occurred 7 hrs. Orange-juice 50 - Cream 40 given.																					
26-27	1440	0	tr in 2 single spec. 0 in 24' am't.		"	4 c.c.	63	53	200	2264	32% 290	32% 290	2	98		Salmon 103	4	Cauliflower 70. Potatoe 40	B.B. 90	Bread 24	Shredded wheat 25
27-28	1360	0	0		"	4 c.c.	60	52	200	2248		360	3	78		Chicken 45.		Veg. marrow 149, Lettuce 20, St. beans 50.	B.B. 90.	28	20
28-29	2400	0	0		"	4 c.c.	66	52	216	2416		410	3	69	10	Chicken, 45		Veg. marrow 144, Onions 70,	B.B. 90, Orange-juice 50.	23.	20
Reaction 6¼ hrs. after evening dose — Orange-juice 50 - cream 50 given																					
29-30	2250	0	0		97 / 100	1½ c.c. / ¾ c.c.	64	53	204	2304		342	1	75		Steak 75. Sweetbread 50	4	Veg. marrow 126. Corn 40. St. beans 50. Celery 40	B.B. 90	14	Brazil nut 15; 25
30-31	2100	0	tr in 2 single spec. 0 in 24' am't.		100	6¼ c.c.	60	53	200	2252		360	2	78		Veal 50. Sweetbread 50	4	Celery 30. Corn 40. Carrots 50.	B.B. 109	14.	20
Sept. 31-1	1440	0	tr			1 c.c. given	20	50	71	919		20% 100	2	12	10	Veal 100		Celery 40. Lettuce 20. Tomatoe 30.	Peaches 30, B.B. 40	15	oat 10
1-2	2400	0	0		13 check after 102	3 c.c.	36	50	123	1451	(54)	32% 305	2	20		Veal 86	4	Celery 80. Lettuce 20. Tomatoe 50.	B.B. 109, Orange-juice 50		10
Reaction 4½ hrs. after evening dose of 2 c.c. - Cream 50 - orange-juice 50 given																					
2-3	2640	0	0		102 / 103	¾ c.c. a.m. / 1¼ c.c. - / 1½ c.c. p.m.	76	50	240	2664		520	3	66.		Veal 50	4	Onions 10, Carrots 10, Celery 15.	Lemon-j 15, Huckleberries 65, Orange-j 160	25	Shredded wheat 20

Reaction 4½ hrs after a.m. dose - Orange-juice 40 - cream 50 given
Reaction 1½ hrs. - after p.m. dose and again 3 hrs. later - Orange-juice 50 - Cream 60
" " 70 " 50 given.

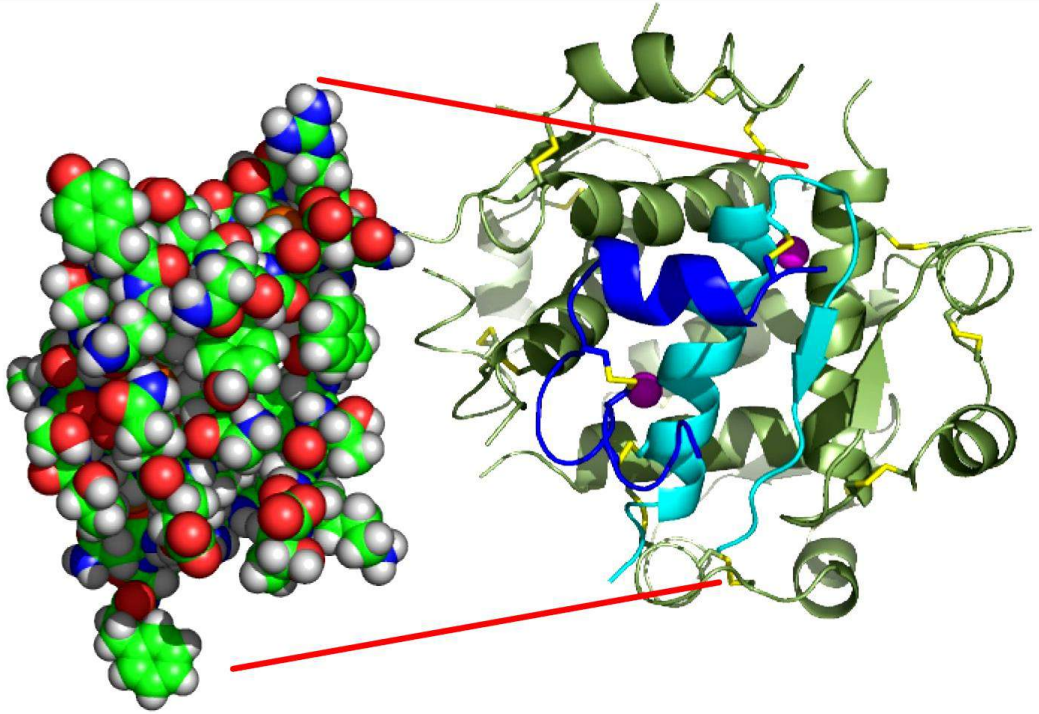


Dorothy Hodgkin 1910-1994

Sir John Leman Grammar School, Beccles, Suffolk.

Universites: Oxford and Cambridge

1964 Nobel prize for developing **protein crystallography** and determining the position in 3d of every single atom in the hormone **insulin**.



SIR JOHN LEMAN HIGH SCHOOL

Just when the world was running out of calf insulin, it became possible to produce

- **human insulin**

- guaranteed **free of disease**
- in **unlimited quantities**

  by putting the human gene for insulin into a harmless bacterium by

  genetic modification.

TURDEP-I ve TURDEP-II Çalışmalarında Bilinen Tip 2 Diyabette Tedavi

	TURDEP-I (%) 1998	TURDEP-II (%) 2010
Tedavisiz	37.0	9
Diyet	12.8	33.2
OAD	47.6	83.3
İnsülin	3.8	14.7
Herbal	0.1	1.0
DM süresi (yıl)	5.9±7.3	6.6±5.7

Satman I and TURDEP Study Group 2010

The International Diabetes Management Practices Study (IDMPS) – Turkey's 5th wave results

Hasan İlkova[1], Taner Damcı[1], Kubilay Karşıdağ[2], Abdurrahman Çömlekçi[3], Göksun Ayvaz[4], IDMPS Türkiye Çalışma Grubu[1]

[1] Istanbul University, Medical School of Cerrahpasa, Division of Endocrinology and Metabolism, Department of Internal Medicine, Istanbul, Turkey.

[2] Istanbul University, Medical School of Istanbul, Division of Endocrinology and Metabolism, Department of Internal Medicine, Istanbul, Turkey.

[3] Dokuz Eylul University, Faculty of Medicine, Division of Endocrinology and Metabolism, Department of Internal Medicine, Izmir, Turkey.

[4] Gazi University, Faculty of Medicine, Division of Endocrinology and Metabolism, Department of Internal Medicine, Ankara, Turkey.

Table 2: General treatment patterns of diabetic patients

	Tip 1 DM	Tip 2 DM
Insulin	%94,8	%17,6
OAD		%52,4
OAD + Insulin	%5,2	%28,6
Other		%0,9
Diet and exercise		%0,5

Toplam insulin tedavisi goren Tip2 %46.2

Table 3: Distribution of insulin treatments in Tip 2 diabetic patients

	(%)
Basal only	%25,4
Prandial only	%3,1
Basal + Prandial	%36,2
Premix only	%34,2
Other	%1

The International Diabetes Management Practices Study (IDMPS) – Turkey's 5th wave results

TABLO 8.1: **İnsülin tipleri ve etki profilleri***

İnsülin tipi	Etki başlangıcı	Pik etki	Etki süresi	Görünüm
HIZLI ETKİLİ				
Lispro U100 & U200	<15 dk	30 - 90 dk	3 - 5 st	Berrak
Biyobenzer İnsülin Lispro U100**	<15 dk	30 - 90 dk	3 - 5 st	Berrak
Glulisin	15 - 30 dk	30 - 60 dk	4 st	Berrak
Aspart	<15 dk	1 - 3 st	3 - 5 st	Berrak
Çok Hızlı Etkili Aspart**	4 dk	30 - 90 dk	3 - 5 st	Berrak
Regüler İnhaler İnsülin**	<5 dk	20 - 40 dk	3 st	Toz
KISA ETKİLİ				
Regüler U100	30 - 60 dk	2 - 4 st	5 - 8 st	Berrak
ORTA ETKİLİ				
Regüler U500**	30 dk	2 - 4 st	<24 st	Berrak
NPH	1 - 2 st	4 - 10 st	>14 st	Bulanık
UZUN ETKİLİ				
Detemir	3 - 4 st	6 - 8 st (≈Piksiz)	20 - 24 st	Berrak
Glargin U100	90 dk	Piksiz	24 st	Berrak
Biyobenzer İnsülin Glargin U100	90 dk	Piksiz	24 st	Berrak
Glargin U300	90 dk	Piksiz	<36 st	Berrak
Degludec U100 & U200**	30 - 60 dk	Piksiz	<42 st	Berrak
KARIŞIM				
NPH/Reg 70/30	30 dk	2 - 4 st	14 - 24 st	Bulanık
NPA/Asp 70/30	6 - 12 dk	1 - 4 st	18 - 24 st	Bulanık
NPL/Lis 75/25	15 - 30 dk	30 - 150 dk	14 - 24 st	Bulanık
NPL/Lis 50/50, NPA/Asp 50/50	15 - 30 dk	30 - 180 dk	14 - 24 st	Bulanık
NPA/Asp 30/70**	10 - 20 dk	1.6 - 3.2 st	14 - 24 st	Bulanık
Deg/Asp 70/30***	14 - 72 dk	2 - 3 st	>24 st	Berrak

*Etki başlangıcı, pik etki ve etki süresi hastaya özgü nedenlerle değişim gösterebilir. Pik etki ve etki süresi bağımlı olup yüksek dozlarda etki süresi uzar. **Ülkemizde ruhsatlı değildir veya satışa sunulmamaktadır. ***Diğerlerinden farklı olarak etki süresi daha uzundur (uzun etkili karışım) ve kısa/hızlı etkili insülin ile bu insülinin protaminle etkisinin uzatılmış halinin karışımını değil, iki ayrı insülin preparatının karışımını içermektedir (Ko-formülasyon).
NPH: Nötral protamin Hagedorn, Reg: Regüler, NPA: Nötral protamin aspart, Asp: Aspart, NPL: Nötral protamin lispro, Lis: Lispro, Deg: Degludec.

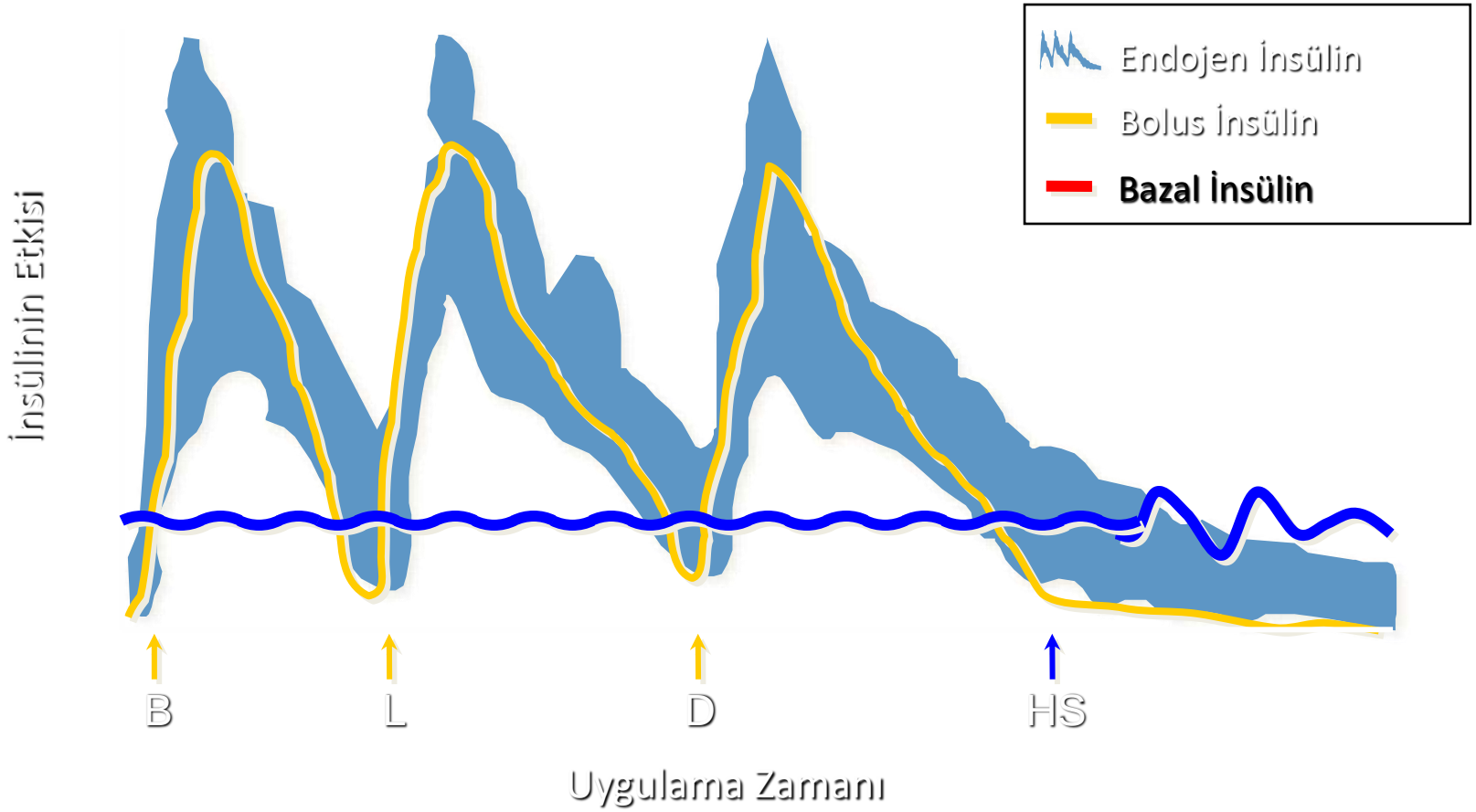
Bazal İnsülin

- Vücudun bazal metabolik insülin gereksinimi karşılar (Hepatik glukoz üretimini baskılar)
- Öğün aralarında ve gece boyunca sürekli salgılanır.
- Öğün aralarında ve gece boyunca glukoz üretimini azaltır.
- Tüm gün boyunca normale yakın glukoz seyrini sağlar

Prandiyal İnsülin

- Besin tüketimine yanıt olarak salgılanır.
- Besin tüketimi sonrası glukoz artışını sınırlar
- Besin alımından hemen sonra artar ve yaklaşık 1 -2 saat sonra zirve yapar

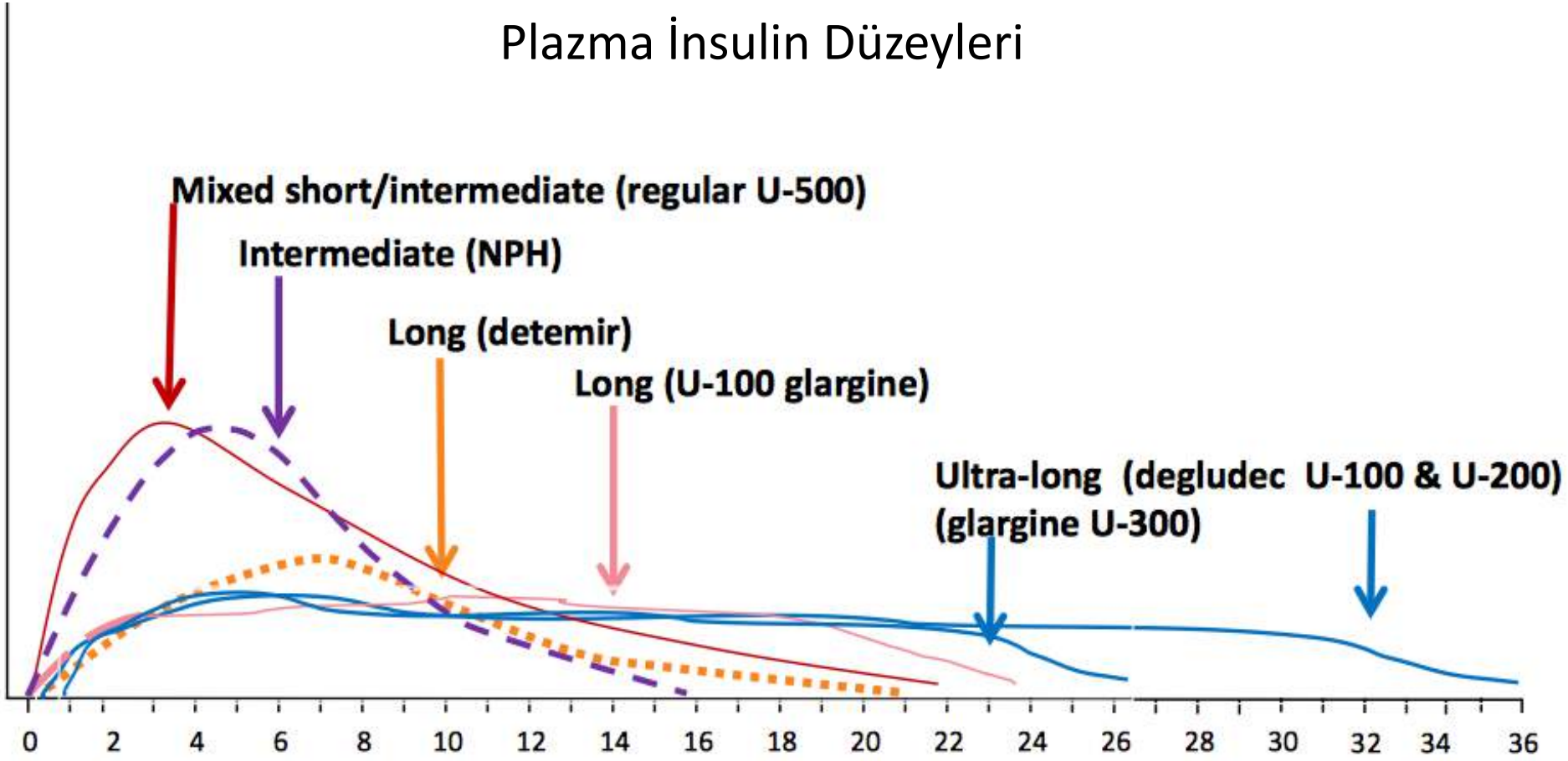
Normal İnsülin Sekresyonu: Bazal-Bolus İnsülin Kavramı



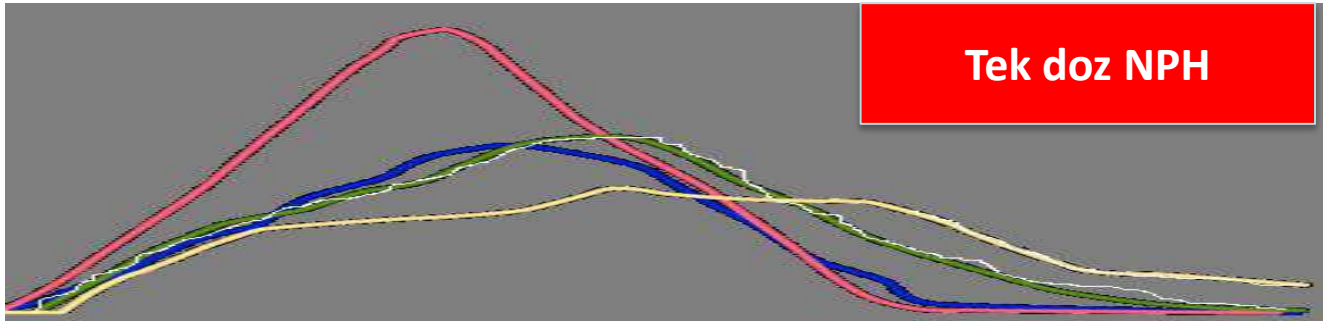
B, kahvaltı; L, öğle yemeği; D, akşam yemeği; HS, yatarken.

Uyarlama:
1. Leahy JL. In: Leahy JL, Cefalu WT, eds. *Insulin Therapy*. New York, NY: Marcel Dekker, Inc.; 2002.
2. Bolli GB et al. *Diabetologia*. 1999;42:1151-1167.

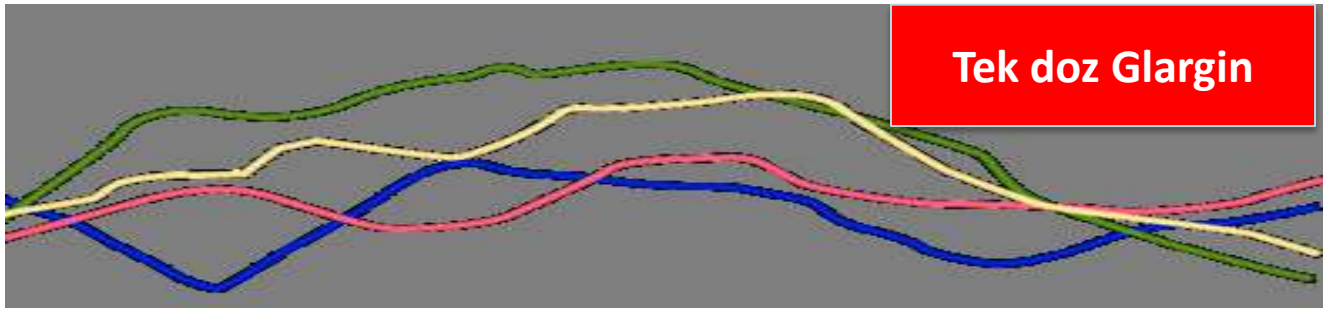
Plazma İnsulin Düzeyleri



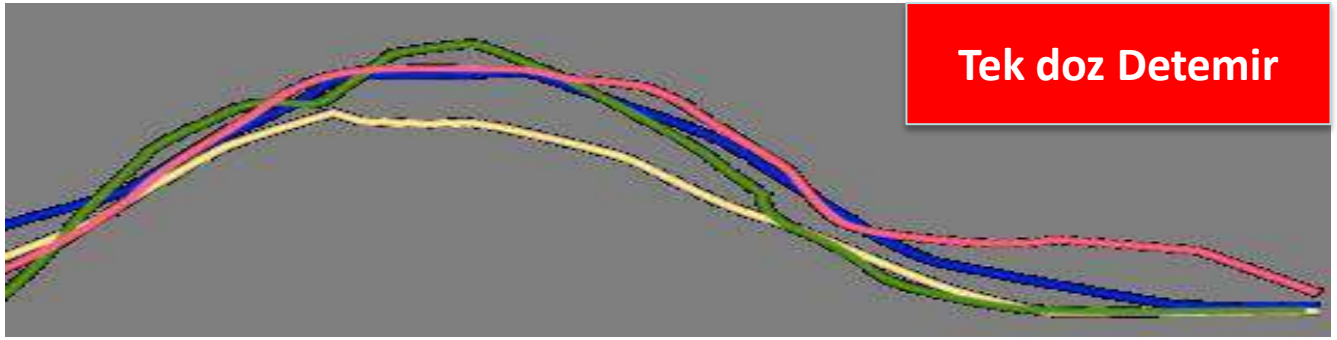
N Engl J Med. 2005; 352:174-83., J Fam Pract. 2007; 56(suppl 1):S1-S12., Diabetes Care. 2015; 38:637-43



Variabilite
% 68



Variabilite
% 48



Variabilite
% 27

0 6 12 18 24

0.4 IU/kg dozunda 4 farklı zamanda enjeksiyon yapılmış hastada Glukoz infüzyon oranları (n: 3)

Diabetes 2003; 52 (Suppl.1) A121
Diabetes 2004; 53: 1614 – 1620

Bazal insülinlerin farmakolojik özellikleri

Etken madde	Form	Görünüm	Etki başlangıç	Etki piki	Etki süresi	Gebelik kategorisi
NPH	Human	Bulanık	1-3 saat	4-6 saat	12-16 saat	B
Detemir	Analog	Berrak	60-90 dakika	6-8 saat	18-20 saat	B
U-100 glarjin	Analog	Berrak	60-90 dakika	8-12 saat Belirgin piki yok	20-24 saat	C
U-300 glarjin	Analog	Berrak	6 saat	12-16 saat	36 saat	C
Degludec insülin	Analog	Berrak	30-90 dakika	Pik yok	42 saat	C

Konsantre veya Düşük Volümlü İnsülinler

- Bazal
  - İnsülin degludec (U-100, U-200)
  - İnsülin glargine (U-300)

Konsantre Glargine (U-300)

- Daha küçük depo alanı
- Emilim hızında azalma
- Nispeten düz ve uzamış PK/PD profili

  Yarı-ömür~23 saat

  Denge durumu 4 gün

  Etki süresi ≤ 36 saat
- Yalnızca kalem ile kullanılıyor

  450 IU/kalem(1.5 mL)

  Maksimum 80 IU /injeksiyon

  Bir kutuda 3 kalem var

Diabetes Obes Metab. 2014;16(6):483-491, Diabetes Metab Res Rev. 2014;30(2):104-119, Diabetes Obes Metab. 2014;16(9):873-876

Glargine U-100’den U-300’e geçiş

- **Günde tek doz U-100 Glargin kullanımında**

  Başlangıç dozu aynı tutulur

- **Günde 2 kez NPH kullanımında**

  Başlangıç dozu % 20 azaltılır

Glargine U-300’den U-100’e geçiş

- Hipoglisemi riskini azaltmak için % 20 azaltılması önerilir

Bazal İnsülinler

- Etki süresi: Glargin > Detemir
- Zirve etki: Glargin < Detemir, NPH
- Varyabilite :Detemir < Glargin

  Deglutec < Glargin
- Hipoglisemi : U-300 Glargin < U-100

N Engl J Med. 2017 Aug 24;377(8):723-732, Diabetes Obes Metab. 2017 Sep 1, Diabetes Obes Metab. 2017 Jul;19(7):1032-1039, JAMA. 2017;318(1):45-56

Human Regüler İnsülin

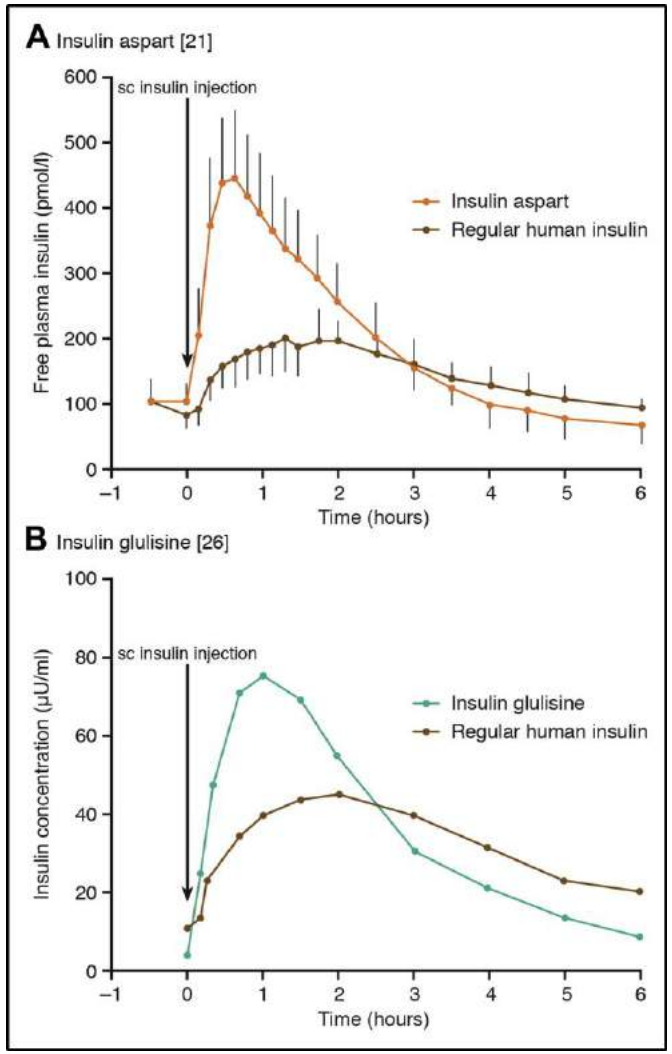
Temel Bilgi

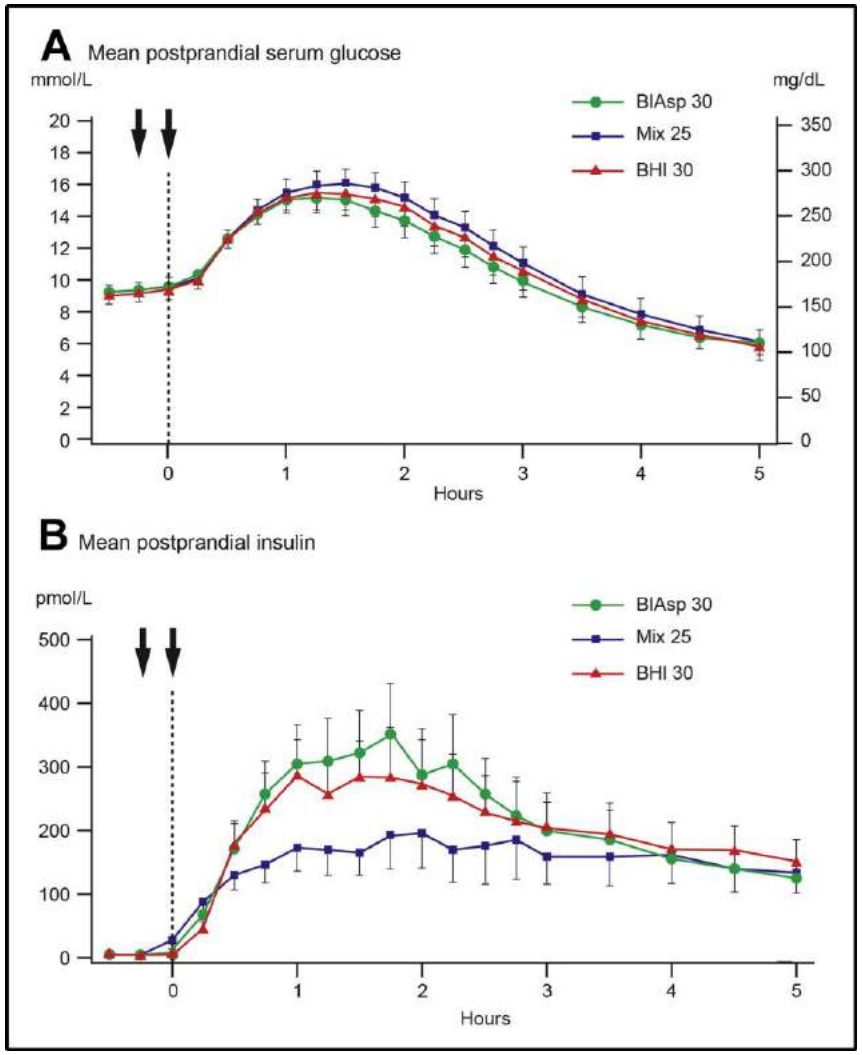
- Etki yavaş başlar
- Öğünlerden 20-40 dakika önce verilmeli
- Geç postprandiyal hipoglisemi riski
- Öğün gecikirse hipoglisemi riski her zaman var
- Etki süresi fazla (10 saat)
- Yüksek dozlarda etki süresi daha da artar

Kısa etkili analog insülin

Temel Bilgi

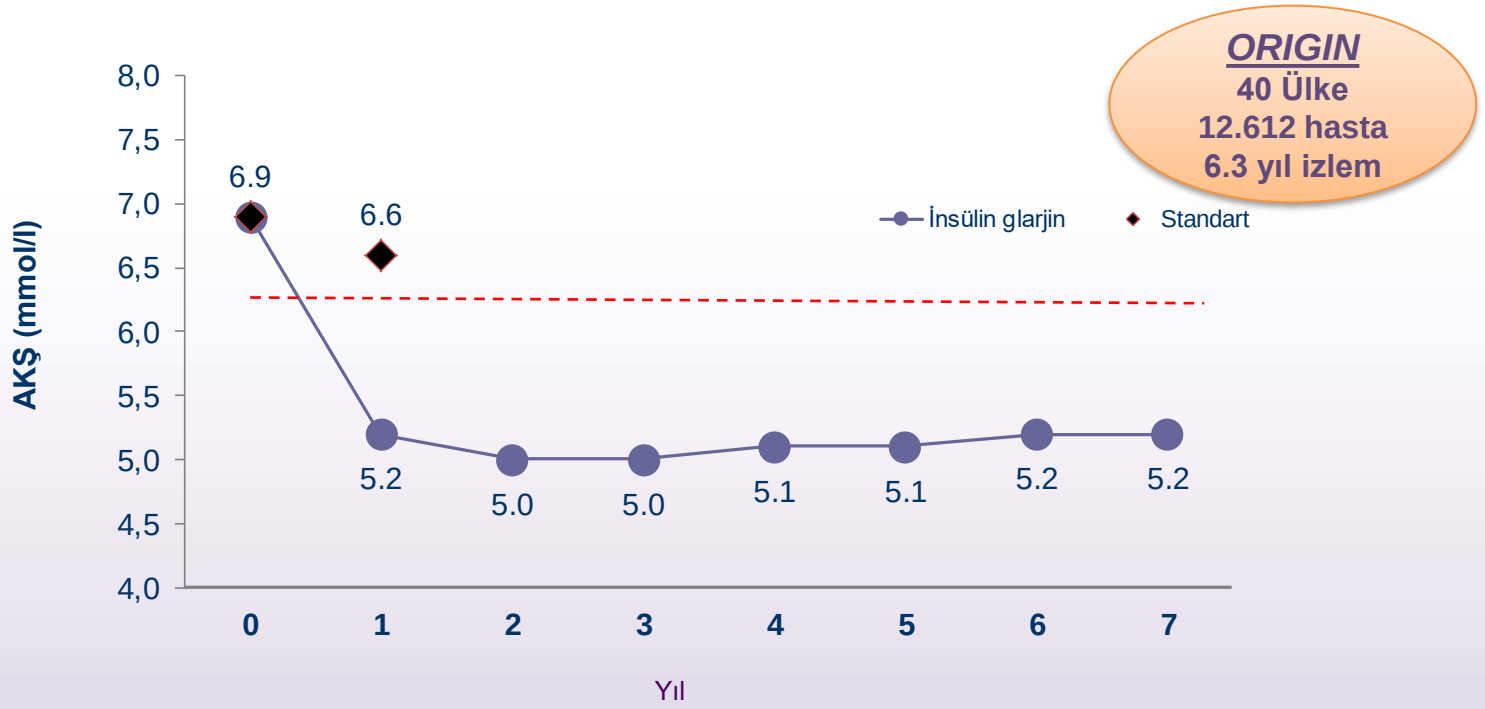
- Uygulama zamanı açısından esneklik
- Öğünden sonra da uygulanabilmesi, beklenmedik planlama dışı besin alımına karşı esneklik sağlar
- Tedavi uyumu daha kolay





ORIGIN : Glarjin ile 7 yıla kadar sürdülebilir glisemik kontrol

Glarjin kullanan diyabetliler 1'inci yıldan itibaren hedef AKŞ' ne ulaşmışlardır (<95 mg/dl)



İnsülin glarjin hastalarının 1/3'ünde ilave antidiyabetik tedavi gerekmemiştir.

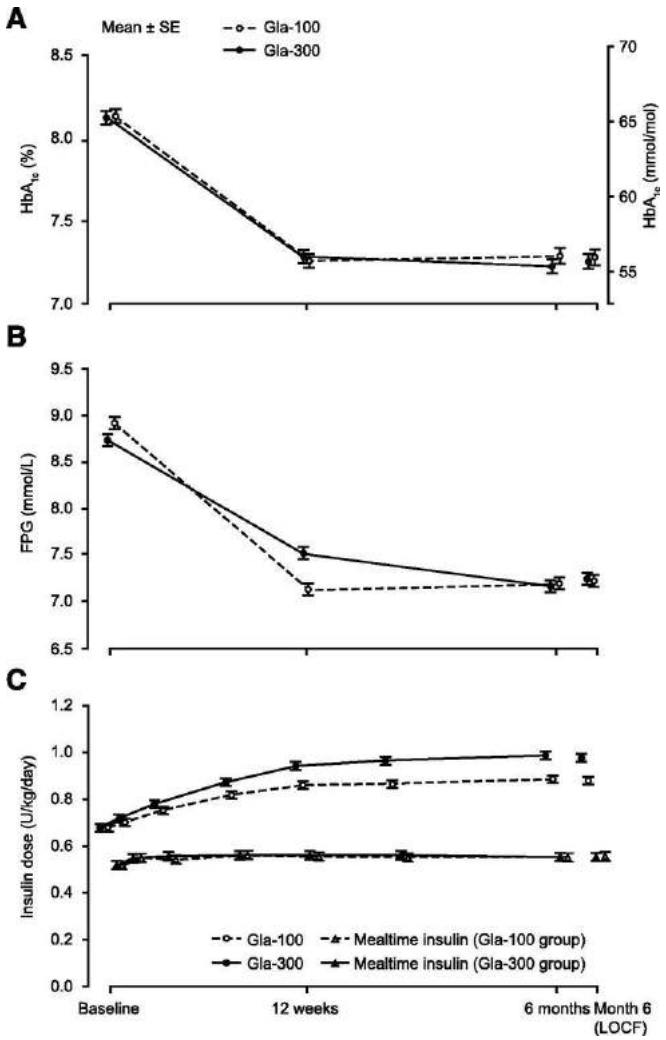
Gerstein HC. et al. Am Heart J 2008;155:26-32.

New Insulin Glargine 300 Units/mL Versus Glargine 100 Units/mL in People With Type 2 Diabetes Using Basal and Mealtime Insulin: Glucose Control and Hypoglycemia in a 6-Month Randomized Controlled Trial (EDITION 1)

Matthew C. Riddle,[1] Geremia B. Bolli,[2] Monika Ziemen,[3] Isabel Muehlen-Bartmer,[3] Florence Bizet,[4] and Philip D. Home,[5] on behalf of the EDITION 1 Study Investigators

Diabetes Care 2014;37:2755–2762 | DOI: 10.2337/dc14-0991

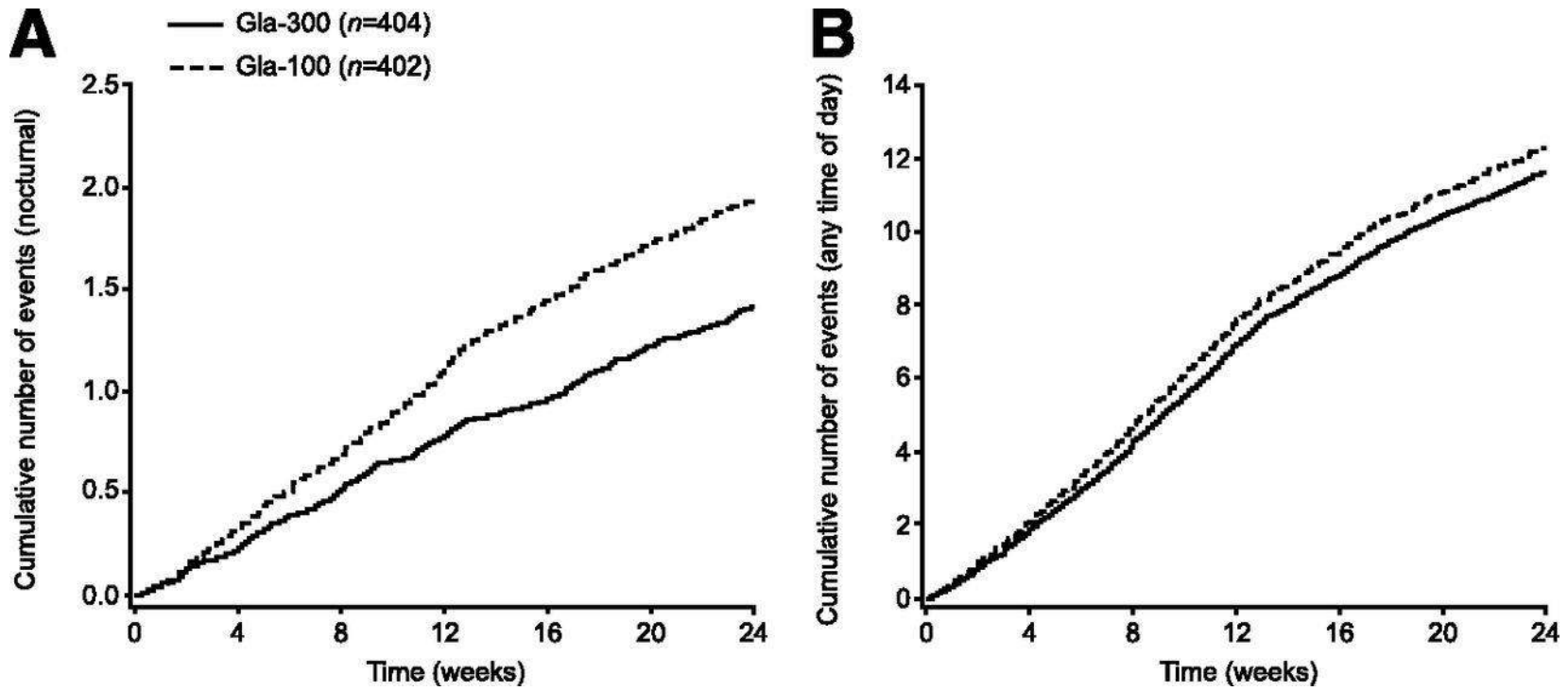
Clinical measures during treatment in the mITT population by visit and with last observation carried forward (LOCF).



Matthew C. Riddle et al. Dia Care 2014;37:2755-2762

American Diabetes Association.

Cumulative mean numbers of confirmed (plasma glucose ≤3.9 mmol/L [70 mg/dL]) or severe hypoglycemic events per participant during the main 6-month treatment period in the safety population.



Matthew C. Riddle et al. Dia Care 2014;37:2755-2762

American Diabetes Association.

Ann Med Res 2020;27(7):1961-5

Annals of Medical Research

DOI: 10.5455/annalsmedres.2020.04.363

Original Article

Retrospective evaluation of insulin degludec/insulin aspart co-formulation therapy in patients with type 2 Diabetes Mellitus: A single-center experience

Ozlem Haliloglu[1], Merve Korkmaz[2], Ozge Polat Korkmaz[1], Serdar Sahin[1], Emre Durcan[1], Zeynep Osar Siva[1]

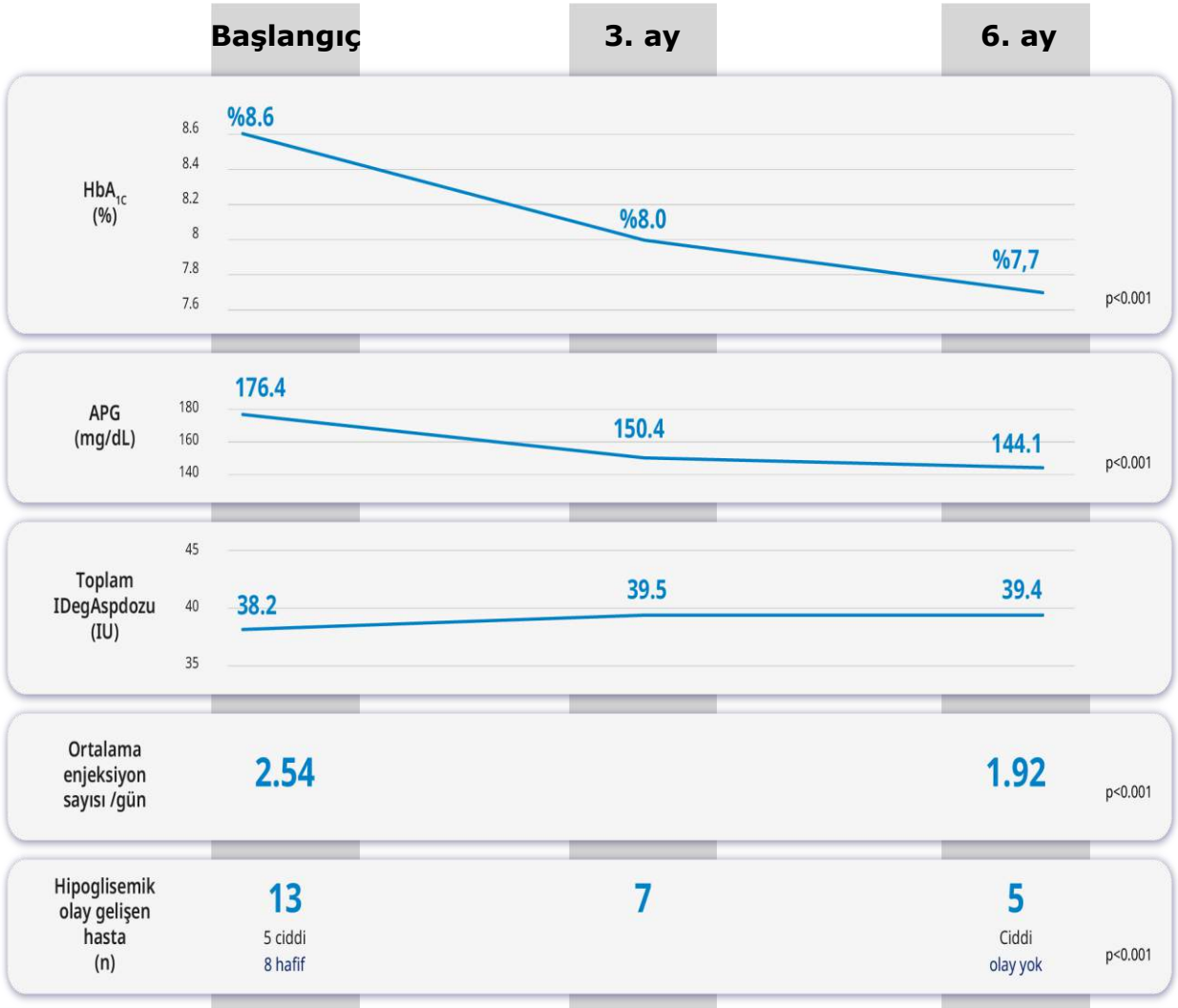
[1]Department of Internal Medicine, Division of Endocrinology-Metabolism and Diabetes, Cerrahpasa Medical Faculty, Istanbul University-Cerrahpasa, Istanbul, Turkey
[2]Department of Internal Medicine, Cerrahpasa Medical Faculty, Istanbul University-Cerrahpasa, Istanbul, Turkey

Başlangıç özellikleri

- N=66; Kadın/erkek: 34/32
- Ortalama yaş: 57.8 (± 11,6) yıl
- Tedavi değişikliği nedeni:
  - Düşük tedavi uyumu ve kontrolsüz hiperglisemi: %80.3
  - Sık hipoglisemik atak: %19.7
- İnsülin dışındaki antidiyabetik tedavi sürdürüldü.
- IDegAsp olguların %53'ünde bir doz, %47'sinde iki doz başlandı.

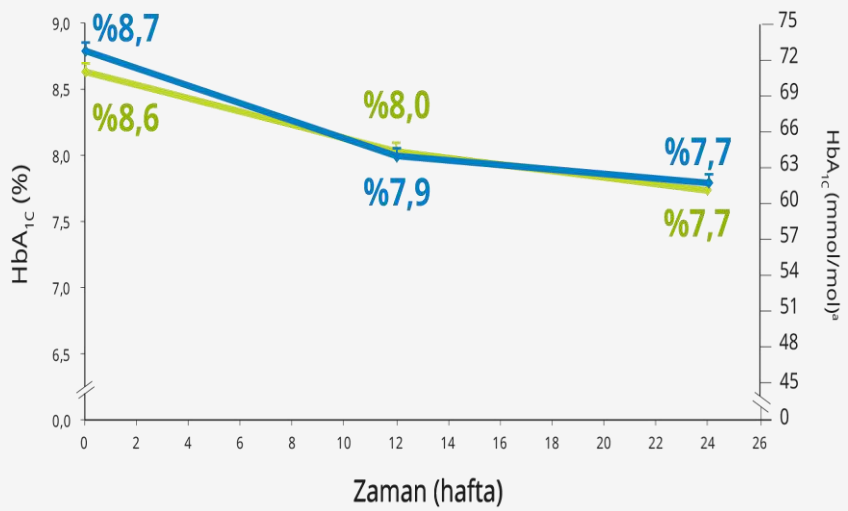
Retrospective evaluation of insulin degludec/insulin aspart co-formulation therapy in patients with type 2 Diabetes Mellitus: A single-center experience

Tüm hastalarda başlangıç, 3 ve 6. ay sonuçları



HbA_{1C} değişimi: Tek doz ve iki doz kullanımı

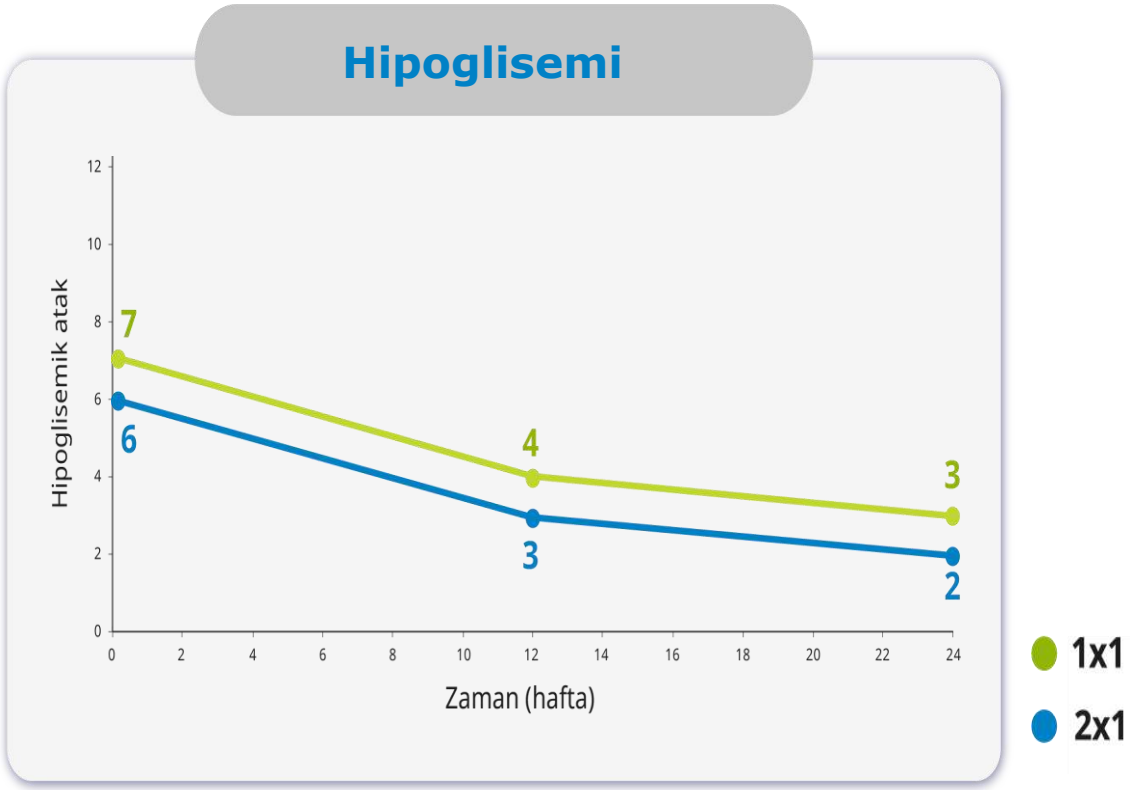
HbA_{1C}



1x1

2x1

Hipoglisemik olay sayısı



The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 NOVEMBER 26, 2020 VOL. 383 NO. 22

Once-Weekly Insulin for Type 2 Diabetes without Previous Insulin Treatment

Julio Rosenstock, M.D., Harpreet S. Bajaj, M.D., M.P.H., Andrej Janež, M.D., Ph.D., Robert Silver, M.D., Kamilla Begtrup, M.Sc., Melissa V. Hansen, M.D., Ph.D., Ting Jia, M.D., Ph.D., and Ronald Goldenberg, M.D., for the NN1436-4383 Investigators*

Contribution of Liraglutide in the Fixed-Ratio Combination of Insulin Degludec and Liraglutide (IDegLira)

John B. Buse,[1] Tina Vilsbøll,[2] Jerry Thurman,[3] Thomas C. Blevins,[4] Irene H. Langbakke,[5] Susanne G. Bøttcher,[5] and Helena W. Rodbard,[6] on behalf of the NN9068-3912 (DUAL-II) Trial Investigators

Diabetes Care 2014;37:2926–2933 | DOI: 10.2337/dc14-0785

RESEARCH DESIGN AND METHODS

In a 26-week, double-blind trial, patients with type 2 diabetes (A1C 7.5–10.0% [58–86 mmol/mol]) on basal insulin (20–40 units) and metformin with or without sulfonylurea/glinides were randomized (1:1) to once-daily IDegLira + metformin or IDeg + metformin with titration aiming for fasting plasma glucose between 4 and 5 mmol/L. Maximum allowed doses were 50 dose steps (equal to 50 units IDeg plus 1.8 mg liraglutide) and 50 units for IDeg. The primary end point was change in A1C from baseline.

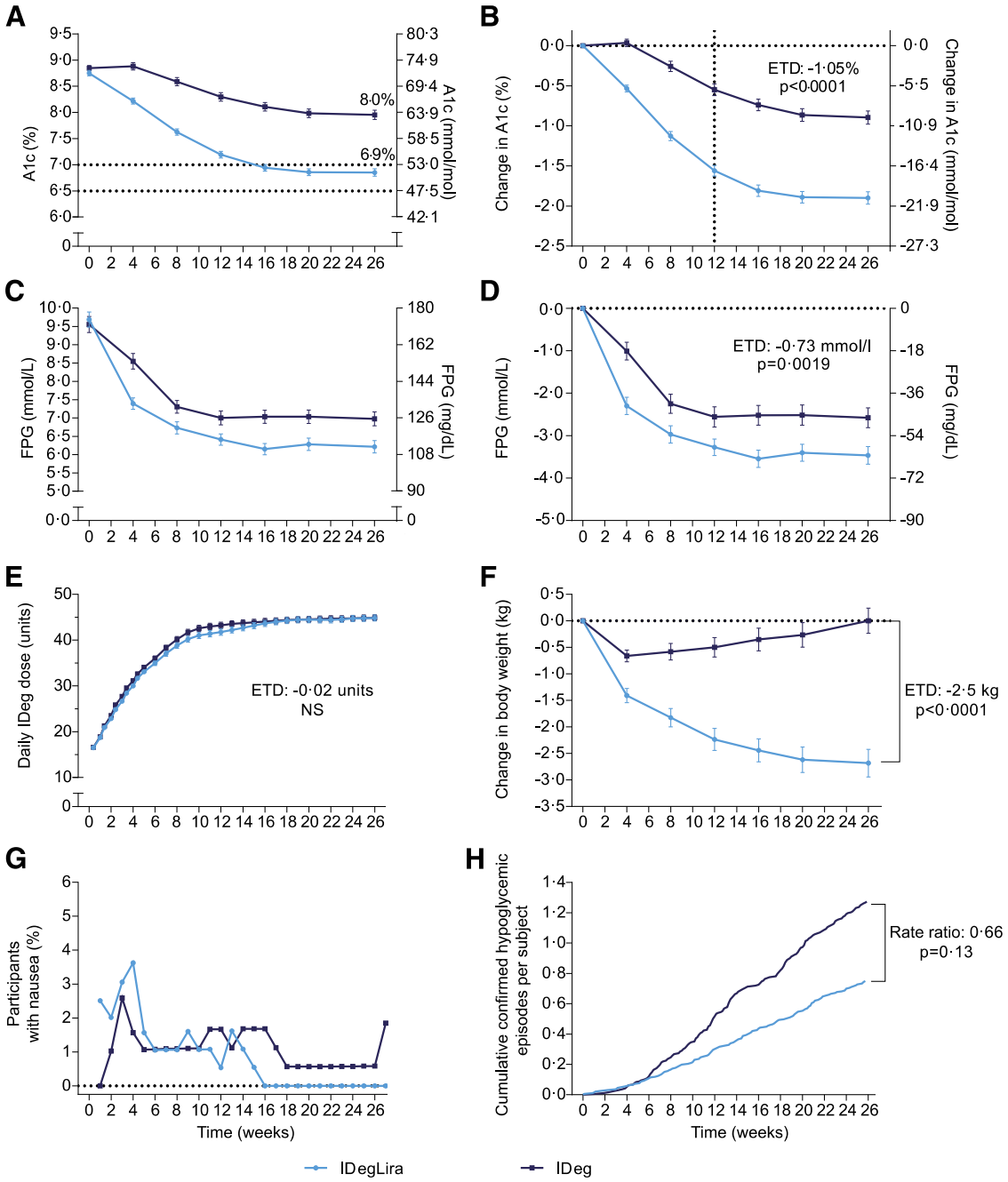
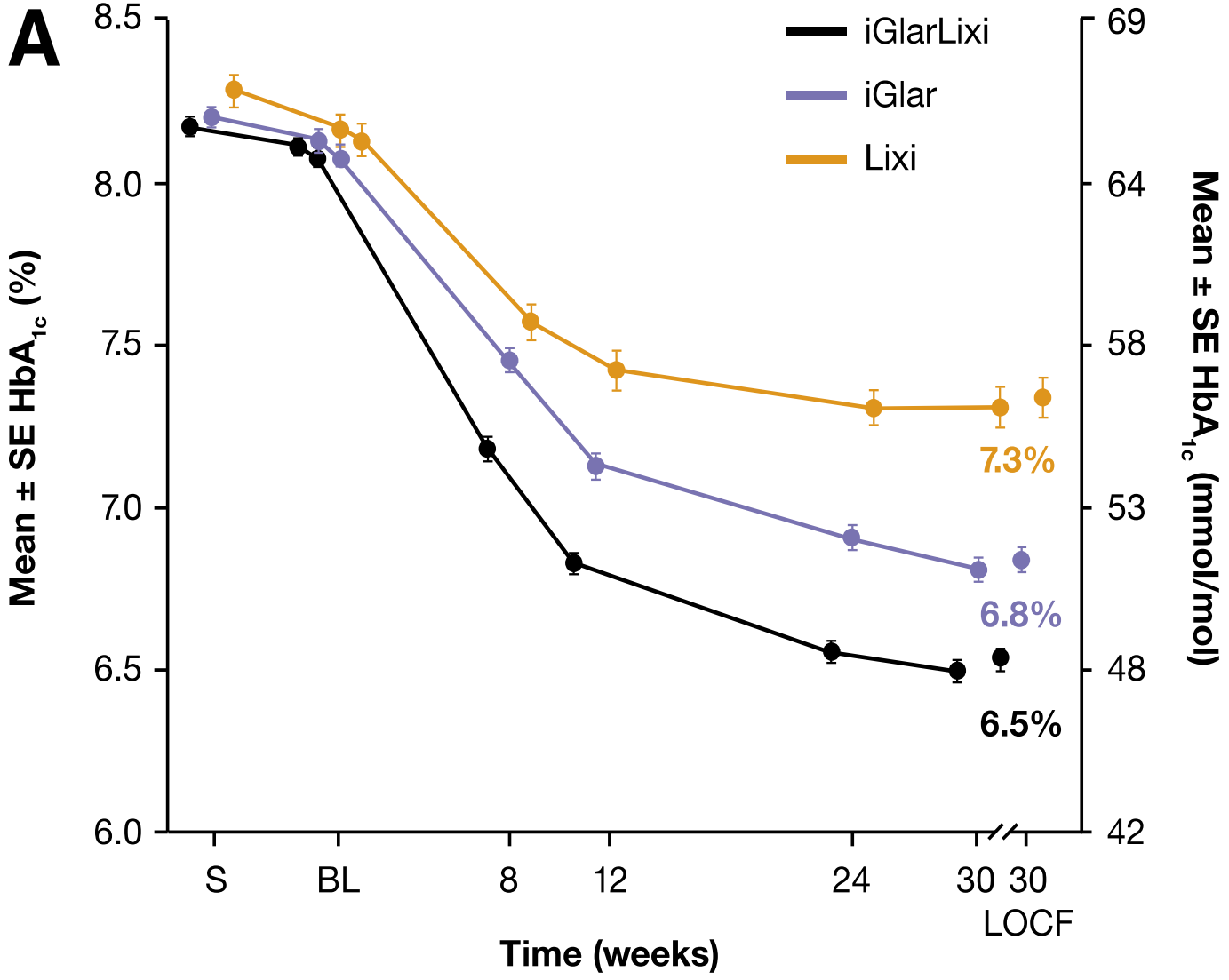


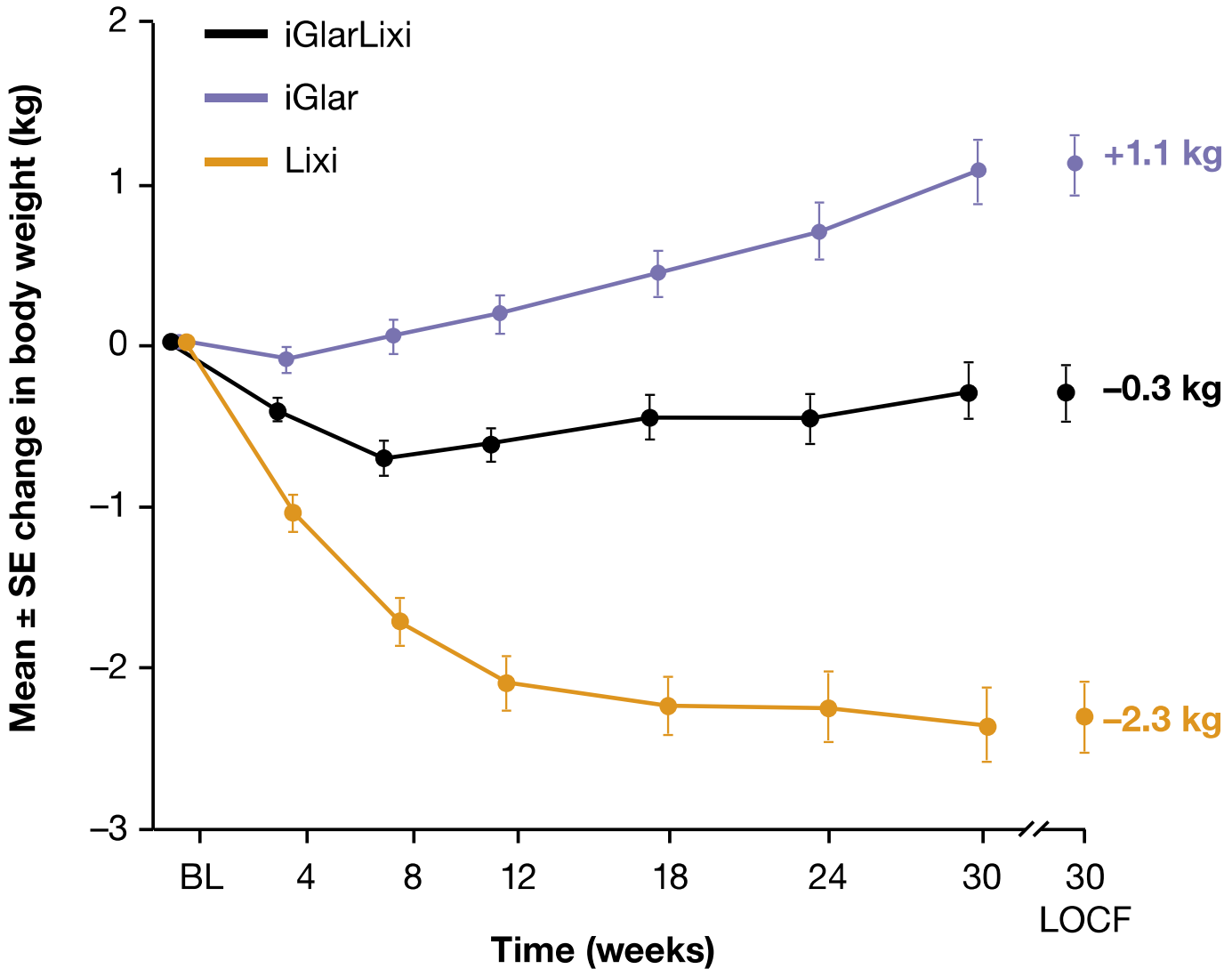
Figure 1—Glycemic efficacy, insulin dose, body weight, and AEs. Data are means (SE). *A*: A1C. *B*: Change in A1C. *C*: FPG. *D*: Change in FPG. *E*: Daily dose of IDeg alone or as part of IDegLira. *F*: Change in body weight. *G*: Proportion of subjects with nausea. *H*: Overall confirmed hypoglycemic episodes.

Benefits of LixiLan, a Titratable Fixed-Ratio Combination of Insulin Glargine Plus Lixisenatide, Versus Insulin Glargine and Lixisenatide Monocomponents in Type 2 Diabetes Inadequately Controlled With Oral Agents: The LixiLan-O Randomized Trial

DOI: 10.2337/dc16-0917

Julio Rosenstock,[1] Ronnie Aronson,[2]
George Grunberger,[3] Markolf Hanefeld,[4]
PierMarco Piatti,[5] Pierre Serusclat,[6]
Xi Cheng,[7] Tianyue Zhou,[8]
Elisabeth Niemoeller,[9]
Elisabeth Souhami,[10] and
Melanie Davies,[11] on behalf of the
*LixiLan-O Trial Investigators**


A
iGlarLixi
iGlar
Lixi
8.5
8.0
7.5
7.0
6.5
6.0
69
64
58
53
48
42
Mean ± SE HbA1c (%)
Mean ± SE HbA1c (mmol/mol)
7.3%
6.8%
6.5%
S
BL
8
12
24
30
30
LOCF
Time (weeks)


iGlarLixi
iGlar
Lixi
+1.1 kg
–0.3 kg
–2.3 kg
Mean ± SE change in body weight (kg)
2
1
0
–1
–2
–3
BL
4
8
12
18
24
30
30
LOCF
Time (weeks)

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Once-Weekly Insulin for Type 2 Diabetes without Previous Insulin Treatment

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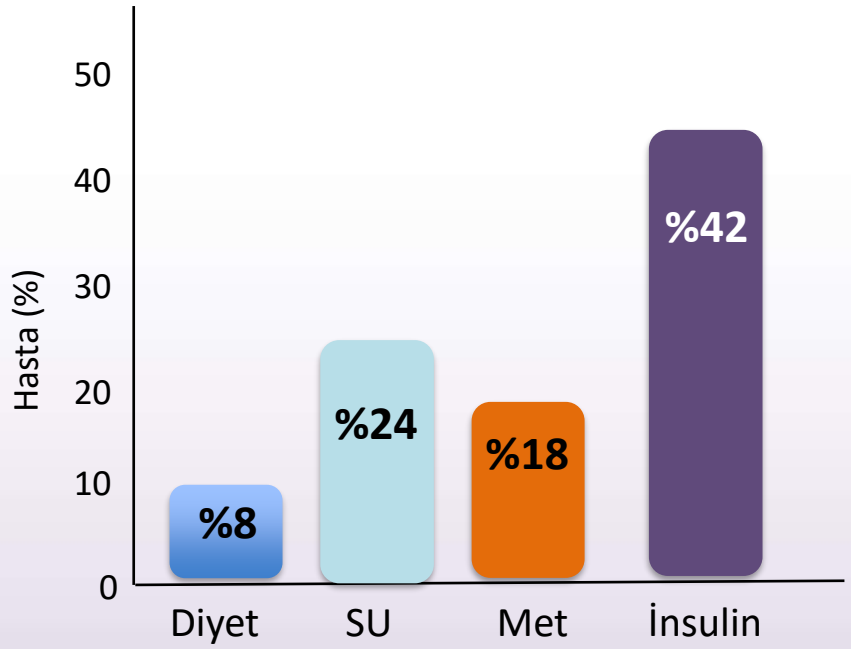
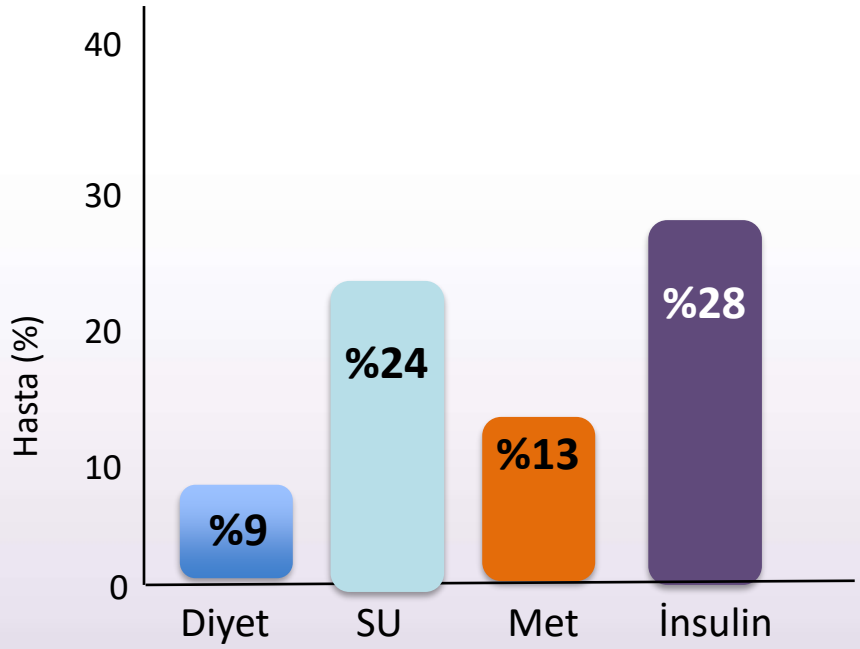
UKPDS 46: Tip 2 Diyabette Oral Monoterapi Başarı Oranları

AKŞ < 140 mg/dl ulaşma oranları



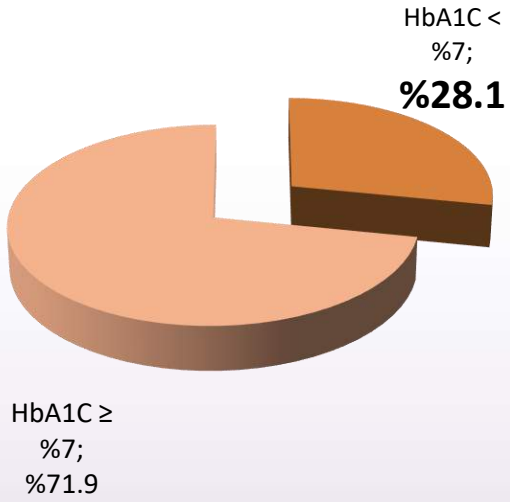
HbA_{1c} < % 7 ulaşma oranları

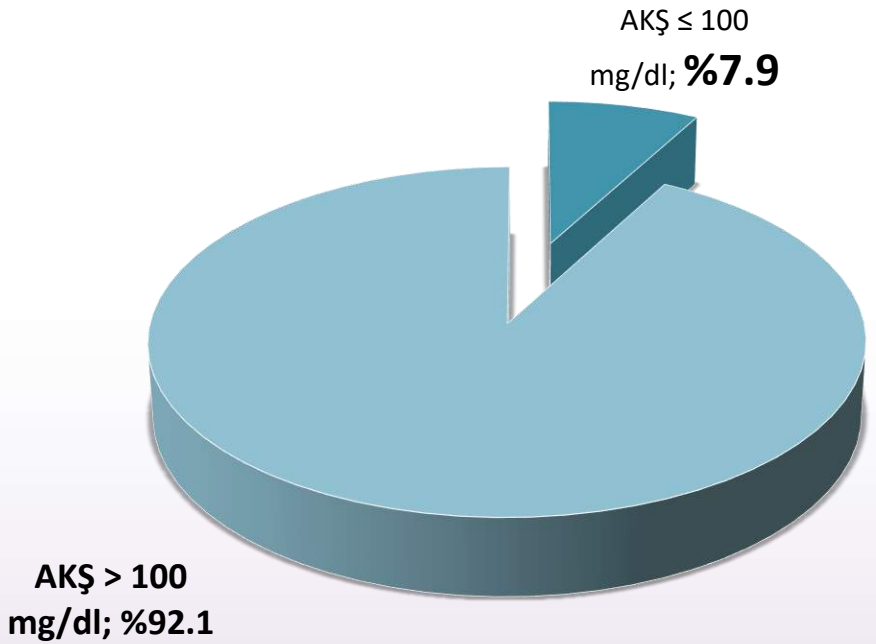


UKPDS 49: 4075 yeni T2DM tanısı alan hastanın katıldığı randomize kontrollü çalışma. Hastalar 25-65 yaş aralığında, başlangış AKŞ 11.5 mmol/l. HbA1C % 9.1.,VKI 29 kg/m^2. 3 .ay, 3.yıl,6. yıl ve 9. yıl değerlendirilmiş.

Cavalot F et al JCEM 2006; 91:813

Tip 2 DM Hastalarda Hedefe Ulaşma Durumu





Son ölçülen ortalama HbA1c: %8.57 (±2.19)

Son ölçülen ortalama AKŞ: 182.54 (±78.91)

H.İlkova IDMPS 5.yıl sonuçları 2013

Adv Ther
https://doi.org/10.1007/s12325-021-01736-4

ORIGINAL RESEARCH

One in Seven Insulin-Treated Patients in Developing Countries Reported Poor Persistence with Insulin Therapy: Real World Evidence from the Cross-Sectional International Diabetes Management Practices Study (IDMPS)

Juliana C. N. Chan · Juan José Gagliardino · Hasan Ilkova · Fernando Lavalle · Ambady Ramachandran · Jean Claude Mbanya · Marina Shestakova · Cecile Dessapt-Baradez · Jean-Marc Chantelot · Pablo Aschner

Received: February 2, 2021 / Accepted: March 30, 2021

One in Seven Insulin-Treated Patients in Developing Countries Reported Poor Persistence With Insulin Therapy: Real World Evidence From the Cross-Sectional International Diabetes Management Practices Study (IDMPS)

Juliana CN Chan, Juan José Gagliardino, Hasan Ilkova, Fernando Lavalle, Ambady Ramachandran, Jean Claude Mbanya, Marina Shestakova, Cecile Dessapt-Baradez, Jean-Marc Chantelot, Pablo Aschner

OPEN ACCESS

Background

For insulin-treated patients with diabetes, lack of persistence with insulin therapy may cause more severe hyperglycaemia than treatment with suboptimal adherence to dosage or frequency

Aim

Using data from Wave 7 of the IDMPS, we assessed persistence* with insulin therapy and reasons for poor persistence in patients with T1D or T2D in LMICs

METHODS

IDMPS is an ongoing, non-interventional real-world study of clinical profiles and practices amongst patients receiving out-patient care in LMICs capturing 8 waves of data collection (2005–2020)

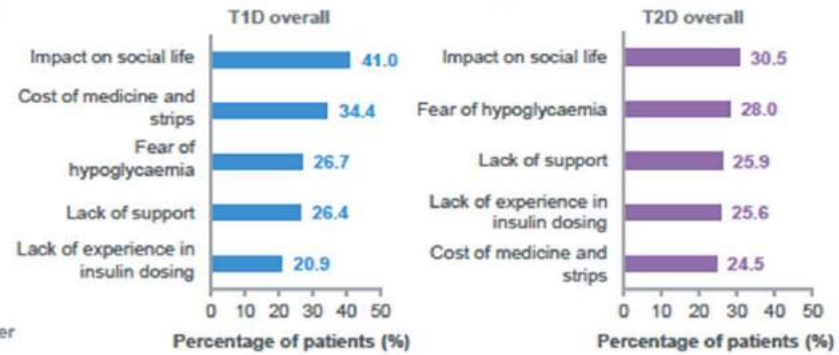
Wave 7 (2016–2017):

24	2000	2596	620
Countries	Insulin-treated T1D	Insulin-treated T2D	HCPs

RESULTS

- Non-persistence was reported by 14.0% of T1D and 13.7% of T2D patients
- Median total discontinuation of insulin therapy: 1–2 months
- Poor persistence in people with T1D and T2D was associated with:
  - age <40 years
  - recent diagnosis (T1D: ≤1 year; T2D: >1–≤5 years)
  - low level of education
  - non-possession of a blood glucose meter

Main reasons for discontinuing insulin therapy:



Conclusions

Poor persistence with insulin is common amongst insulin-treated patients with diabetes in developing countries, supporting calls for urgent action to ensure easy access to insulin, tools for SMBG and education.

Footnotes

*Persistence recorded as a 'yes'/'no' response to the following question: "Has the patient ever discontinued insulin therapy in the past?"

Abbreviations

HCP, healthcare professional; LMIC, low- to middle-income-country; IDMPS, International Diabetes Management Practices Study; SMBG, self-monitoring of blood glucose; T1D, type 1 diabetes; T2D, type 2 diabetes

Table 3 Mean HbA_{1c} and glycaemic control according to status of insulin persistence

	T1D (n = 2000)[a]		T2D[b] (n = 2596)[a]	
	Poor persistence with insulin (n = 273)	Persistent with insulin (n = 1682)	Poor persistence with insulin (n = 347)	Persistent with insulin (n = 2190)
Value of last HbA_{1c} measurement, mean (SD)				
n	230	1582	317	1998
mmol/mol	76.7 (23.5)	66.9 (19.8)	78.5 (24.6)	69.8 (20.5)
%	9.17 (2.15)	8.27 (1.81)	9.33 (2.25)	8.54 (1.88)
Glycaemic control, n (%)				
HbA_{1c} < 53 mmol/mol (< 7%)	34 (14.8)	366 (23.1)	37 (11.7)	330 (16.5)
HbA_{1c} 53–≤ 64 mmol/mol (7–≤ 8%)	44 (19.1)	464 (29.3)	67 (21.1)	642 (32.1)
HbA_{1c} 64–≤ 75 mmol/mol (8–≤ 9%)	46 (20.0)	331 (20.9)	66 (20.8)	401 (20.1)
HbA_{1c} > 75 mmol/mol (> 9%)	106 (46.1)	421 (26.6)	147 (46.4)	625 (31.3)

OGLD oral glucose lowering drugs; *SD* standard deviation; *T1D* type 1 diabetes; *T2D* type 2 diabetes

[a] Data on adherence status were missing for 45 patients with T1D and 59 patients with T2D (data not shown). [b]Results for patients with T2D are shown for the overall insulin-treated population (insulin only and insulin plus OGLD groups combined)

Diabetologia (2020) 63:711–721
https://doi.org/10.1007/s00125-019-05078-3

ARTICLE

Persistent poor glycaemic control in individuals with type 2 diabetes in developing countries: 12 years of real-world evidence of the International Diabetes Management Practices Study (IDMPS)

Pablo Aschner[1] · Juan J. Gagliardino[2] · Hasan Ilkova[3] · Fernando Lavalle[4] · Ambady Ramachandran[5] · Jean Claude Mbanya[6,7] · Marina Shestakova[8] · Jean-Marc Chantelot[9] · Juliana C. N. Chan[10]

Research in context

What is already known about this subject?

- In developed countries, there are declining trends in diabetes-related complications
- Structured education programmes and system change to improve self-management, early intervention and physician–patient communication can improve glycaemic control in individuals with type 2 diabetes
- Real-world data on glycaemic control and diabetes management practices in developing countries are limited

What is the key question?

- Has glycaemic control in individuals with type 2 diabetes improved from 2005 to 2017 in developing countries?

What are the new findings?

- During this 12 year period, use of sulfonylureas declined and few participants used newer glucose-lowering medications. Although the use of insulin increased, glycaemic control has deteriorated with <50% of participants achieving HbA_{1c} <53 mmol/mol (<7%) during any wave
- Increases were observed in monitoring of HbA_{1c} by physicians and in possession of blood glucose meters by patients
- More patients received diabetes education over time from their physicians, but few attended structured education programmes

How might this impact on clinical practice in the foreseeable future?

- System change is needed to improve access to structured education, self-monitoring tools and appropriate medications to facilitate self-management of diabetes and enable care providers to intensify treatment early and effectively

International Diabetes Management Practices Study

Ongoing global, cross-sectional observational survey describing patient profiles, disease management, and patterns of care in patients with diabetes across time in 49 developing countries.

Wave 1 2005	Wave 2 2006	Wave 3 2008	Wave 4 2010	Wave 5 2011-12	Wave 6 2013-14	Wave 7 2016-17
11,763	20,739	14,547	6,301	12,392	7,122	8,303
Understanding control	Health resource use	Barriers to insulin	Exploring hypoglycaemia	Health resource use Depression	Self-management	Adherence to insulin
1,845 Type 1	3,507 Type 1	2,337 Type 1	958 Type 1	2,789 Type 1	1,643 Type 1	2,000 Type 1
9,918 Type 2	17,232 Type 2	12,210 Type 2	5,343 Type 2	9,603 Type 2	5,479 Type 2	6,303 Type 2
937 HCPs	1538 HCPs	1083 HCPs	480 HCPs	879 HCPs	537 HCPs	620 HCPs
17 Countries	27 Countries	18 Countries	9 Countries	21 Countries	22 Countries	24 Countries

81,000

6,000 HCPS

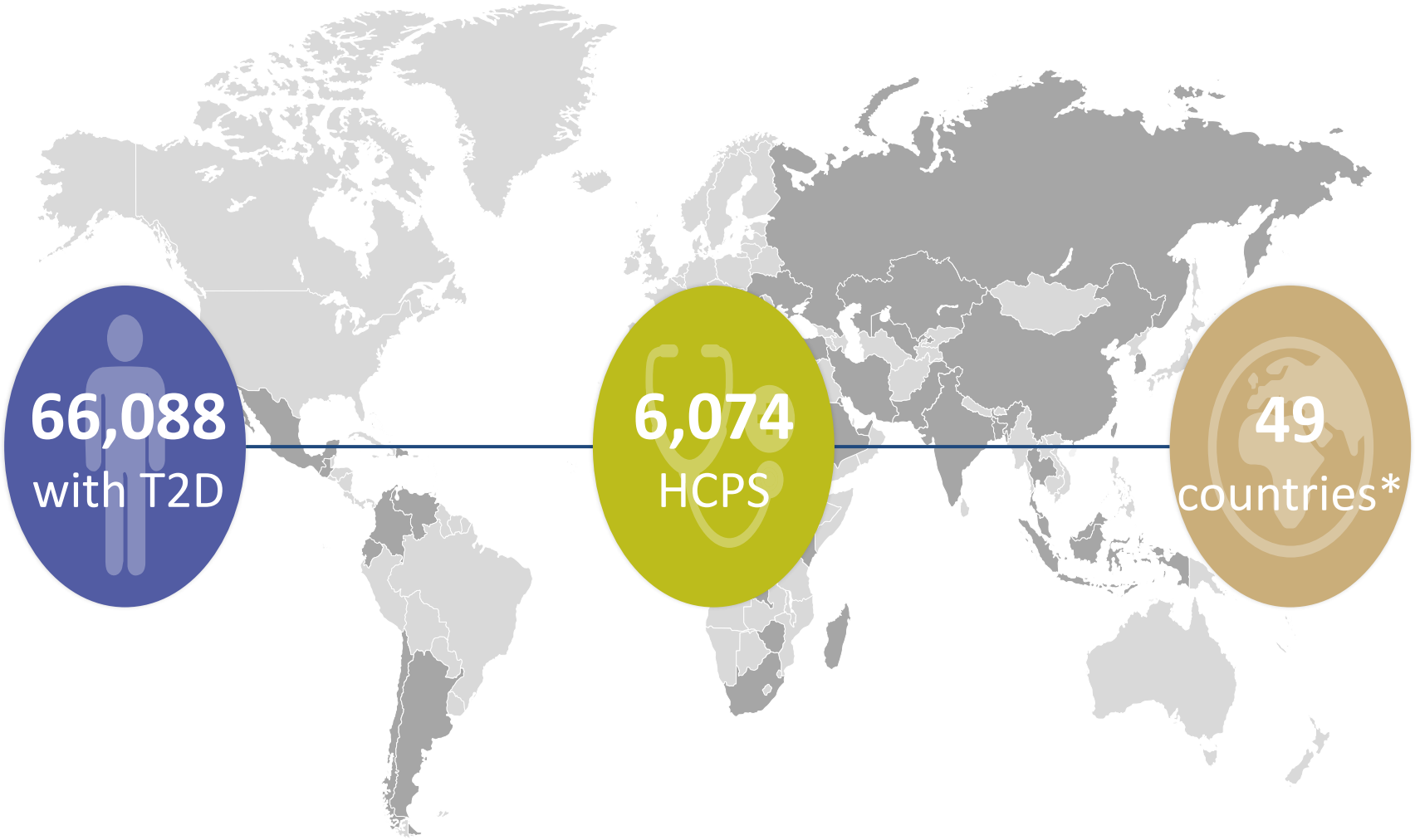
49 countries

Core topic: diabetes education

Core topic: management of care

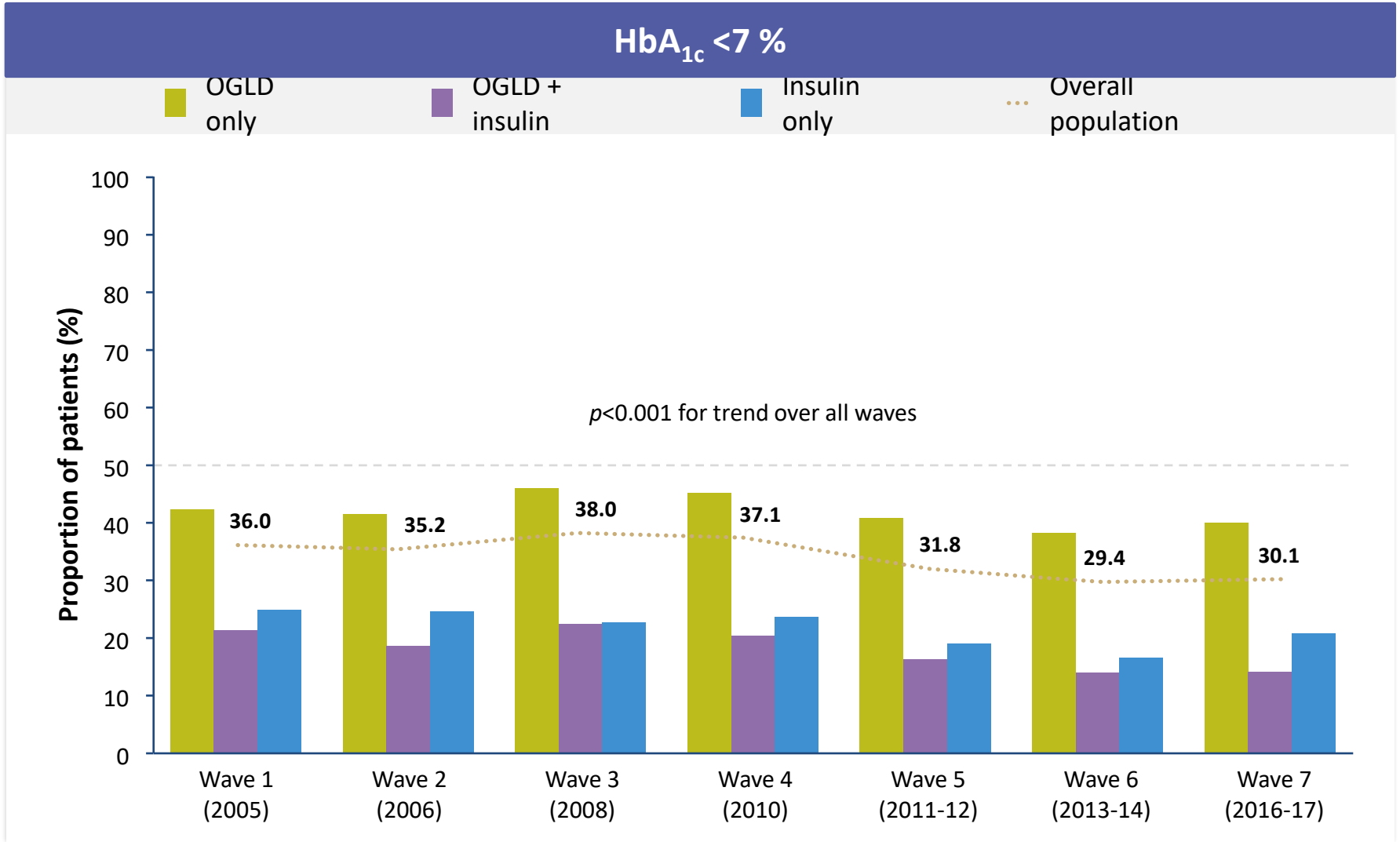
HCP, healthcare professional

12 years of data across seven waves



*Algeria, Argentina, Azerbaijan, Bangladesh, Bosnia and Herzegovina, Bulgaria, Cameroon, Chile, China, Colombia, Democratic Republic of Congo, Dominican Republic, Ecuador, Egypt, Georgia, Guatemala, Hong Kong, India, Indonesia, Iran, Iraq, Ivory Coast, Jordan, Kazakhstan, Kenya, Korea, Kuwait, Lebanon, Madagascar, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Panama, Romania, Russia, Kingdom of Saudi Arabia, Senegal, South Africa,

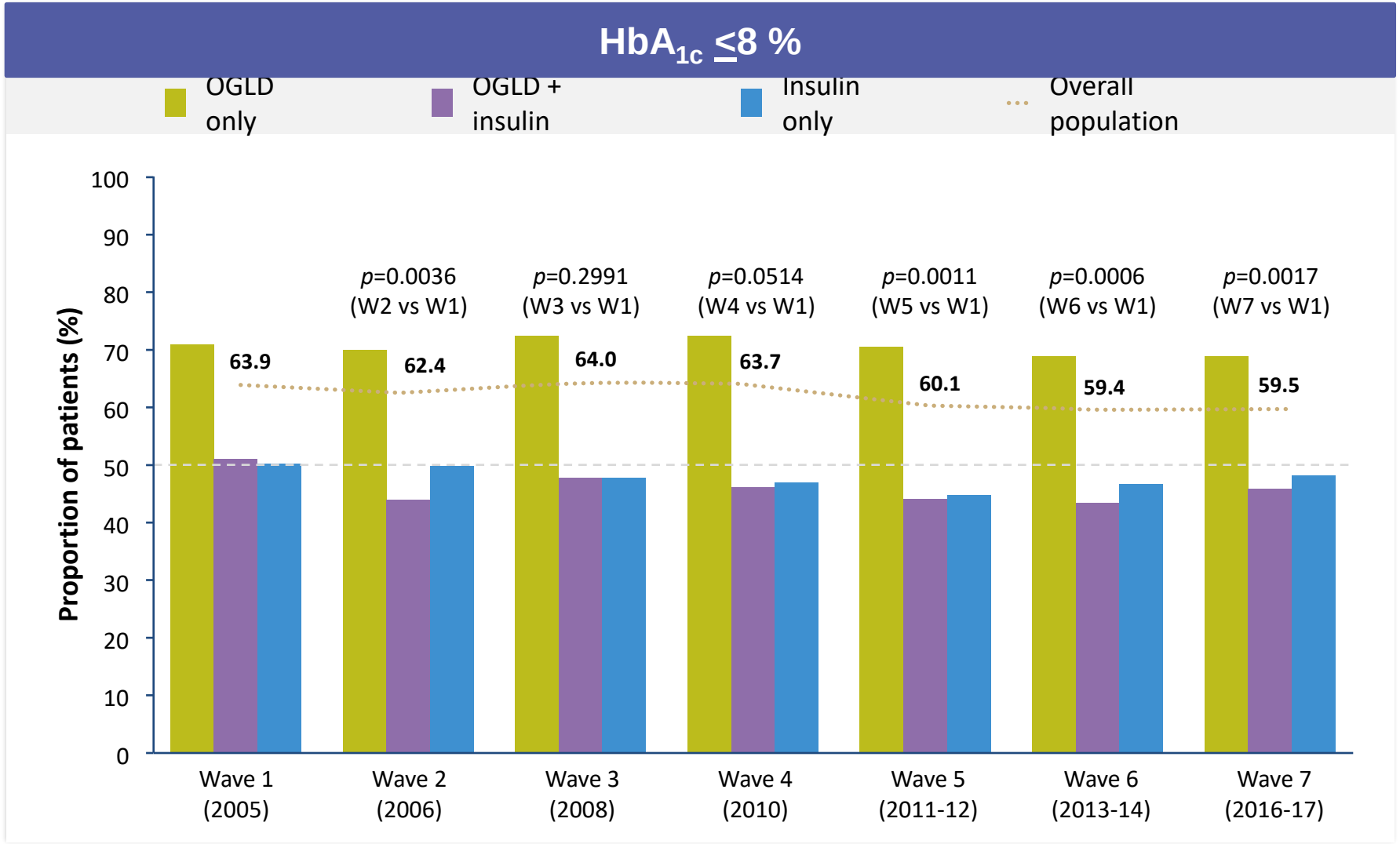
HbA_{1c} target achievement (HbA_{1c} <7 %) remained suboptimal and decreased over time



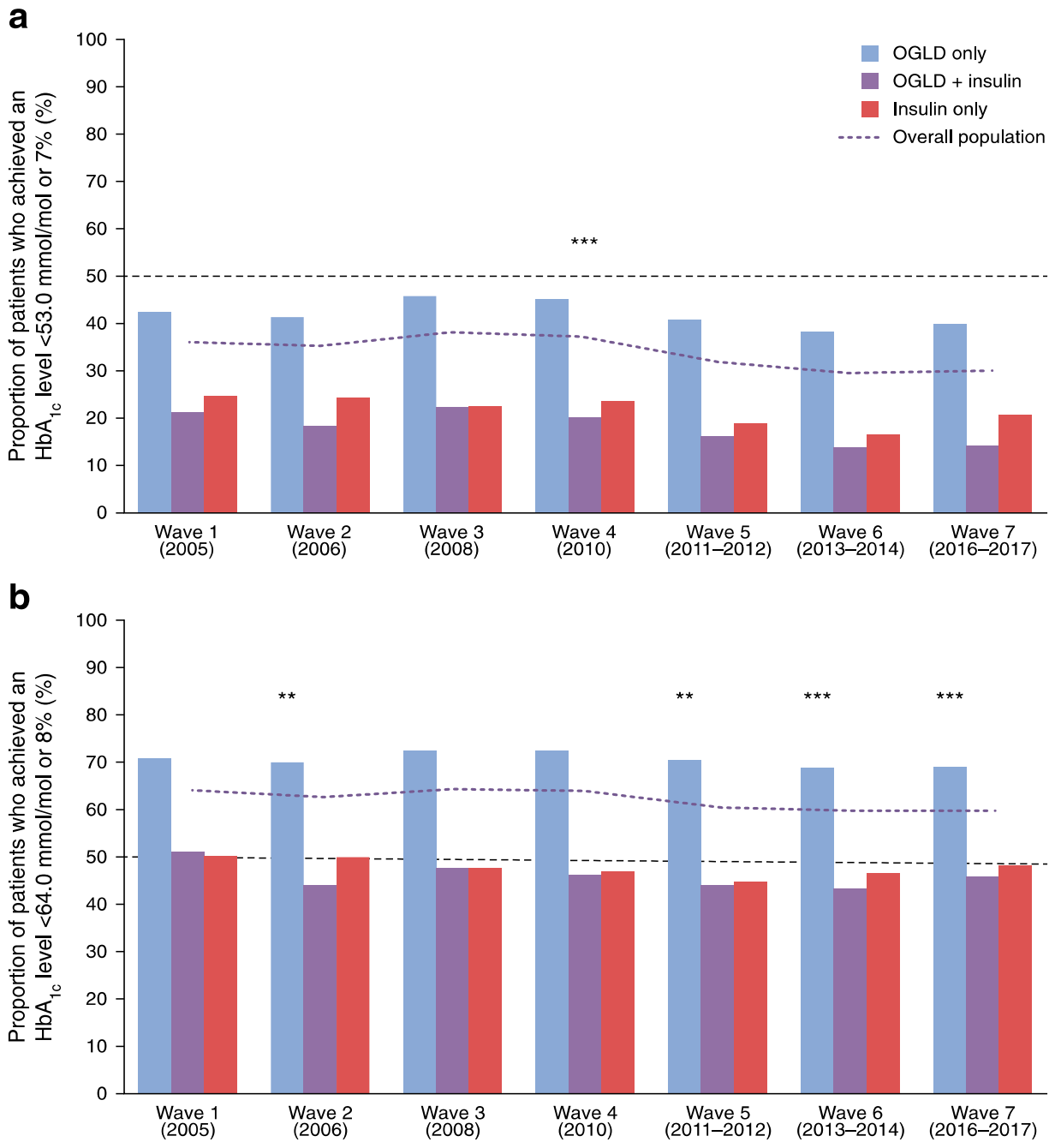
HbA_{1c} goal achievement data were missing for 3893 patients in Wave 1, 5084 patients in Wave 2, 3150 patients in Wave 3, 961 patients in Wave 4, 1256 patients in Wave 5, 548 patients in Wave 6 and 608 patients in Wave 7.

OGLD, oral glucose-lowering drugs

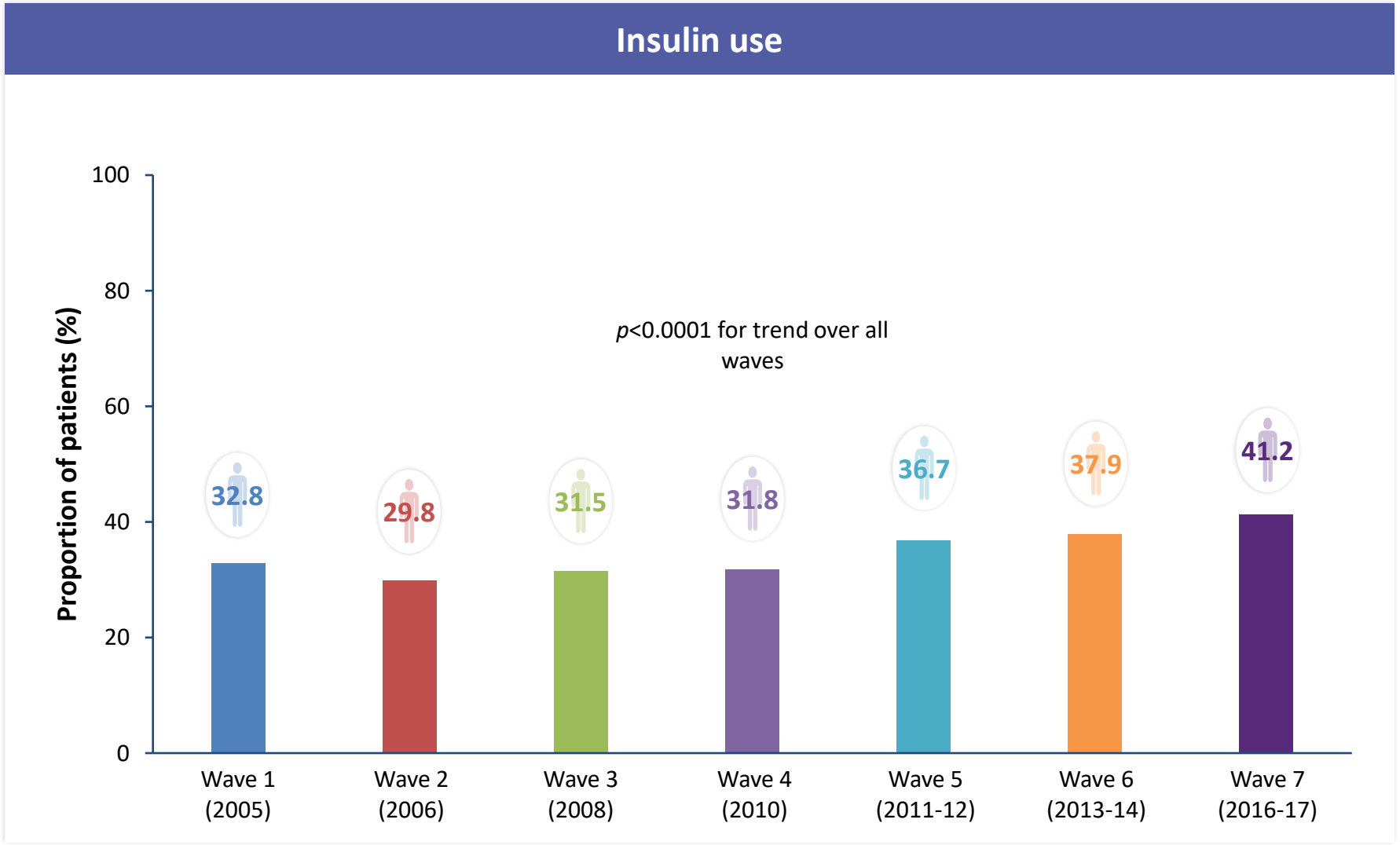
Similar suboptimal target achievement over time was seen for HbA_{1c} ≤8 %



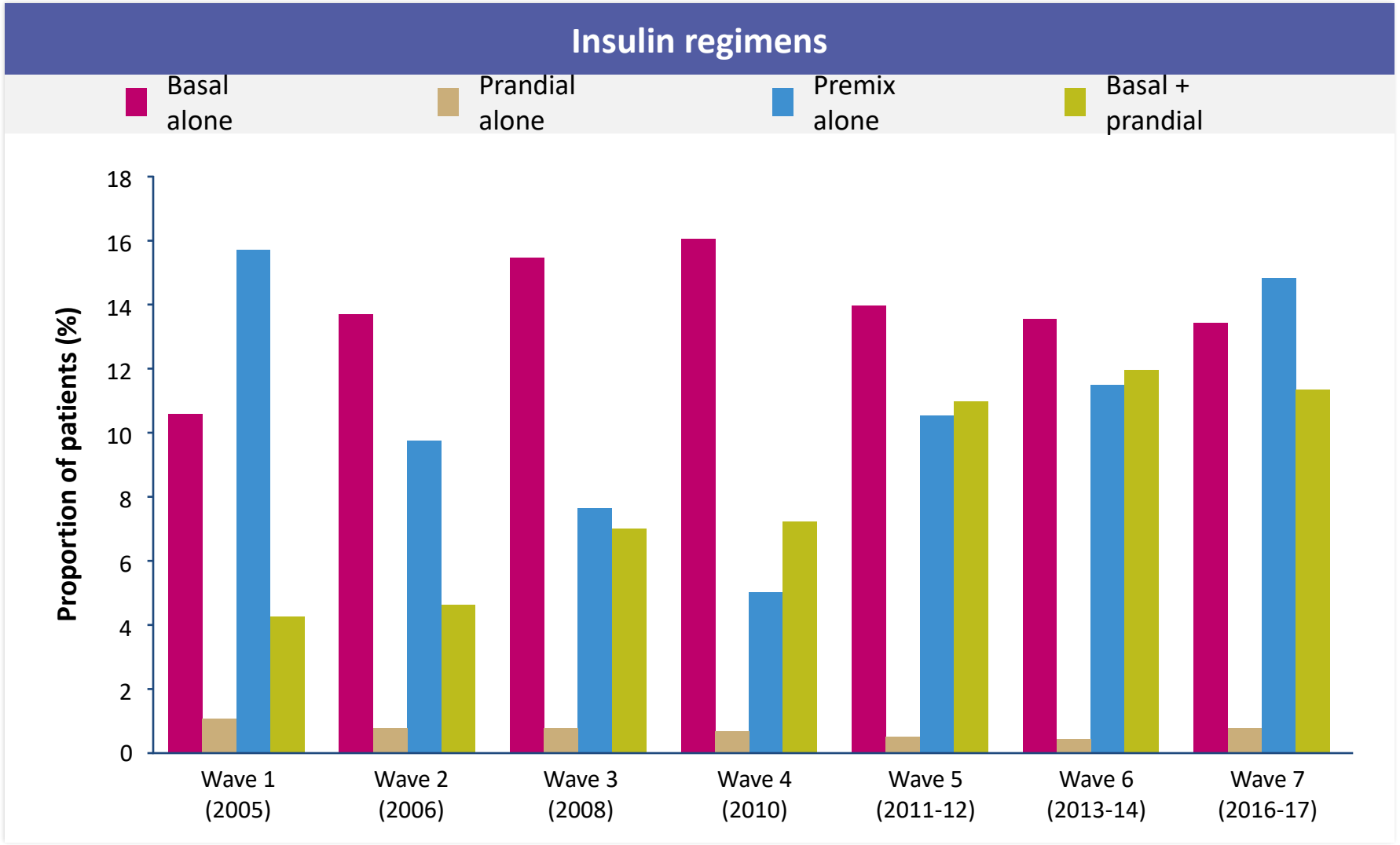
HbA_{1c} goal achievement data were missing for 3893 patients in Wave 1, 5084 patients in Wave 2, 3150 patients in Wave 3, 961 patients in Wave 4, 1256 patients in Wave 5, 548 patients in Wave 6 and 608 patients in Wave 7.


a
Proportion of patients who achieved an HbA1c level <53.0 mmol/mol or 7% (%)
100
90
80
70
60
50
40
30
20
10
0
OGLD only
OGLD + insulin
Insulin only
Overall population
***
Wave 1 (2005)
Wave 2 (2006)
Wave 3 (2008)
Wave 4 (2010)
Wave 5 (2011–2012)
Wave 6 (2013–2014)
Wave 7 (2016–2017)
b
Proportion of patients who achieved an HbA1c level <64.0 mmol/mol or 8% (%)
100
90
80
70
60
50
40
30
20
10
0
**
**
***
***
Wave 1 (2005)
Wave 2 (2006)
Wave 3 (2008)
Wave 4 (2010)
Wave 5 (2011–2012)
Wave 6 (2013–2014)
Wave 7 (2016–2017)

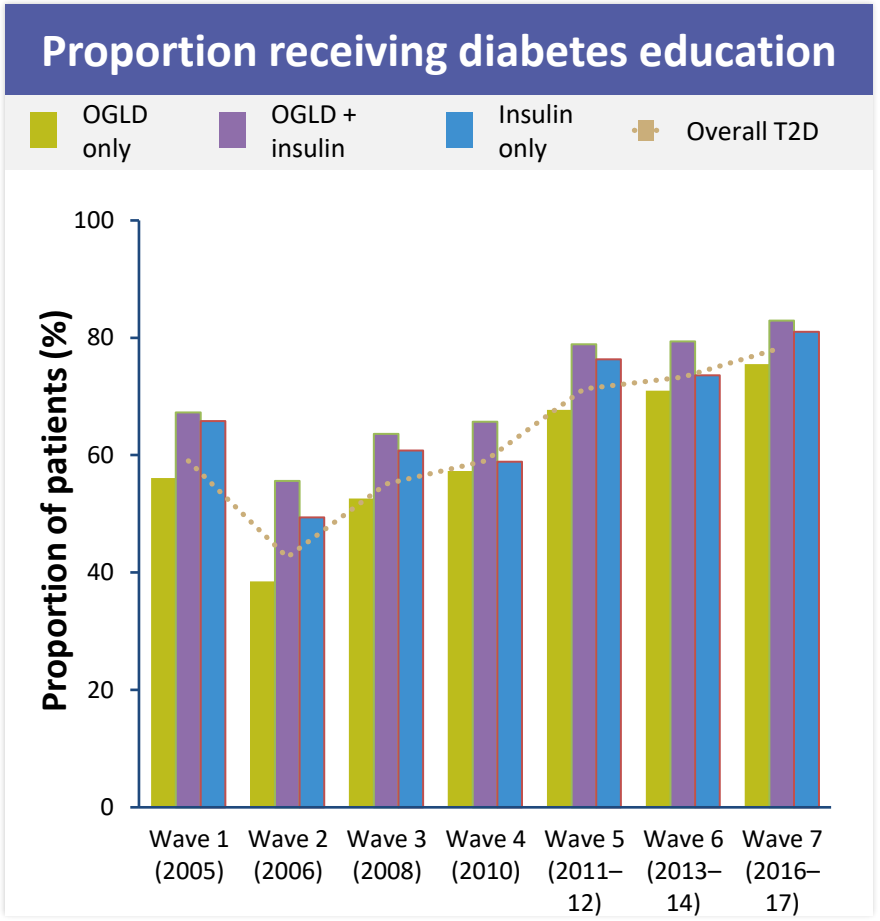
The proportion of patients using insulin increased over time

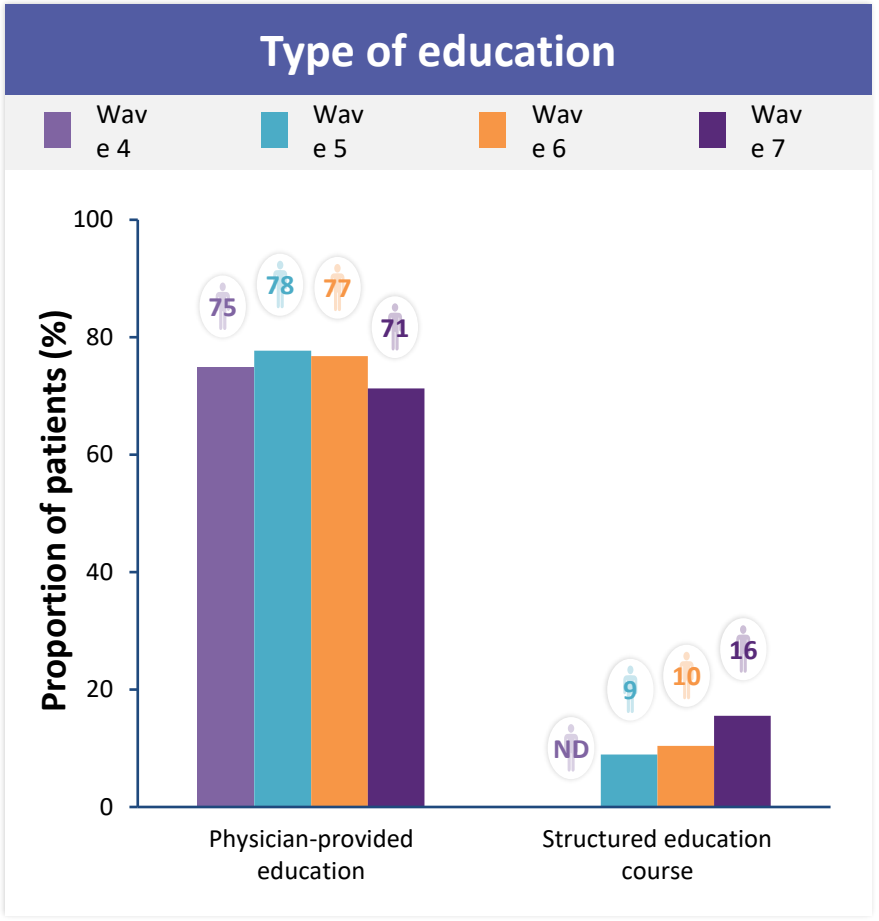


Use of basal+prandial insulin regimens increased over time



Diabetes education increased over time but few patients received structured education courses

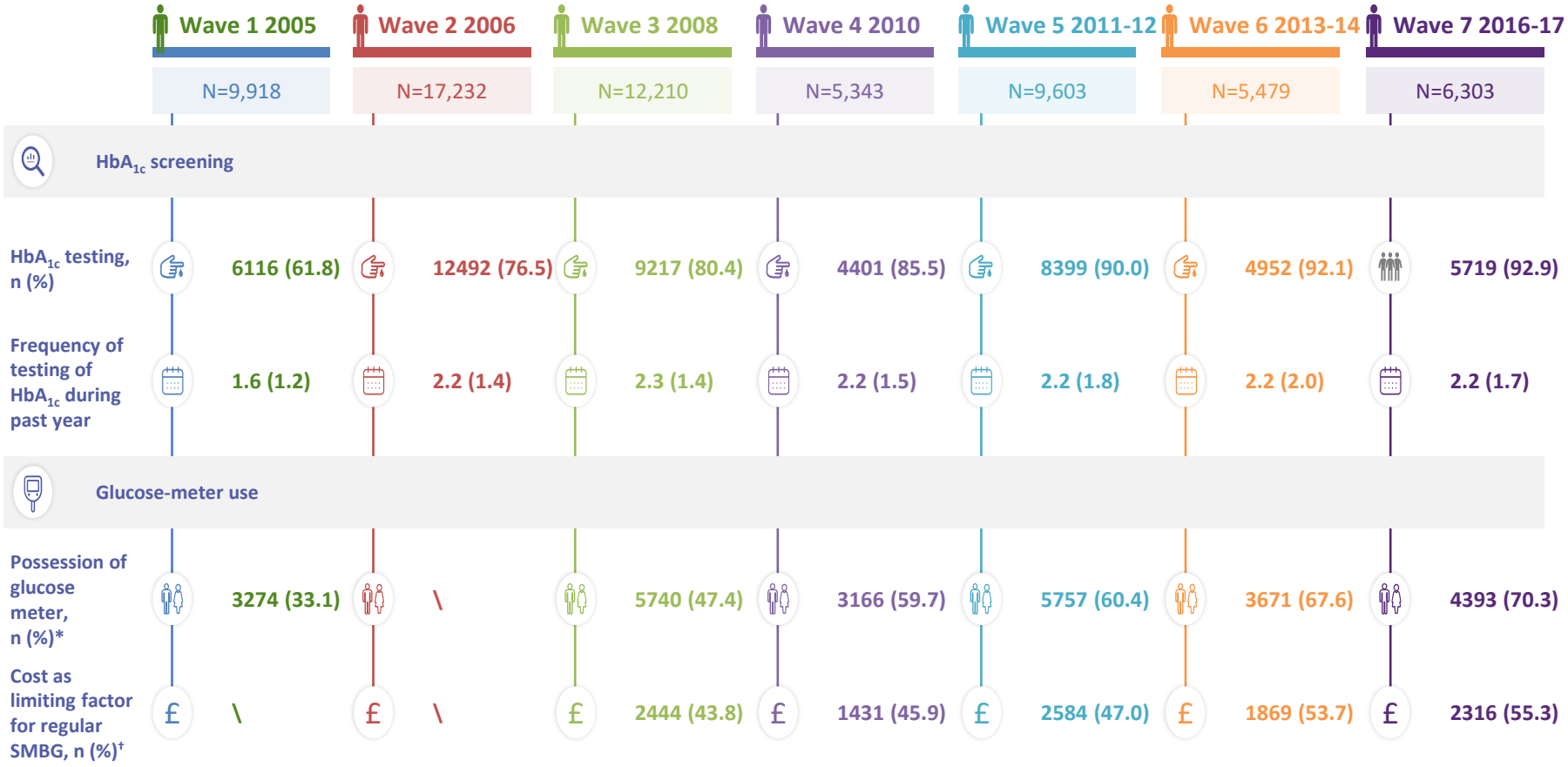




Most patients (>70% across Wave 4–7) received diabetes education from their treating physician

Data on type of education are only available from Wave 4 onwards.
OGLD, oral glucose-lowering drug; T2D, type 2 diabetes

HbA_{1c} screening and glucose meter possession increased over time



*Data not available for Wave 2; †Data not available for Waves 1 and 2.
Mean (SD) values are presented unless otherwise stated. SD, standard deviation; SMBG, self-monitoring blood glucose

Discussion

Glycaemic control remained poor over 12 years (<50% achieved HbA_{1c} <7 %)

Similar poor control is seen in developed countries **(~20–40%)**[1,2] indicating the challenge is universal

Provision of diabetes **education increased** but **<20%** of patients **received structured courses**, as recommended by guidelines[9,10]

Education programmes and self-management can improve glycaemic control[7,8]

Poor glycaemic control was seen despite increase in insulin use

Prescribed doses were similar to RCTs,[3–5] suggesting lack of adherence

Possession of **SMPG devices increased**, but cost of test strips was cited as a limiting factor in their use

Newer antihyperglycemic drugs provide clinical benefits,[6] **but use of newer OGLDs was low and use of human intermediate insulins remained high**

Some drugs became **available during the course** of IDMPS; however, **higher costs** of these drugs may limit wider use in developing countries

Quality improvement programmes implemented at a system level can **improve glycaemic control** and clinical outcomes in communities[11–14]

Results highlight need for systems changes to improve access to structured education, self-monitoring tools and appropriate medications

1. Ali MK, et al. New Engl J Med 2013; 368(17): 1613–24; 2. Mannucci E, et al. J Endocrinol Investig 2014; 37(5): 477–95; 3. Aschner P, et al. Lancet 2012; 379(9833): 2262–9; 4. Owens DR, et al. Diabetes Res Clin Pract 2014; 106(2): 264–74; 5. Yki-Jarvinen H and Kotronen A. Diabetes Care 2013; 26 (Suppl 2):S205–11; 6. Tibaldi JM. Am J Med 2014; 127(10 Suppl): S25–38;
7. Gagliardino JJ, et al. Diabetes Metab 2012; 38(2): 128–34; 8. Norris SL, et al. Diabetes Care 2002; 25(7):1159–71; 9. ADA Standards of Medical Care in DIabetes, Diabetes Care 2020; 42 (Suppl 1): S1–193; 10. IDF Clinical Guidelines 2017, available at: https://www.idf.org/component/attachments/attachments.html?id=1270&task=download; 11. Luk AOY, et al. Diabetes Care 2017; 40(7): 928–35; 12. Prestes M, et al. Prim Care Diabetes 2017; 11(2): 193–200; 13. Prestes M, et al. Acta Diabetol 2017; 54(9): 853–61; 14. Chan JCN, et al. Diabetes Care 2019; 42(11):2022–31.

IDMPS, International Diabetes and Management Practices Study; OGLD, oral glucose-lowering drugs; RCT, randomised controlled trials; SMPG, self-monitored plasma glucose