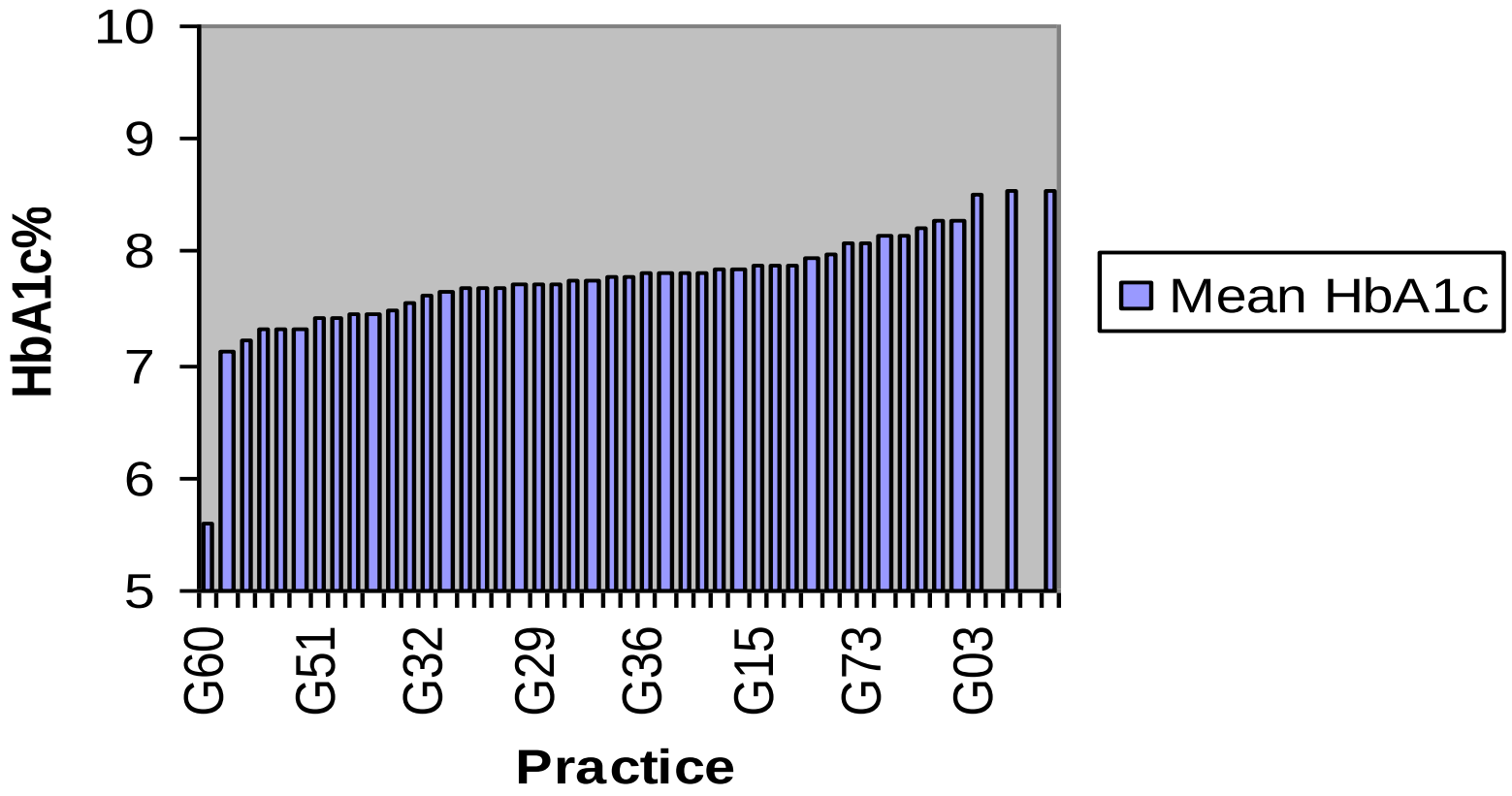
What happens to people with T2DM on o.d. glargine insulin and tablets?

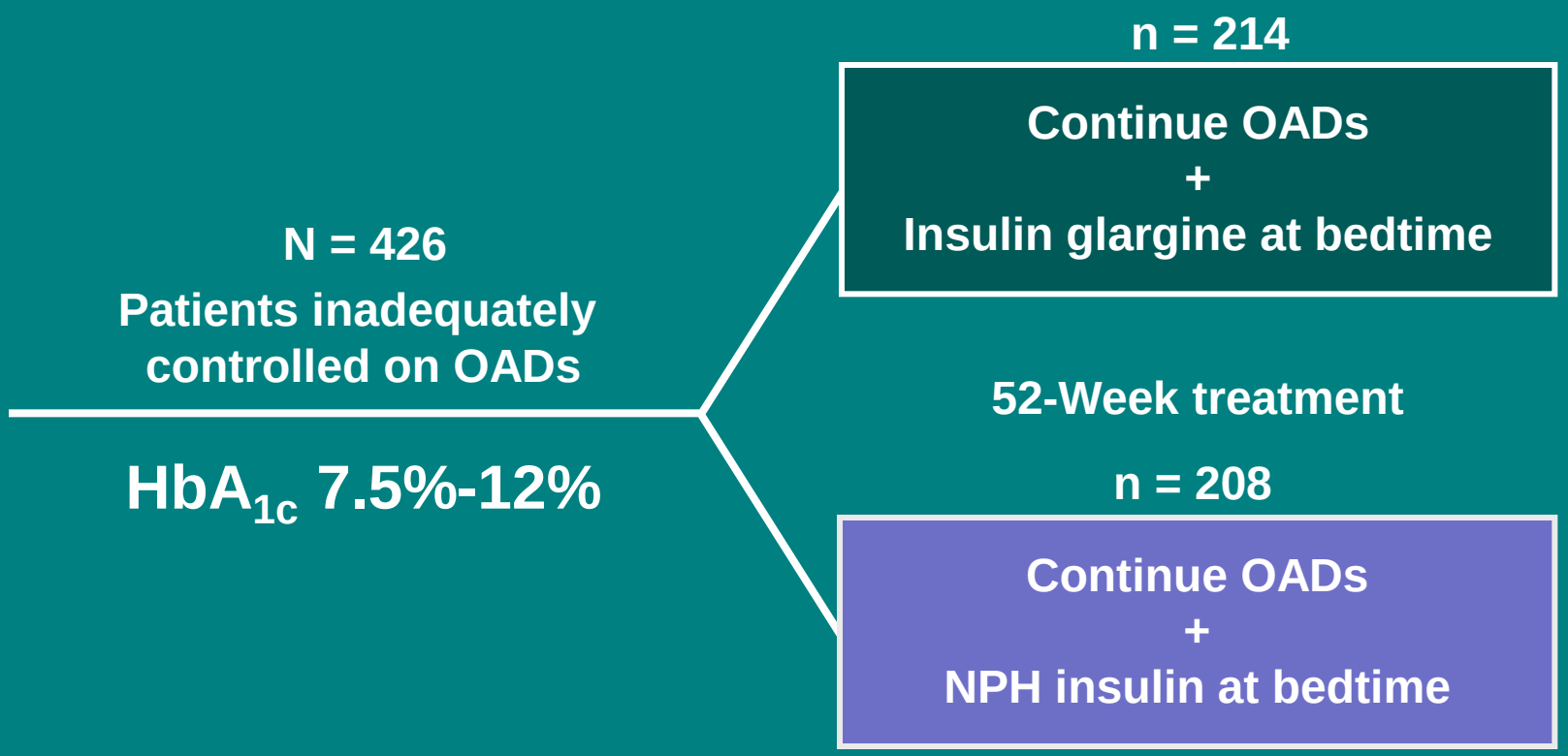
Ian Gallen

Glycaemic control in Buckinghamshire
Mean HbA1c by GP Practice 2004



Insulin Glargine vs NPH Insulin Added to Oral Therapy

Target FBG: ≤120 mg/dL (≤6.7 mmol/L)
Equivalent to FPG ≤135 mg/dL (≤7.5 mmol/L)



NPH=neutral protamine Hagedorn; FBG=fasting blood glucose; FPG=fasting plasma glucose; OAD=oral anti-diabetic drug.
Yki-Järvinen H et al. *Diabetes Care.* 2000;23:1130-1136.

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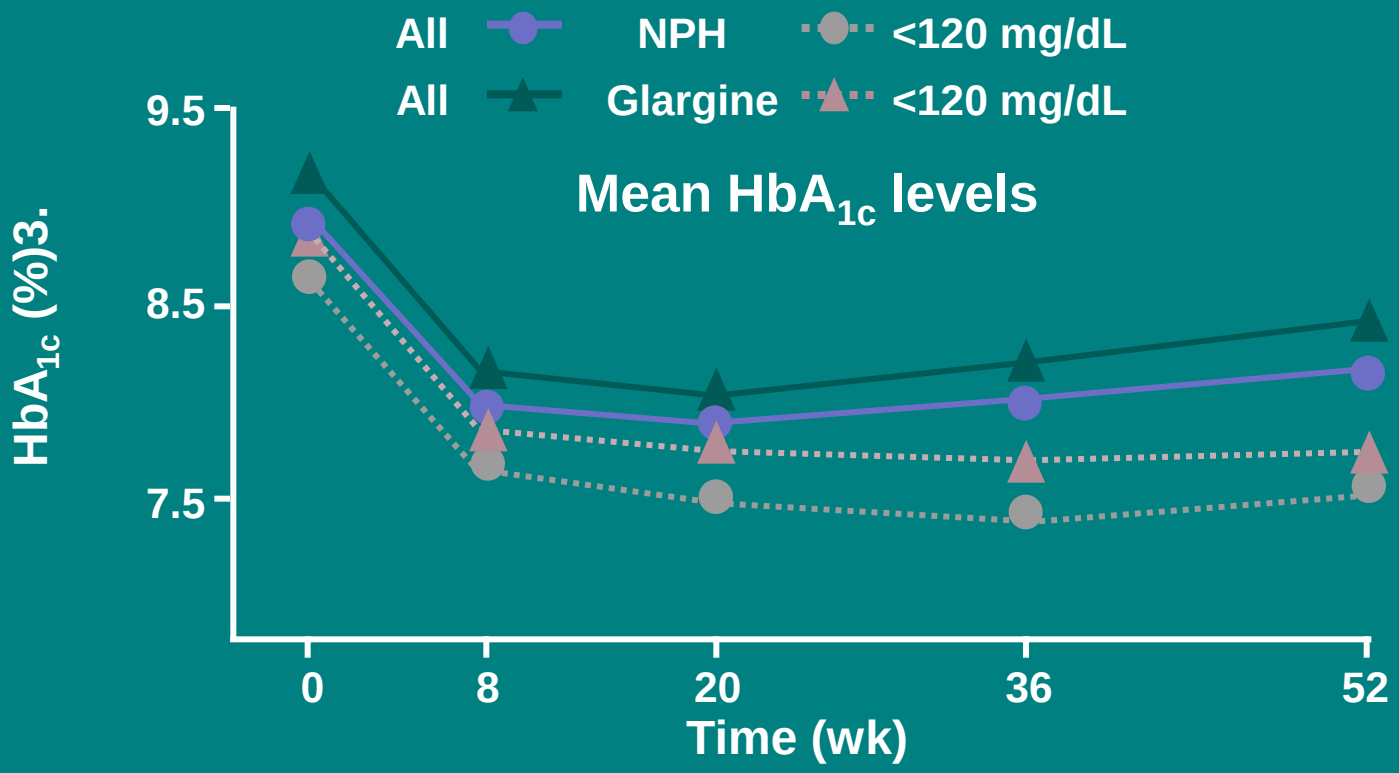

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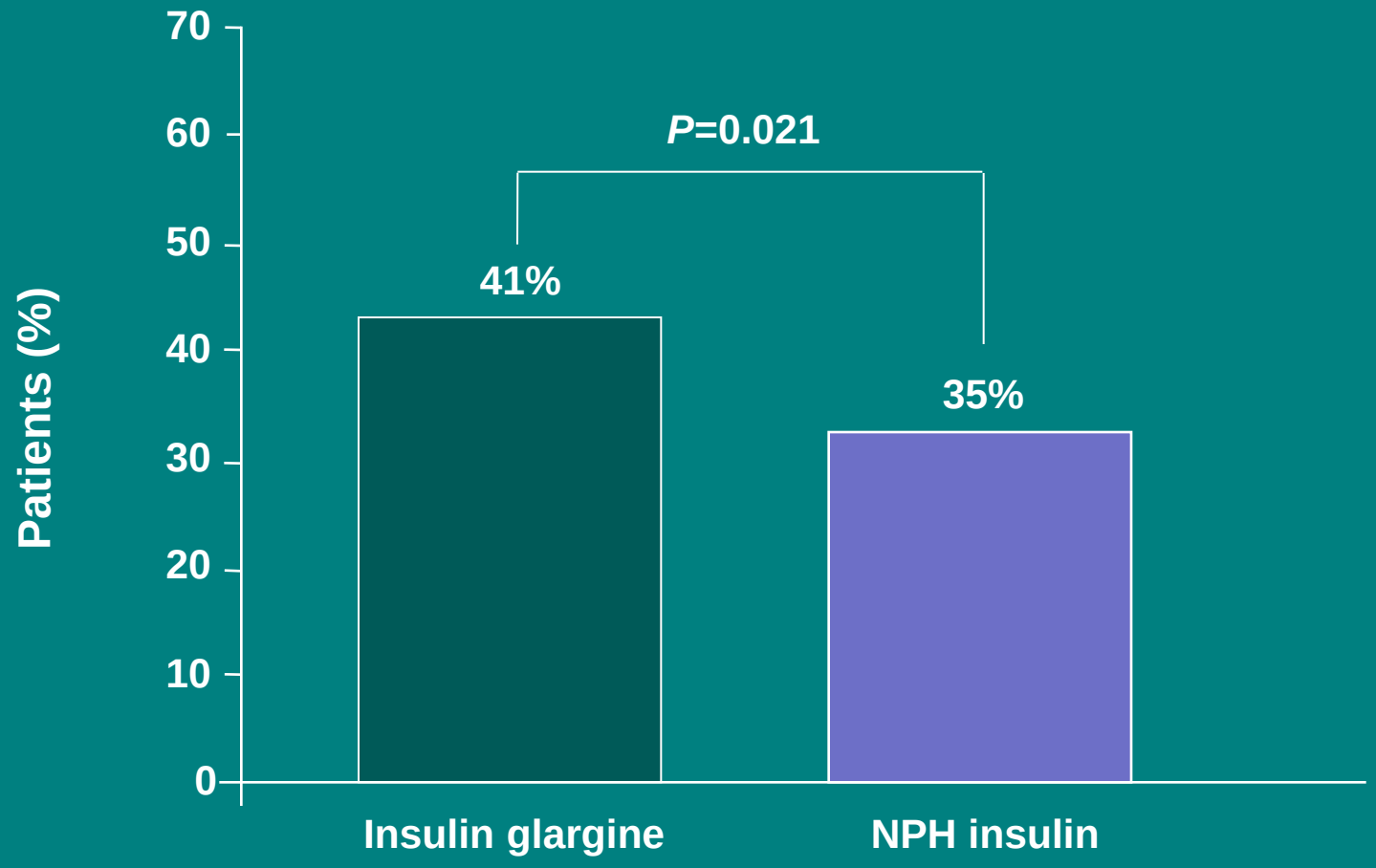
Patients with T2DM with FBG ≤6.7 mmol/L at 52 Weeks With Insulin Glargine vs NPH Insulin



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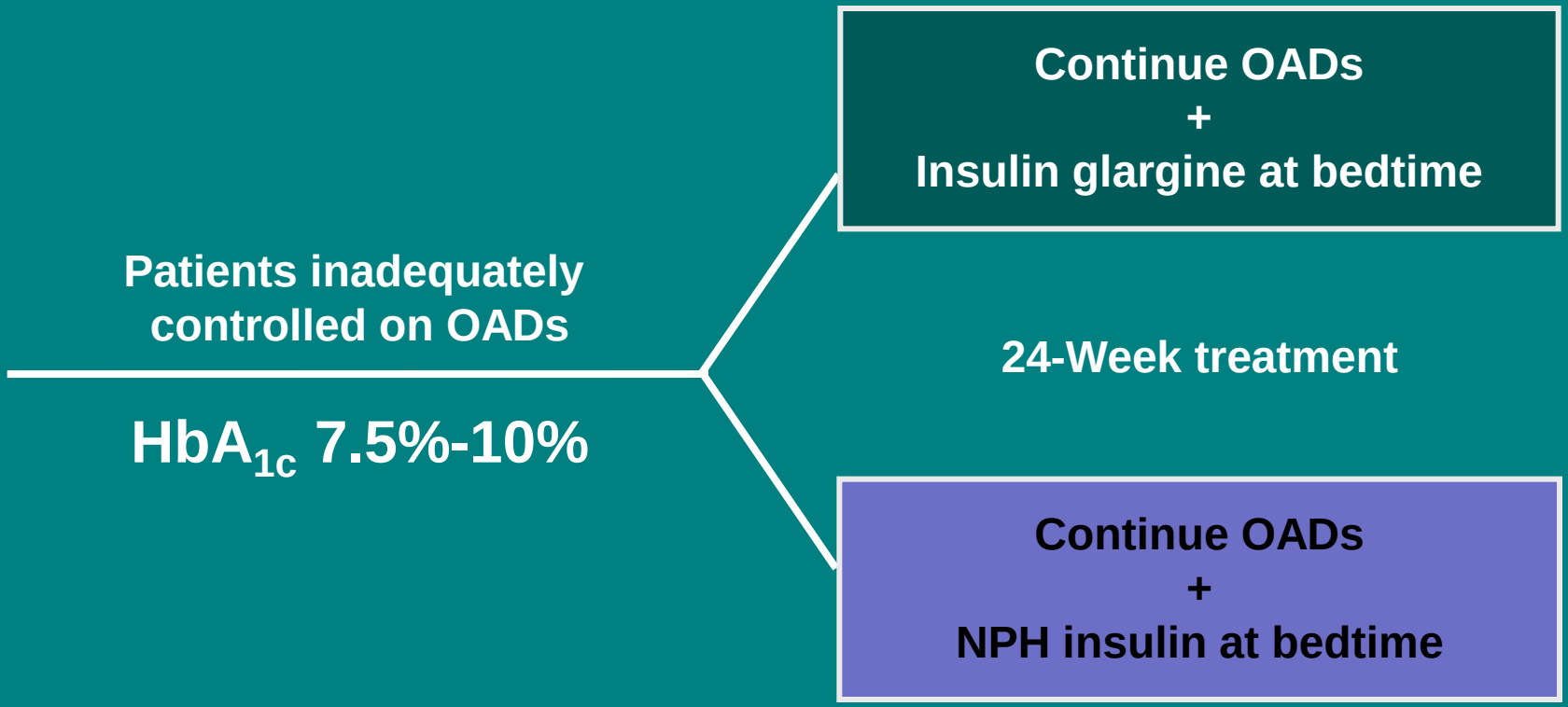
Treat-to-Target Trial in T2DM

Target FPG: ≤100 mg/dL (≤5.5 mmol/L)



NPH=neutral protamine Hagedorn; FPG=fasting plasma glucose; OAD=oral anti-diabetic drug.

Riddle M et al. *Diabetes Care*. 2003;26:3080-3086.

Treat-to-Target Trial Methods: Forced-Titration Schedule

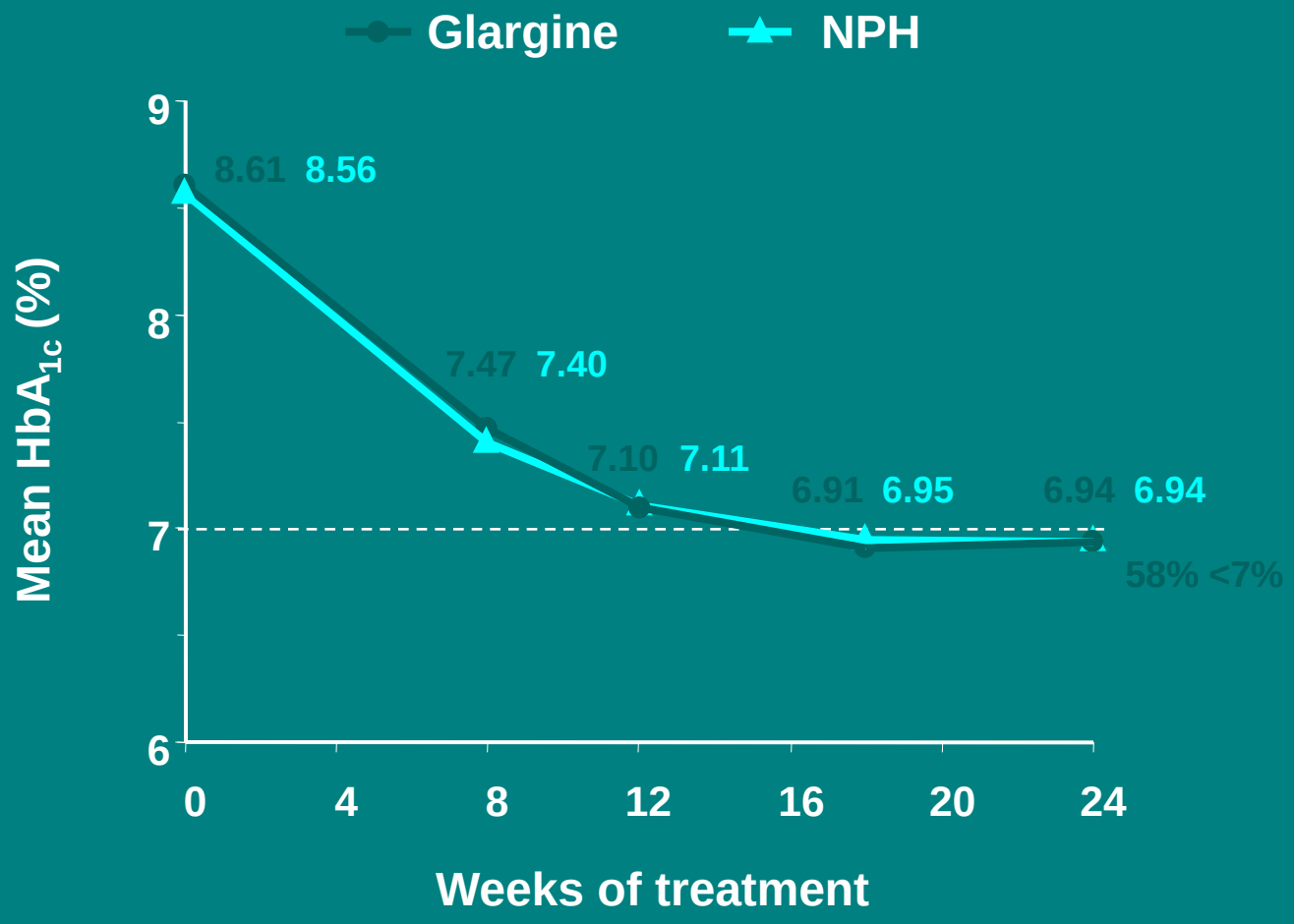
Start With 10 IU/d Bedtime Basal Insulin and Adjust Weekly

Self-monitored FPG (mg/dL)*	↑ Insulin Dose (IU/d)†
>180	8
140-180	6
120-140	4
100-120	2

Treat-to-Target ≤100 mg/dL (≤5.6 mmol/L)

*Measurements were from 2 preceding days; no increase in dosage if PG ≤72 mg/dL (≤4.0 mmol/L) was documented at any time in preceding week.
†Small decrease (2-4 IU/d) in dosage allowed if self-monitored PG <56 mg/dL (<3.1 mmol/L) or severe hypoglycaemia occurs.
FPG=fasting plasma glucose; PG=plasma glucose.
Adapted, with permission, from Riddle M et al. *Diabetes Care.* 2003;26:3080-3086.

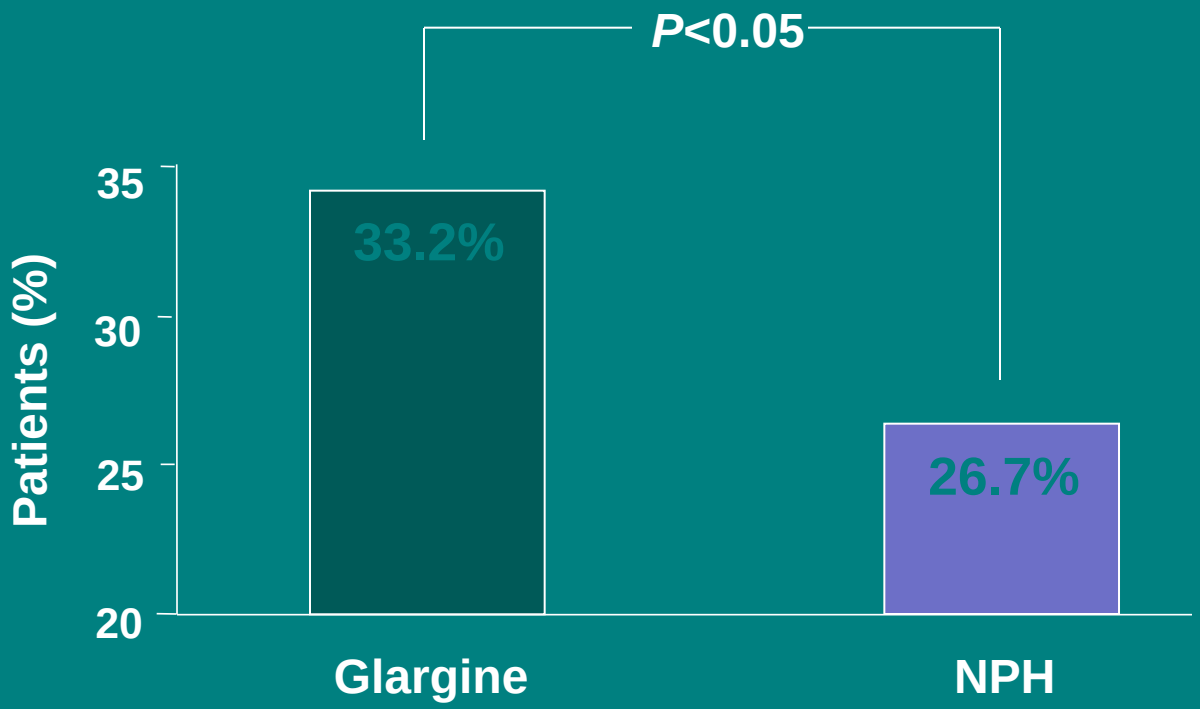
Mean HbA_{1c} with Insulin Glargine and NPH Insulin



Adapted from Riddle M et al. *Diabetes Care.* 2003;26:3080-3086.

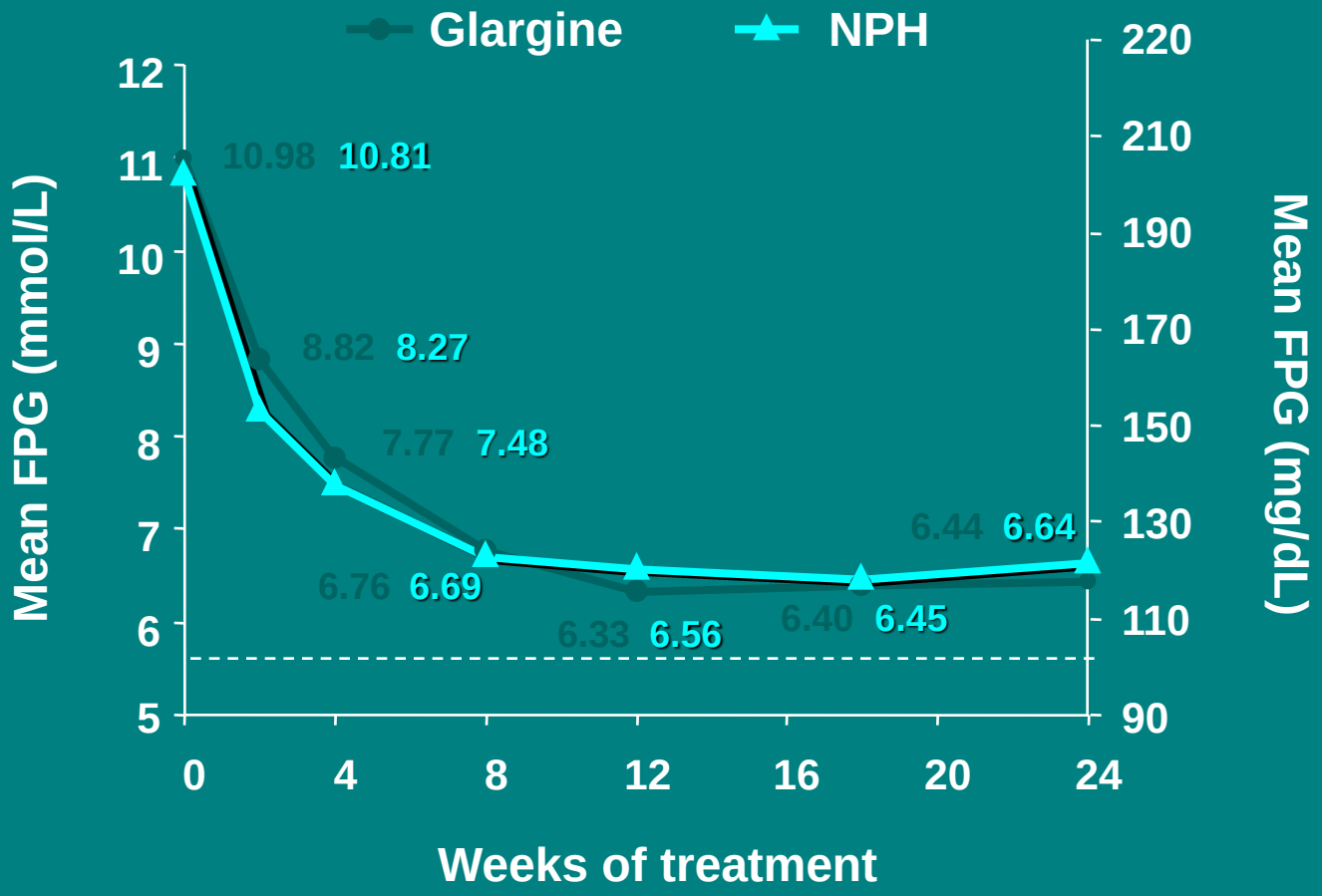
Treat-to-Target Trial in T2DM: Results

33% of Patients Achieve Target HbA_{1c} ≤7%, Without Documented Nocturnal Hypoglycaemia (PG ≤72 mg/dL [4.0 mmol/L]), With Insulin Glargine



Intent-to-treat analysis.
PG=plasma glucose; NPH=neutral protamine Hagedorn.
Adapted from Riddle M et al. *Diabetes Care.* 2003;26:3080-3086.

Sustained FPG Reductions Are Achieved During Study With Insulin Glargine and NPH Insulin



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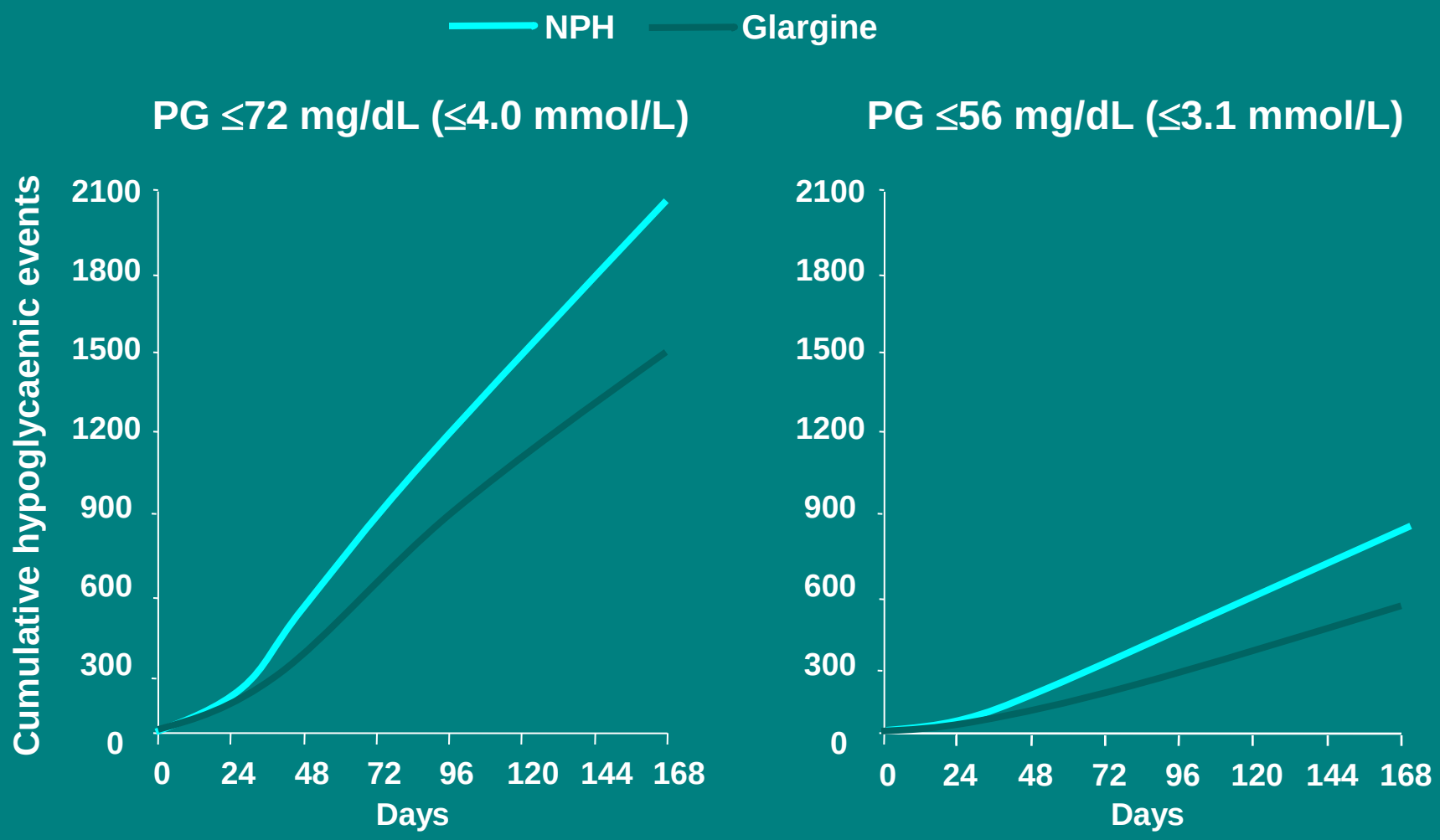
Incidence of Hypoglycaemia With Insulin Glargine vs NPH Insulin



NPH=neutral protamine Hagedorn; PG=plasma glucose.

Adapted, with permission, from Riddle M et al. *Diabetes Care.* 2003;26:3080-3086.

Hypoglycaemic Events With Insulin Glargine vs NPH Insulin

No. of Hypoglycaemic Events per PY	Glargine	NPH	*P* Value	Relative Risk Reduction, %
All symptomatic	13.9	17.7	<0.02	21
Confirmed ≤4 mmol/L (≤72 mg/dL)	9.2	12.9	<0.005	29
Confirmed ≤3.1 mmol/L (≤56 mg/dL)	3.0	5.1	<0.003	41

PY=person-year; NPH=neutral protamine Hagedorn.

Nocturnal Hypoglycaemic Events With Insulin Glargine vs NPH Insulin

No. of Nocturnal Hypoglycaemic Events per PY	Glargine	NPH	*P* Value	Relative Risk Reduction, %
All nocturnal symptomatic	4.0	6.9	<0.001	42
Confirmed nocturnal ≤4 mmol/L (72 mg/dL)	3.1	5.5	<0.001	44
Confirmed nocturnal ≤3.1 mmol/L (56 mg/dL)	1.3	2.5	<0.002	48

PY=person-year; NPH=neutral protamine Hagedorn.

Glargine-T2DM in Wycombe

- October 2003-until October 2004
- 105 people with **T2 DM** (77 male, 83 Caucasian, 20 South-Asian, 2 other ethnicity)
- 75 (77%) were treated with **GLAR+MET**
- Sulphonylurea **SU** agents 88 (84%), thiazolidinediones **TZD** 22(21%), and Repaglinide/Nateglinide **MEG** 6 (7%) were stopped
- **GLAR** monotherapy in 20 (23%).

Methods

- Group starts of 6-10 in Wycombe Diabetes Centre
- 4 times 2 hour group session with DSN, and 30 minutes with dietician
- Translator group for SA patients (Urdu/Punjabi)
- Minimum of 4 telephone contacts for dose titration
- Requested 4 point SBGM 3 times weekly
- TTT titration protocol
- No additional measurements or questionnaires

Baseline data

		n	%
Sex	**Male**	**71**	**67%**
	Female	**34**	**33%**
Race	**Caucasian**	**83**	**80%**
	South Asian	**20**	**17%**
	Other	**2**	**3%**

Baseline data

	Mean	SD	Min	Max
Age (years)	**59.1**	**12.0**	**35.0**	**83.0**
Weight (kg)	**89.0**	**22.0**	**53.3**	**153.4**
Height (m)	**1.7**	**0.1**	**1.5**	**1.9**
Body mass index (kg/m^2)	**30.5**	**7.4**	**18.0**	**55.8**
HbA_{1c} (%)	**9.5**	**1.4**	**7.2**	**15.2**
Fasting blood glucose (mmol/L)	**10.4**	**3.1**	**5.0**	**22.0**
Time since diagnosis (years)	**7.2**	**4.6**	**0.0**	**25.0**
Duration of oral therapy (years)	**5.3**	**3.0**	**1.0**	**13.0**

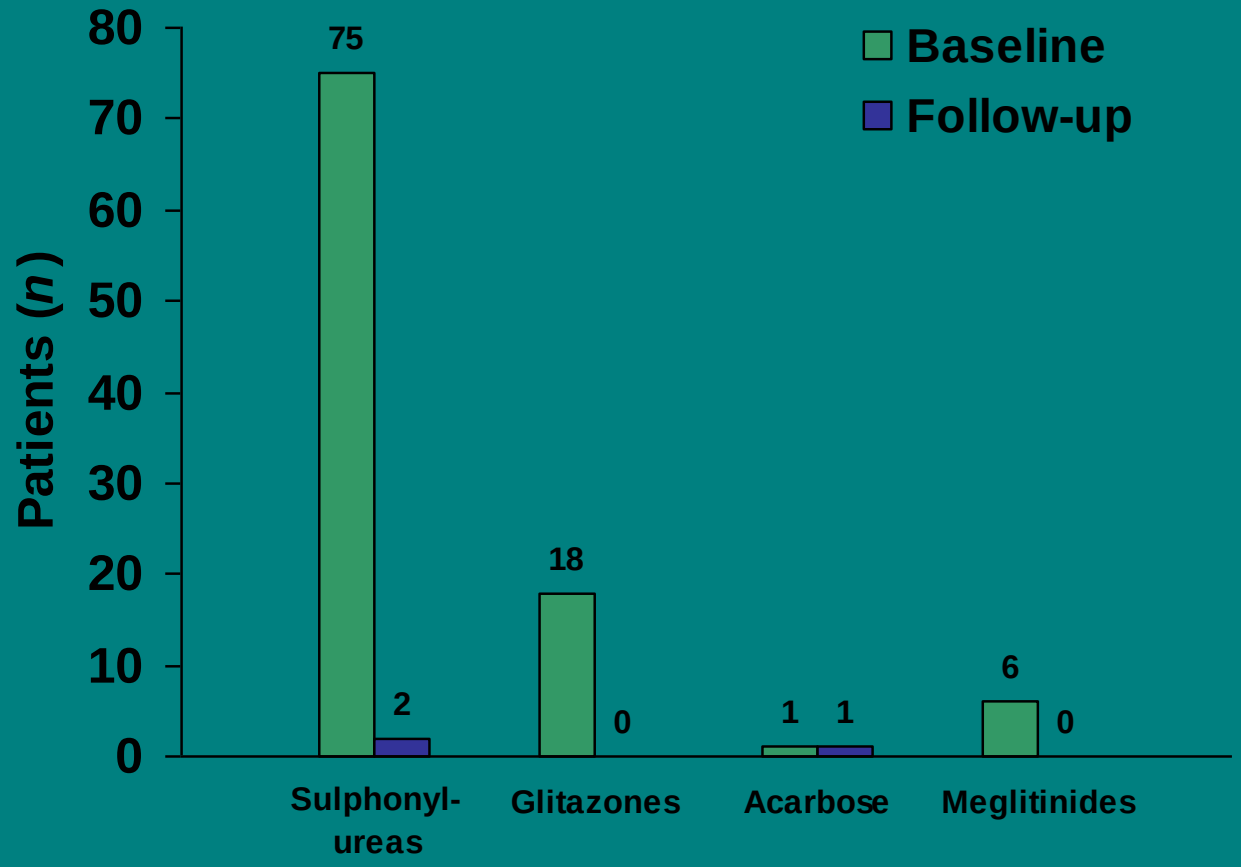
Baseline data

		%	
Time since diagnosis	**0–5 years** **5–10 years** **10–15 years** **>15 years**	**46%** **33%** **16%** **6%**	
Duration of oral therapy	**0–5 years** **5–10 years** **>10–15 years**	**63%** **31%** **6%**	
Mild hypos in past month	**0** **1** **2**	**97%** **1%** **2%**	
Severe hypos in past month	**0**	**100%**	

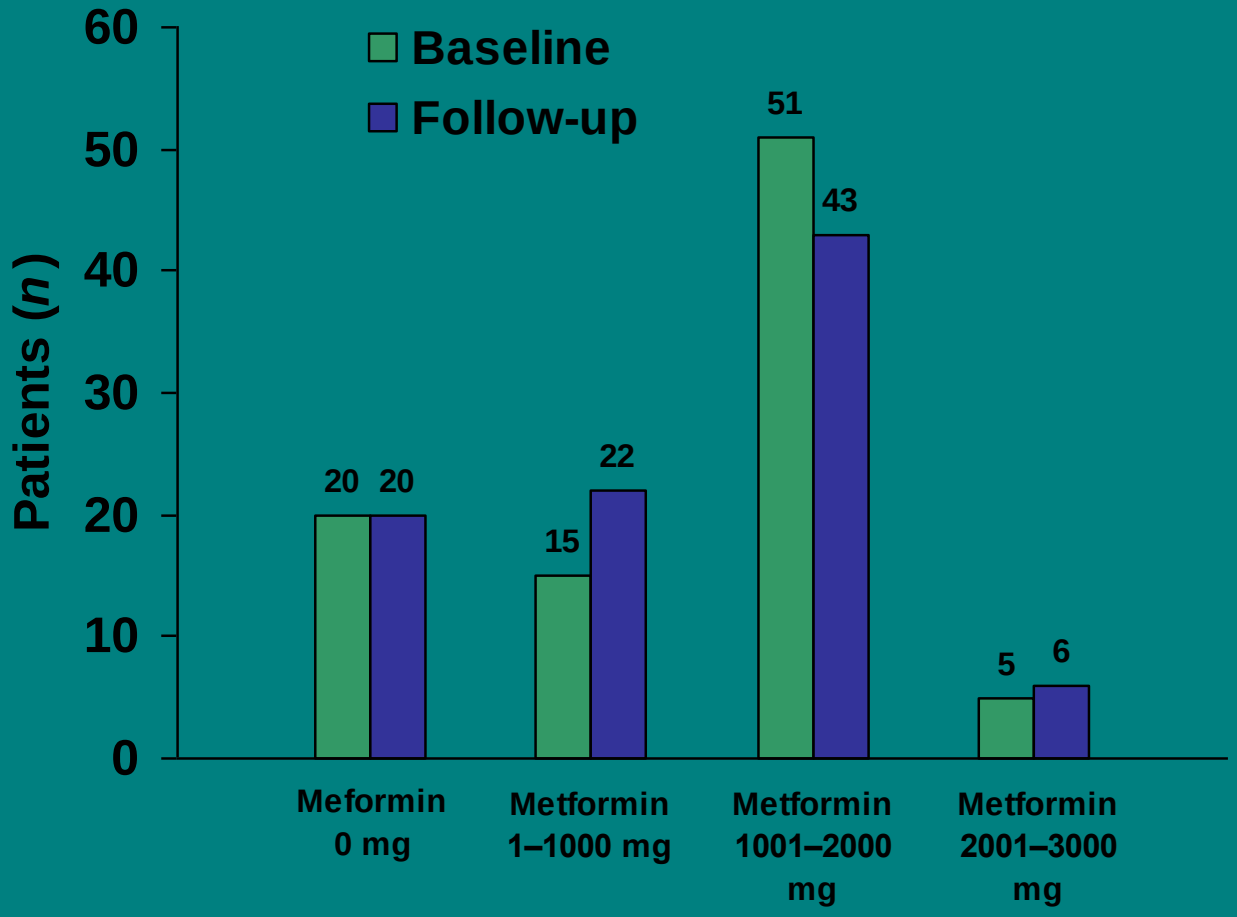
Baseline data

		%
Complications	**Retinopathy**	**16%**
	Nephropathy	**10%**
	Cardiovascular	**15%**
	Other vascular	**4%**
	Neuropathy	**21%**
	Lipodystrophy	
	Foot disease	**2%**
	Impotence (men only)	**7%**

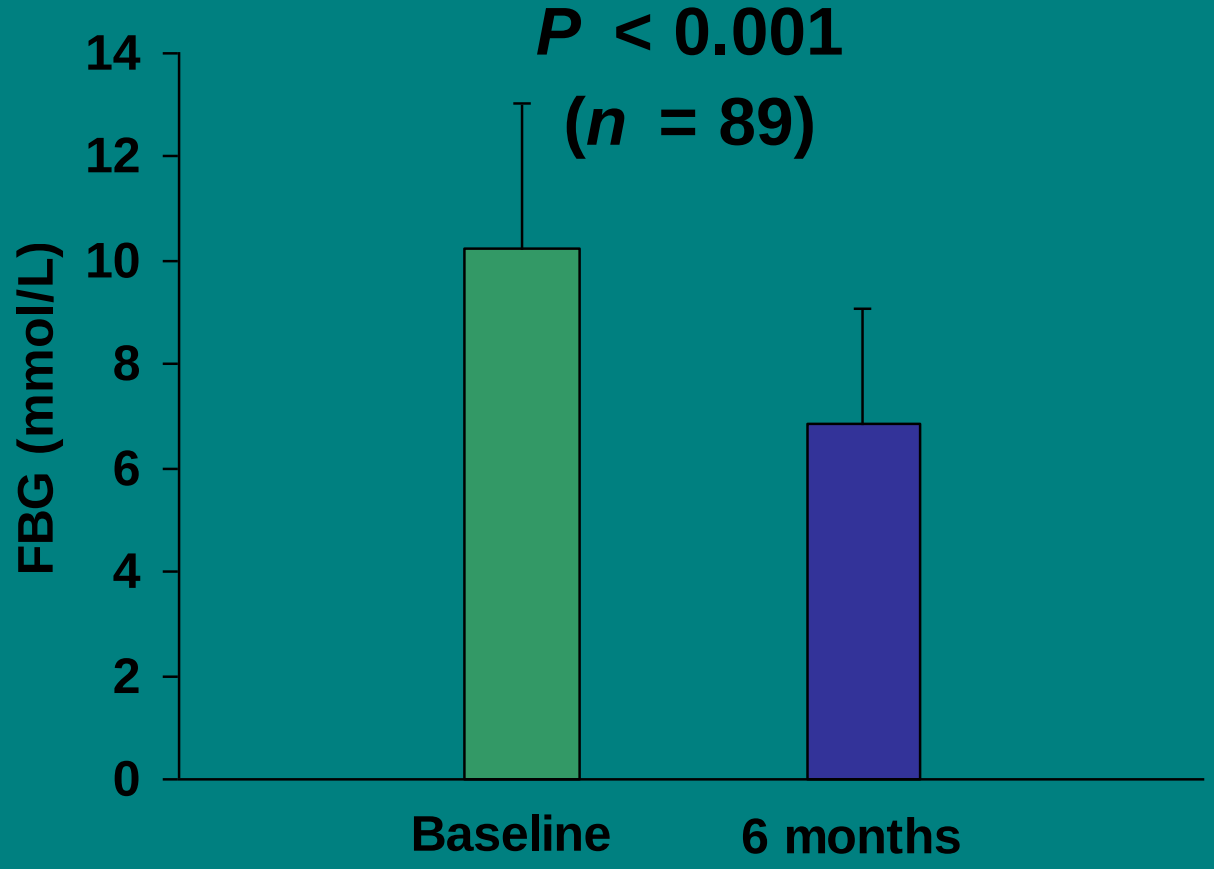
Other anti-diabetic therapies



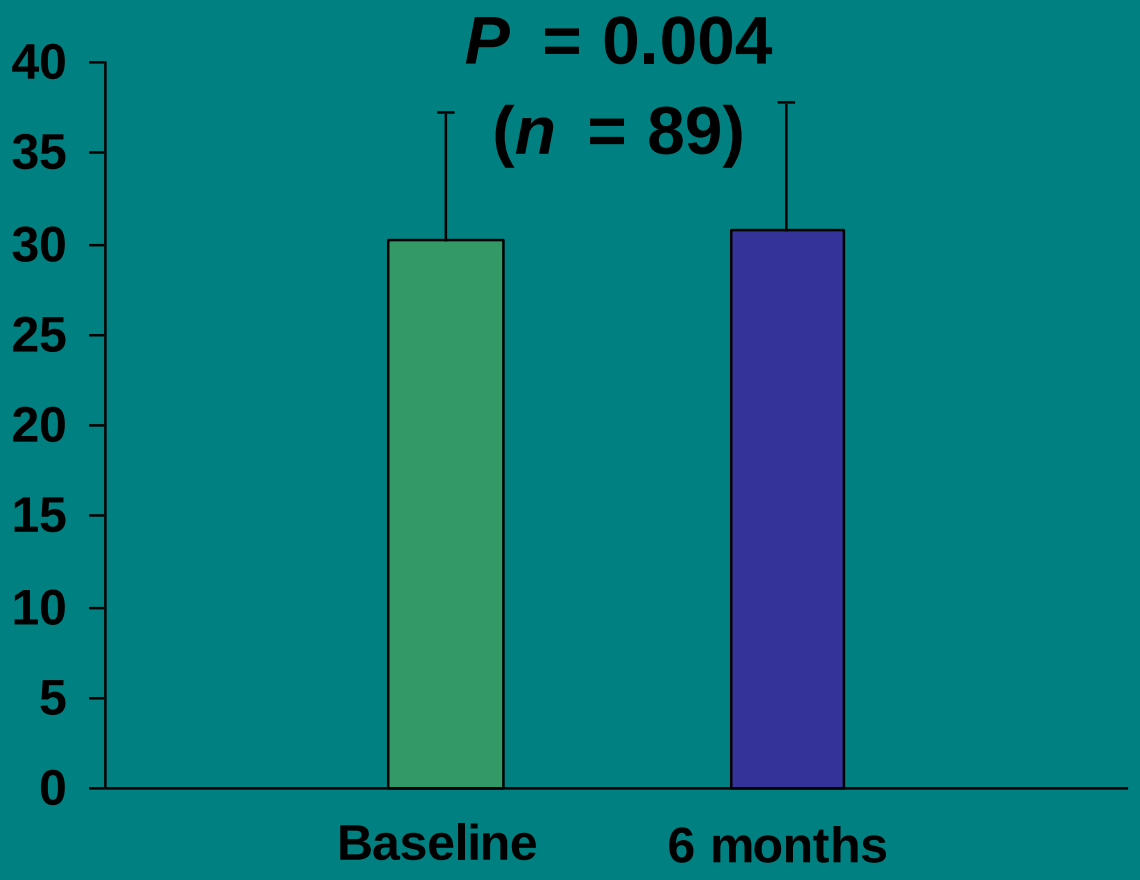
Other anti-diabetic therapies



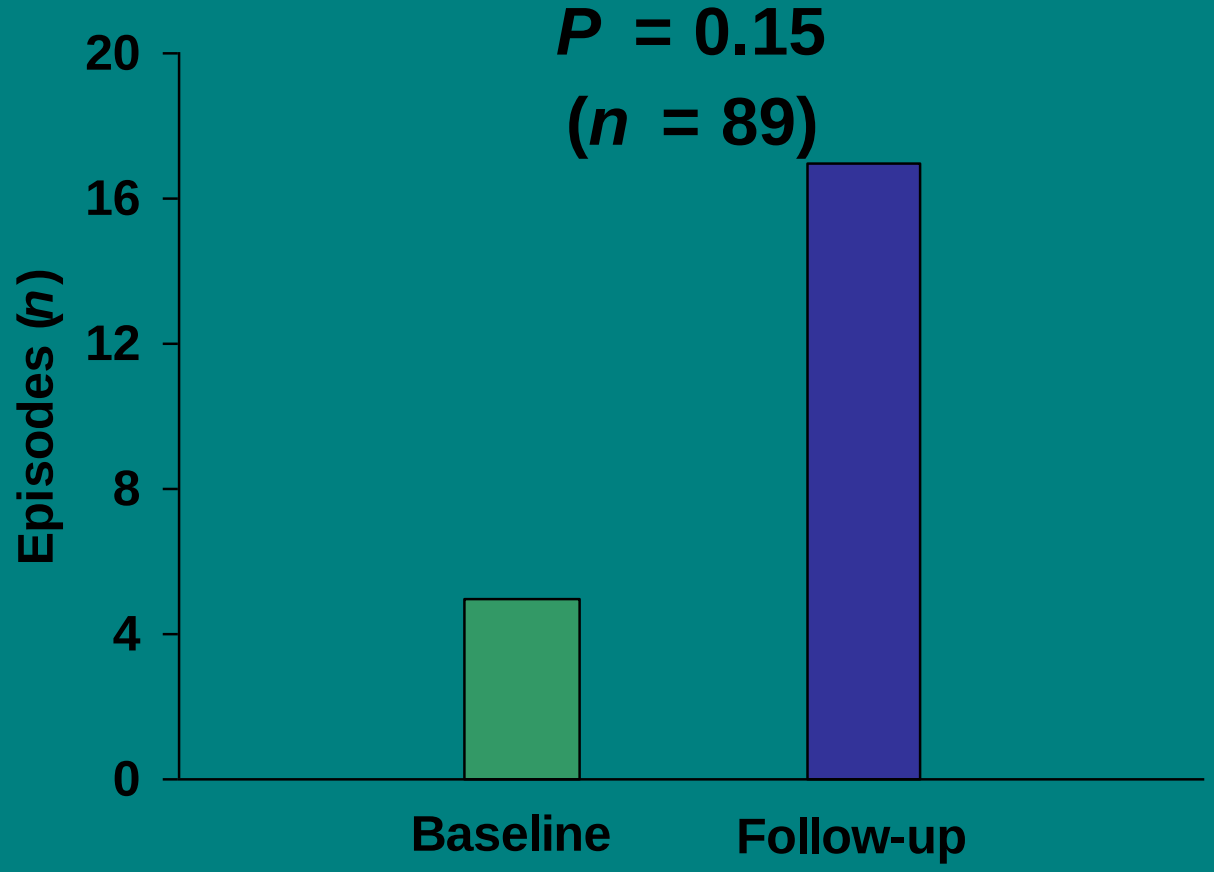
Fasting blood glucose



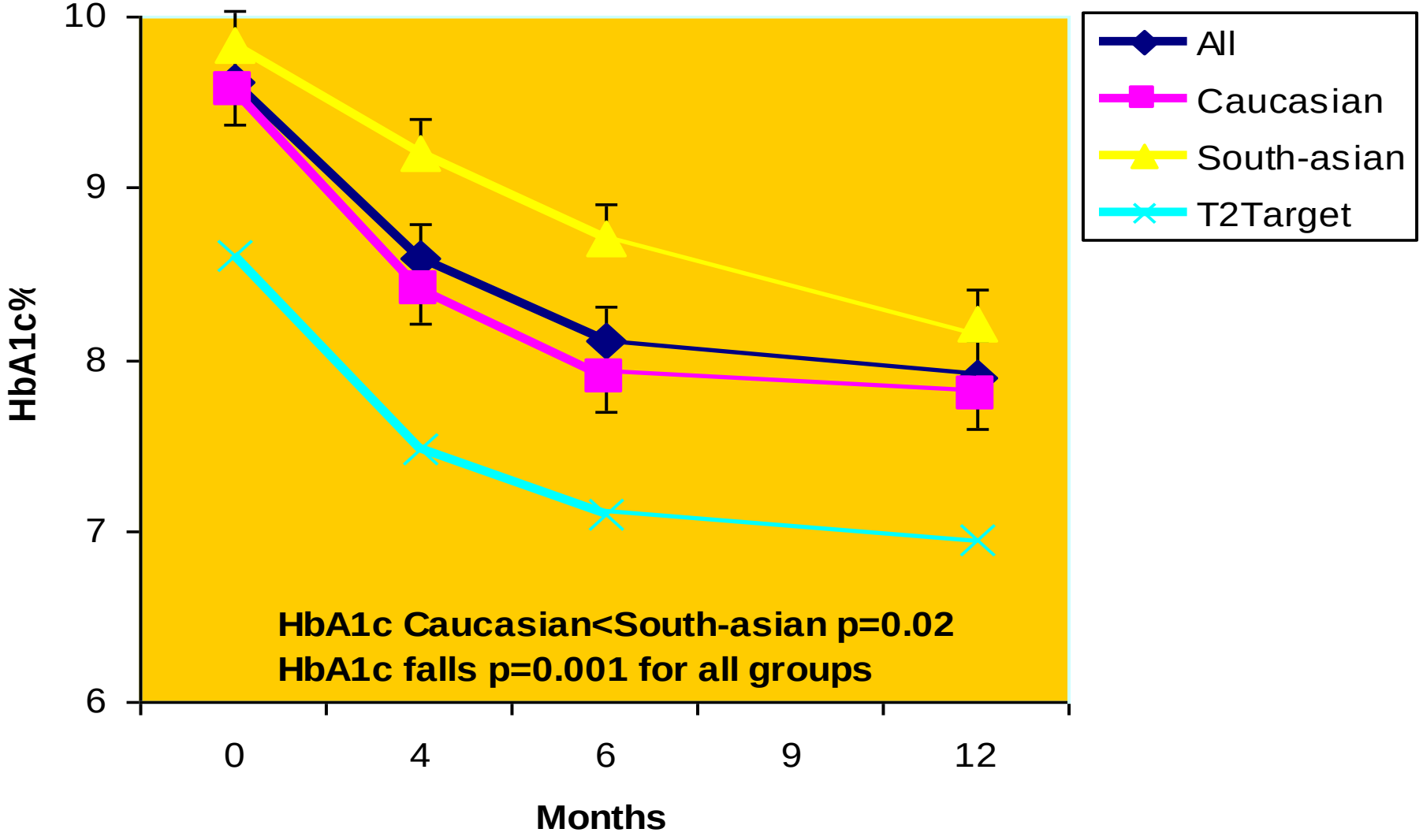
Body mass index



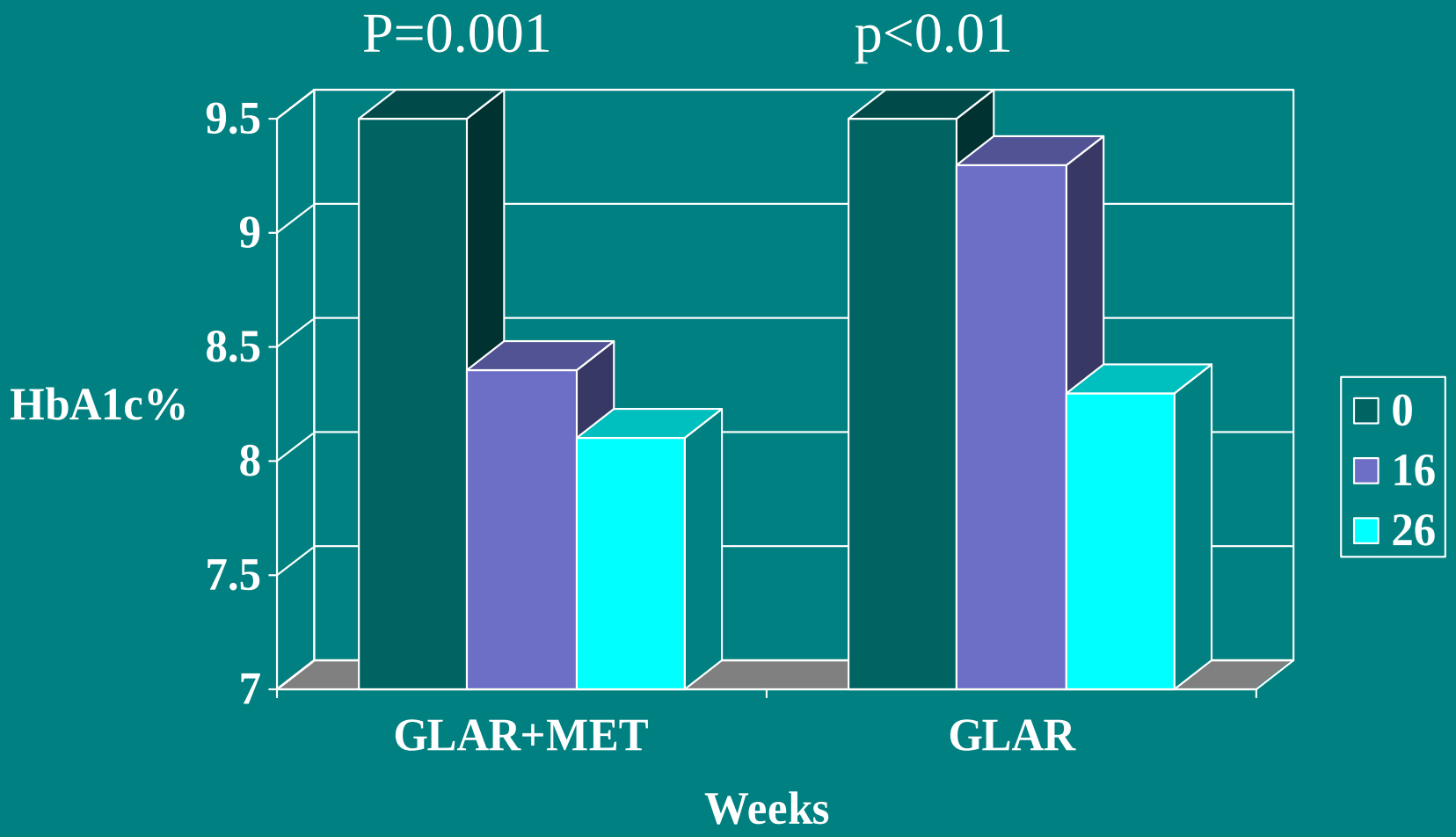
Mild hypoglycaemic episodes



Glycaemic control in T2DM following Glargine treatment



HbA1c



Target achieved?

	HbA1c < 7%	HbA1c < 7.5%
6 months (%)	15%	33%
6 months (n=89)	13	29
12 months (%)	19%	42%
12 months (n=69)	13	26

Achieving target?
Starting HbA1c < 9%

	HbA1c < 7%	HbA1c < 7.5%
12 months (%) n=41	17%	30%

Number of doses of insulin aspart

		n	%
Number of doses of insulin aspart	**0**	**50**	**56%**
	1	**17**	**19%**
	2+	**22**	**25%**

Conclusions

- Similar falls in blood glucose and HbA1c as TTT/Lanmet
- Similar weight gain and hypoglycaemia as TTT/Lanmet
- However most patients not at target
- Prandial insulin frequently required
- Group starts seem as effective as individual tuition