

# ASSESSMENT OF GLYCEMIC CONTROL WITH A COMPOSITE METRIC: REVISED GLUCOSE PENTAGON

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## Introduction

New ways to describe overall diabetes control are needed, since HbA1c does not reflect the severity/frequency of hypoglycemia, hyperglycemia and glycemia variability. CGM data was used to update the previously published composite metric-the Glucose Pentagon(1)- creating a revised Glucose Pentagon (rPG).

## Materials and Methods

The five axes of the rGP describe the area of a pentagon for non-diabetes (green) to which those with diabetes (red) can be compared (Fig. 1). The intensity of hypoglycemia and hyperglycemia is the magnitude of the vectors of area-under-the-curve (AUC) <70 mg/dL and time/day <70 mg/dL and AUC >180 mg/dL and time/day >180 mg/dL, respectively (Fig. 2). We applied baseline and end-of-study data from the low-glucose suspend ASPIRE In-Home study(2) to the rGP and compared the changes in rGP area to changes in HbA1c (Table). A representative example is shown in Fig. 3 & 4.

## Results

ASPIRE	Visit 1	Visit 4	Visit 1	Visit 4
	SAP + LGS	SAP + LGS	SAP (control)	SAP (control)
Mean Glucose	146,6	158,1	147,2	155,6
SD	60,8	63,7	61,5	64,9
Time out of range (ToR)	507,5	551,0	503,2	561,8
Intensity HYPER	6127,2	9461,9	6148,4	9853,1
Intensity HYPO	210,4	92,2	221,9	161,6
Pentagon Area	1380	1240	1344	1338
HbA1c	7,26	7,25	7,21	7,17

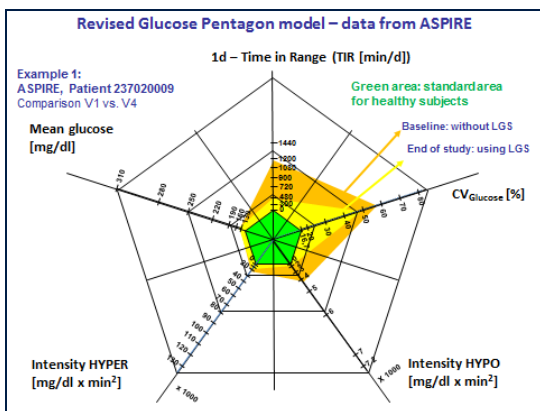


Fig. 3

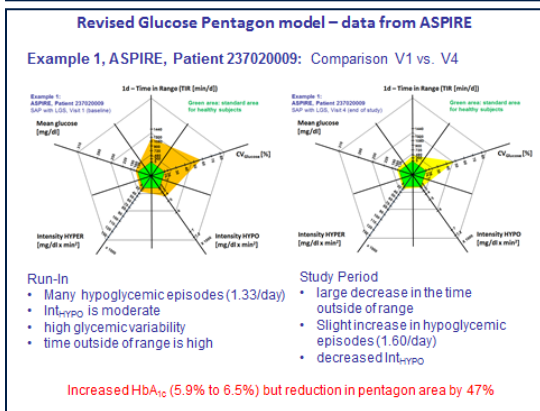


Fig. 4

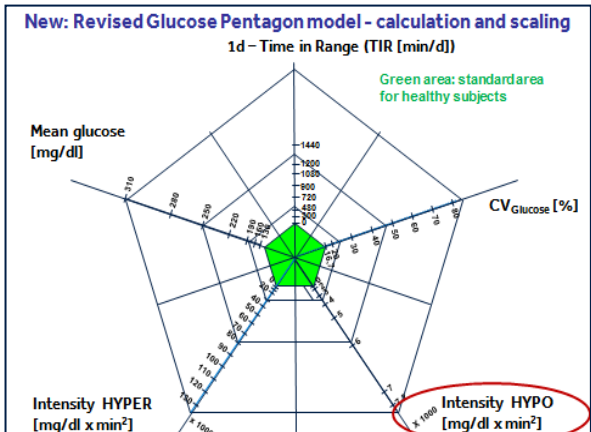


Fig. 1

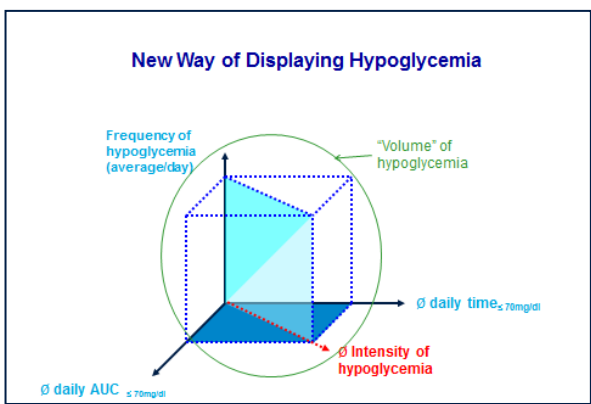


Fig. 2

## Conclusions

1. The rGP, using the "intensity of hypoglycemia" metric, describes overall glycemic control numerically and visually.
2. The rGP is a composite metric that provides a clinically relevant assessment of interventions such as a low-glucose suspend system.
3. The rGP can be used to investigate the effects of a technology, drug or psycho-educational intervention on glycemic control.

## References

1. Thomas A et al., *Diab Tech Ther* 2009;11:399-409.
2. Bergenstal R et al., *N Eng J Med* 2013;369:224-232.