

## Use of the GLYCEMIZER®-tool by GPs to meet individual HbA1c goals in patients with T2DM

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### Question under study

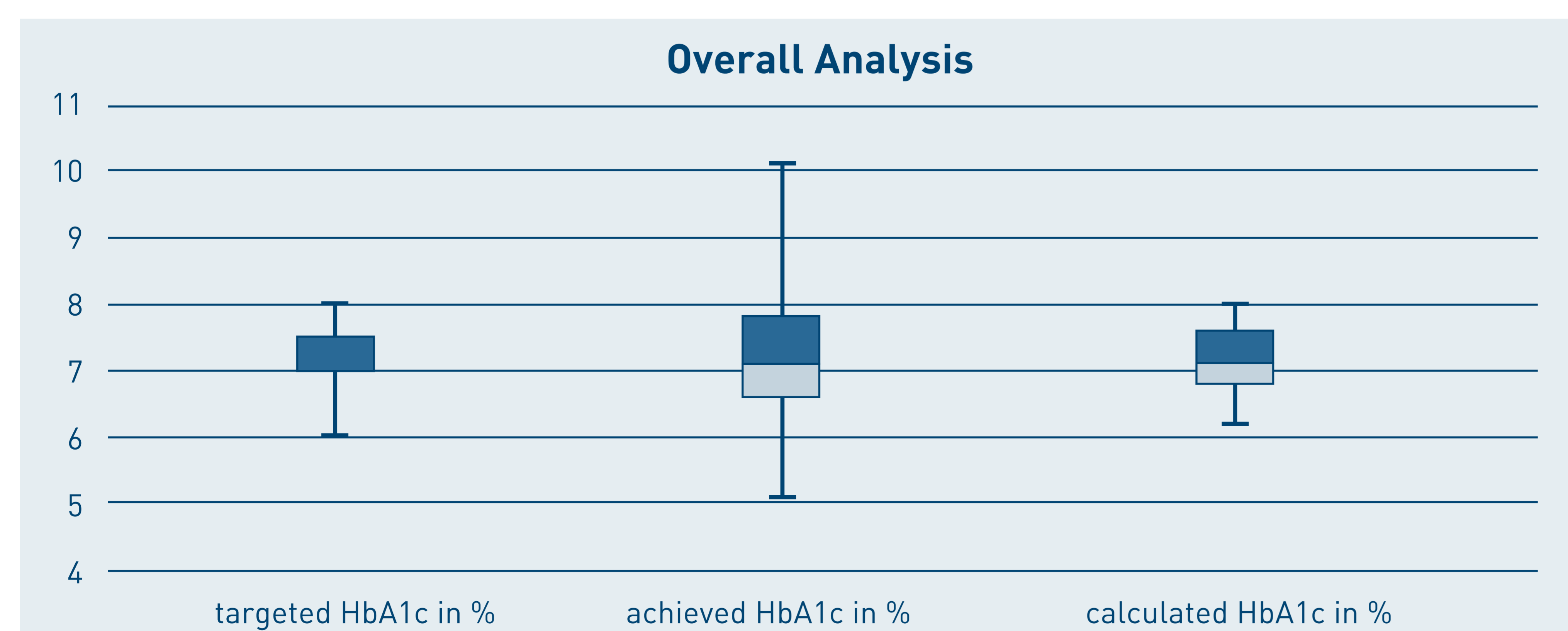
To assess the usefulness of a simple tool (GLYCEMIZER®) to calculate individual HbA1c-goals in patients with T2DM in general practice.

### Results

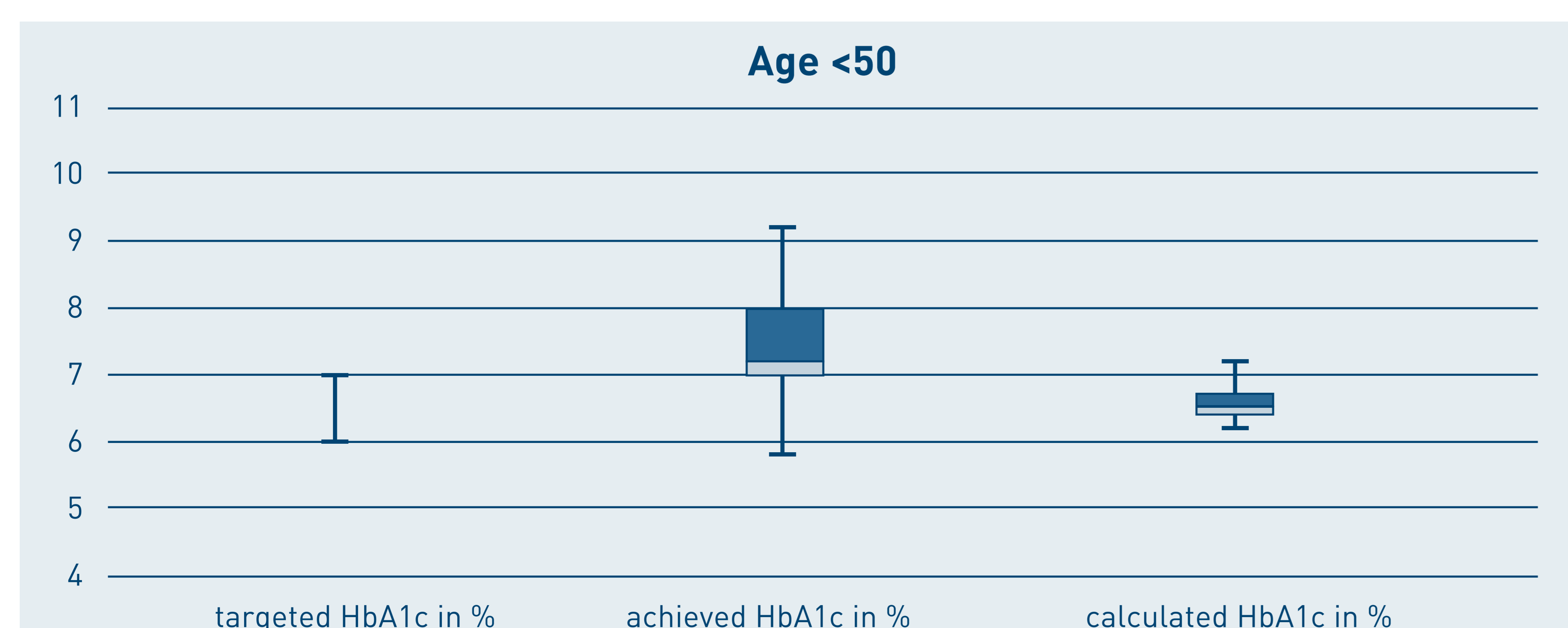
A total of 184 files (patients' mean age: 69y) were collected by 6 participating general practitioners from the Werdenberg-Sarganserland region in eastern Switzerland. 4 patients did not meet the inclusion criteria [Tab. 1]. The overall median calculated HbA1c-goal did not differ from the targeted and achieved levels (7.1% vs. 7.0% vs. 7.1%,  $p=0.89$ ) [Fig. 2]. There was a significant difference between achieved and calculated HbA1c-levels in patients aged <50 ( $n=13$ , median 7.2% vs. 6.5%,  $p=0.01$ , goals not achieved) [Fig. 3] and patients aged >71 ( $n=85$ , median 6.9% vs. 7.5%,  $p=0.005$ , lower levels achieved in relation to calculated HbA1c-goals) [Fig. 4]. Both in patients treated with insulin ( $n=44$ ) and in patients without insulin ( $n=136$ ) the achieved HbA1c-levels met the calculated goals (no insulin: 6.9% vs. 7.0%, ns; with insulin: 7.8% vs. 7.7%, ns) [Fig. 5]. In regard to CKD-stages 3 and 4 the achieved HbA1c-levels were significantly lower than calculated ( $n=41$ , median 6.9% vs. 7.6%,  $p=0.001$ ) [Fig. 6].

	Male	(%)	Female	(%)	Total / Ø	(%)
Patients	106	58,9	74	41,1	180	100
Age Ø y	66		72		69	
Age <50y	9	8,5	4	5,4	13	7,2
Age 51-70y	57	53,8	25	33,8	82	45,6
Age >71y	40	37,7	45	60,8	85	47,2
T2D duration Ø y	9,5		11		10	
T2D duration <5y	38	35,9	22	29,7	60	33,3
T2D duration 6-15y	47	44,3	29	39,2	76	42,2
T2D duration >16y	21	19,8	23	31,1	44	24,4
Insulin use	25	23,6	19	25,7	44	24,4
CKD 1, 2	93	87,7	46	62,2	139	77,2
CKD 3, 4	13	12,3	28	37,8	41	22,8

[Tab. 1] Baseline characteristics. Note, women included in this cross sectional study were older, had a longer history of diabetes and more frequently an impaired renal function.



[Fig. 2] Overall analysis ( $n=180$ ). This boxplot displays the distribution of the HbA1c levels comprising all patients in this study. The median of the three examined HbA1c-values (targeted, achieved and calculated) reaches 7.0% vs. 7.1% vs. 7.1%. The box represents the mean 50% of the data. The lower limit is the 25th percentile, the upper one the 75th percentile. The median is the bar in the middle. The whiskers show the minimal and maximal value respectively.



[Fig. 3] Patients aged <50 ( $n=13$ ). The achieved HbA1c-levels show a median of 7.3%, whereas the calculated ones amount only to a median of 6.5%.

### Methods

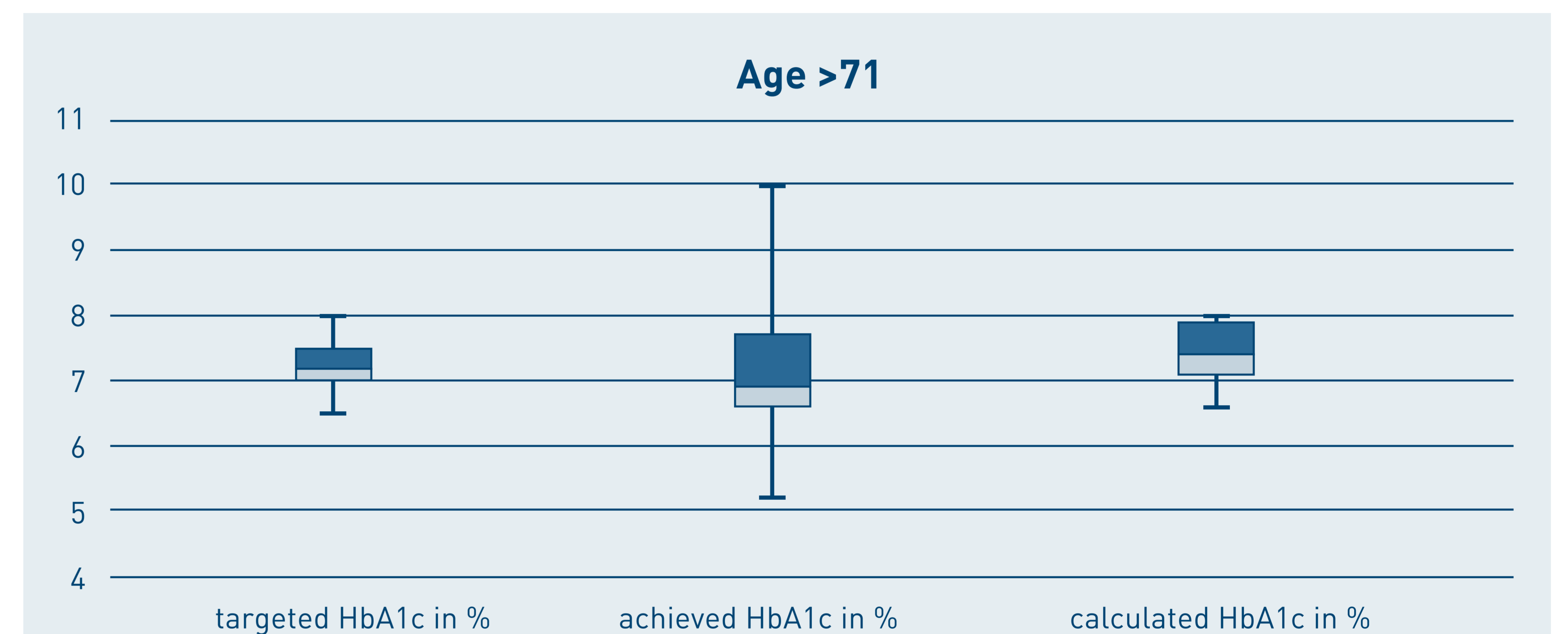
In this cross-sectional study participating general practitioners were asked to anonymously file at least 30 consecutive patients with T2DM presenting in his/her office from May 1<sup>st</sup> to August 15<sup>th</sup> 2016. Demographic, clinical and biochemical data were used to feed the GLYCEMIZER®-tool to calculate the individual HbA1c-goals. A statistical analysis was conducted in order to compare the calculated HbA1c-goals with targeted (gut feeling) and achieved HbA1c-levels.

### Conclusions

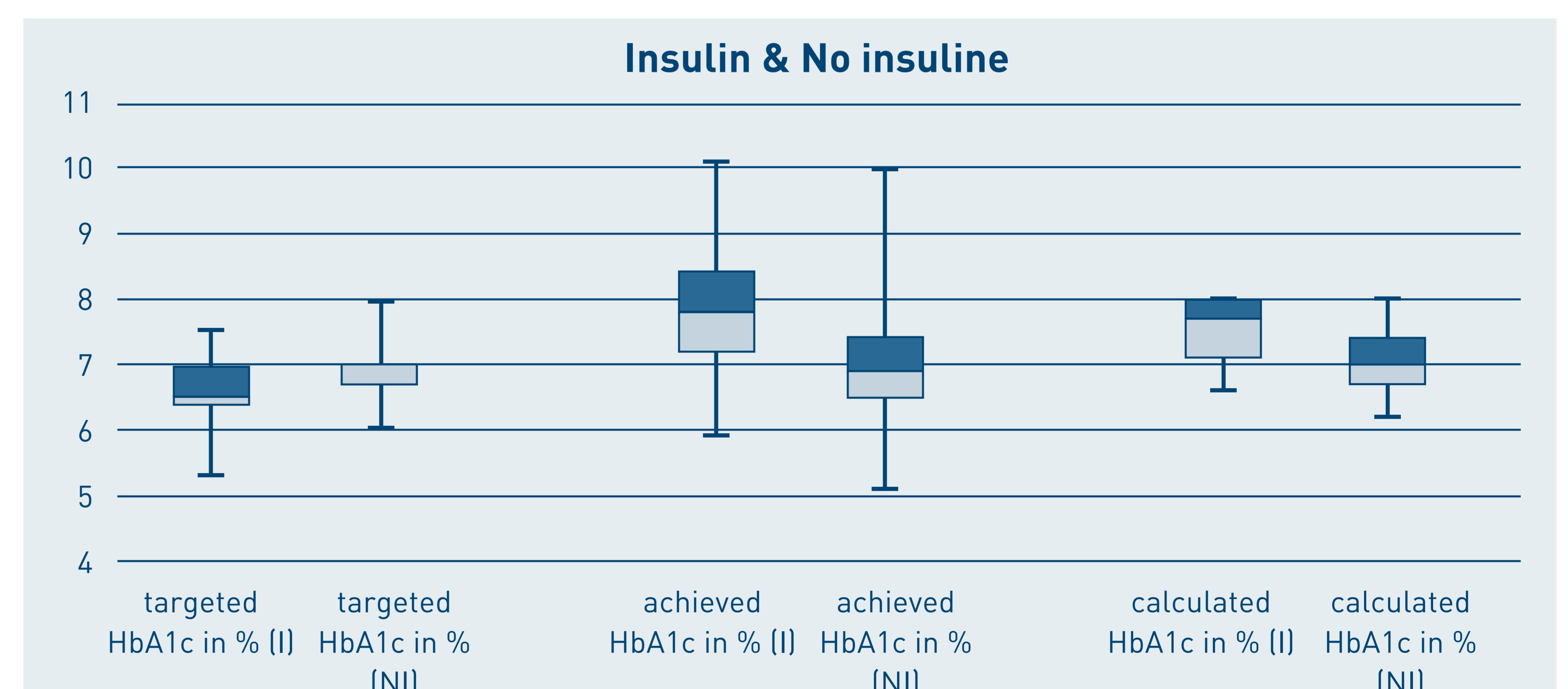
Calculating HbA1c-goals using the GLYCEMIZER® tool is more accurate than relying on gut feeling and specifically useful in the treatment of type 2 diabetic patients of less than 50 years of age, as well as in patients aged more than 71 years. Additionally, it is helpful in patients with CKD-stages 3+. The participating GPs showed a very high compliance with the actual treatment-guidelines for T2DM.

### Abbreviations

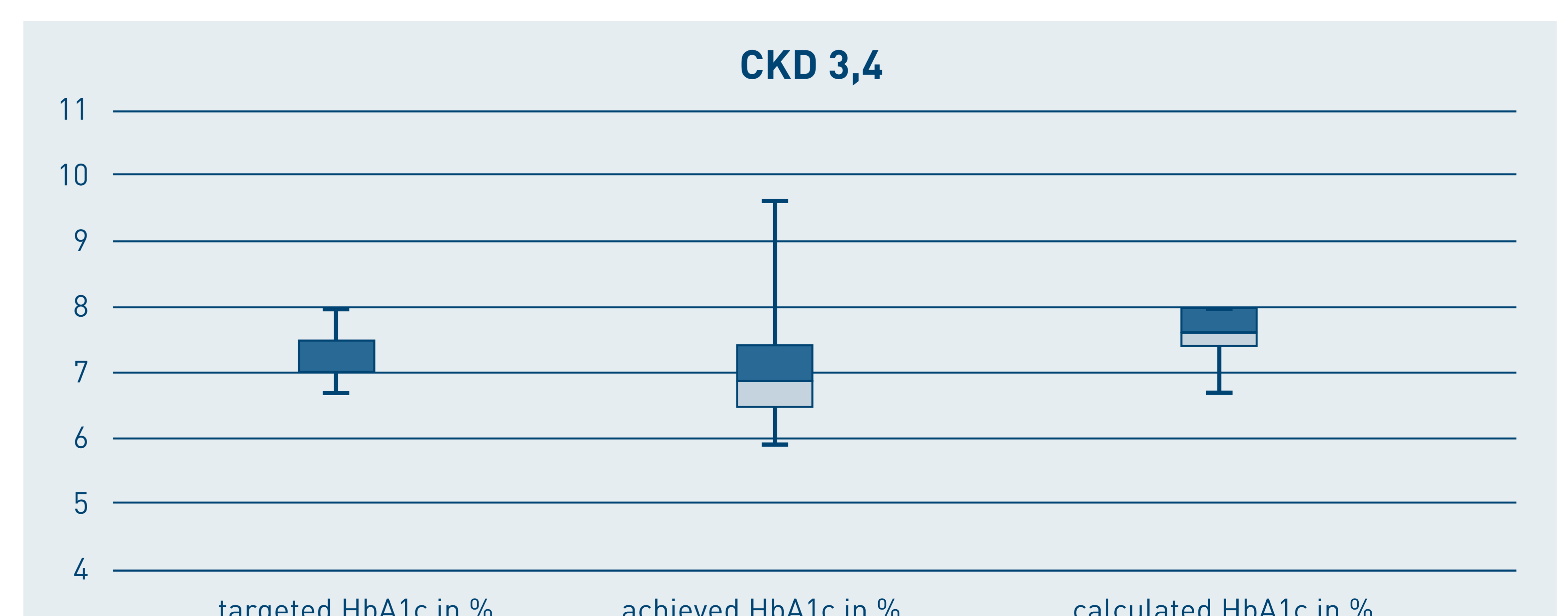
CKD Chronic Kidney Disease, eGFR estimated Glomerular Filtration Rate, HbA1c Glycated Haemoglobin, T2DM Type 2 Diabetes Mellitus, GP General Practitioner.



[Fig. 4] Patients aged >71 ( $n=85$ ). Note that the median achieved HbA1c is 6.9%, whereas the calculated one using GLYCEMIZER® comes to 7.5%.



[Fig. 5] Patients treated with insulin ( $n=44$ ) vs. no insulin ( $n=136$ ). No significant difference was observed between achieved and calculated HbA1c-levels within the specific groups. On the other hand there is a significant difference between the achieved HbA1c-levels when the insulin-group is compared to the non-insulin-group.



[Fig. 6] Patients with renal dysfunction CKD 3,4 ( $n=41$ ). The median HbA1c reaches 6.9%. Calculated with GLYCEMIZER® it should amount to 7.6%.