

Evidence Tables
SM1: Is self-monitoring effective in assisting in the management of people with type 2 diabetes?

Reference	Study type Evidence level	Number of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Source of funding																					
<p>Jansen JP. Self monitoring of glucose in type 2 diabetes mellitus: a Bayesian meta-analysis of direct and indirect comparisons. <i>Current Medical Research and Opinion</i> 2006; 22(4): 671-681</p> <p>Ref ID: 4916</p>	<p>Systematic review 1+</p> <p>Mixed treatment comparison meta-analysis.</p>	<p>N=12 studies</p> <p>Including N=2011 patients</p>	<p>Study conducted both direct and indirect comparisons of strategies. Estimated the effect of SMUG vs no monitoring despite there being no pair-wise comparison.</p> <p>Study inclusion criteria: Published RCT's, study population all T2Ds independent of the type of treatment, intervention for at least one study group was SMBG, reported on outcomes HbA1c.</p> <p>Baseline characteristics: each study was given a score of internal validity. There was no difference in this total quality score comparing different interventions. No other reported assessment of baseline characteristics of participants.</p> <p>Mean score for internal</p>	<p>N=3 studies compared SMBG with SMUG</p> <p>N=8 studies SMBG vs no self monitoring</p> <p>N=2 studies compared different SMBG with SMBG and feedback programmes</p>	<p>SMUG</p> <p>No intervention</p> <p>SMBG with feedback</p>	<p>12 weeks to 12 months</p>	<p>Change from baseline (CFB) in HbA1c</p>	<p>Pooled Δ HbA1c for no self monitoring: -0.47% (95% CI -0.66 to -0.28%)</p> <p>Pooled Δ HbA1c for SMUG: -0.61% (95% CI -1.20 to -0.05%)</p> <p>Pooled Δ HbA1c for SMBG: -0.87% (95% CI -1.14 to -0.58%)</p> <p>Pooled Δ HbA1c for SMBG + feedback: -1.48% (95% CI -2.06 to -0.89%)</p> <p>Relative efficacy of different monitoring strategies in all T2D patients</p> <table border="1"> <thead> <tr> <th></th> <th>Difference in Δ HbA1c¹ (95% CI)</th> <th>Pr (%)²</th> </tr> </thead> <tbody> <tr> <td>SMUG vs NSM</td> <td>-0.02 (-0.70; 0.62)</td> <td>54</td> </tr> <tr> <td>SMBG vs NSM</td> <td>-0.40 (-0.70; -0.07)</td> <td>99</td> </tr> <tr> <td>SMBG + FB vs NSM</td> <td>-1.04 (-1.66; -0.36)</td> <td>>99</td> </tr> <tr> <td>SMBG vs SMUG</td> <td>-0.38 (-1.00; 0.30)</td> <td>88</td> </tr> <tr> <td>SMBG+ FB vs SMUG</td> <td>-1.01 (-1.77; -0.14)</td> <td>99</td> </tr> <tr> <td>SMBG+ FB vs SMBG</td> <td>-0.63 (-1.22; -0.05)</td> <td>98</td> </tr> </tbody> </table>		Difference in Δ HbA1c ¹ (95% CI)	Pr (%) ²	SMUG vs NSM	-0.02 (-0.70; 0.62)	54	SMBG vs NSM	-0.40 (-0.70; -0.07)	99	SMBG + FB vs NSM	-1.04 (-1.66; -0.36)	>99	SMBG vs SMUG	-0.38 (-1.00; 0.30)	88	SMBG+ FB vs SMUG	-1.01 (-1.77; -0.14)	99	SMBG+ FB vs SMBG	-0.63 (-1.22; -0.05)	98	<p>Roche diagnostics</p>
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¹ Adjusted for baseline HbA1c and weighted for internal validity

² Probability that 1st intervention results in a greater HbA1c reduction than the 2nd intervention.

<p>care system. <i>Diabetes Care</i> 2006; 29(12):2625-2631.</p> <p>Ref ID: 4911</p>		<p>randomisation</p> <p>Not possible to blind assessors</p>	<p>regimen, no internet access or no internet knowledge, previous participation in similar problems, use of any other web-based diabetes management programme.</p> <p>No baseline differences between groups wrt clinical characteristics and mode of treatment.</p>	<p>monitoring system (IBGMS) and electronically organised circuit for diabetes management including both online and offline systems.</p> <p>Patients uploaded SMBG results on an online chart.</p> <p>Feedback given on this 2 weekly</p>	<p>Conventional note keeping system</p>		<p>measure developed by the authors)</p>	<table border="1" data-bbox="1599 245 2011 580"> <tr> <td>HbA1c ≥ 7%</td> <td></td> <td></td> <td></td> </tr> <tr> <td>HFI</td> <td>0.47 ± 0.23</td> <td>0.78 ± 0.51</td> <td>0.001</td> </tr> <tr> <td>HFI if basal HbA1c < 7%</td> <td>0.39 ± 0.26</td> <td>0.84 ± 0.67</td> <td>0.03</td> </tr> <tr> <td>HFI if basal HbA1c ≥ 7%</td> <td>0.51 ± 0.27</td> <td>0.74 ± 0.40</td> <td>0.015</td> </tr> </table> <p>Compliance⁵ with regular SMBG: Basal HbA1c level showed no significant difference between the GC and PC subgroups in either IBGMS or control group. HFI: no difference between compliance groups in the IBGMS group; however in control group if basal HbA1c ≥ 7% GC group had significantly lower HFI (0.43 ± 0.20 vs. 0.93 ± 0.37; p<0.01)</p>	HbA1c ≥ 7%				HFI	0.47 ± 0.23	0.78 ± 0.51	0.001	HFI if basal HbA1c < 7%	0.39 ± 0.26	0.84 ± 0.67	0.03	HFI if basal HbA1c ≥ 7%	0.51 ± 0.27	0.74 ± 0.40	0.015	
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<p>Davis WA, Bruce DG, Davis TM. Is self-monitoring of blood glucose appropriate for all type 2 diabetic patients? The Fremantle Diabetes Study. <i>Diabetes</i></p>	<p>Cross-sectional study of T2D patients from FDS 3</p> <p>Cohort study of sample of</p>	<p>N=1286 baseline patients drawn from FDS</p> <p>N=531 followed up over 5 years</p>	<p>From Fremantle Diabetes study cohort, N=1426, N=1294 (91%) T2D</p> <p>Inclusion criteria: All T2D, reporting SMBG status at baseline.</p> <p>Exclusion criteria: not described in this paper</p>	<p>SMBG users⁶</p>	<p>SMBG non-users</p>	<p>5 years</p>	<p>Proportion performing SMBG, SMBG frequency, glycaemic control, hypoglycaemic episodes, diabetes</p>	<p>Prevalence of SMBG: 70% reported performing SMBG.</p> <p>Throughout follow up there was no difference in A1C or FPG either overall or within treatment groups in patient who used SMBG than those who did not (p≥0.05).</p> <p>There were no differences in fasting plasma glucose (FPG) or A1C between</p>	<p>Raine Foundation, University of Western Australia</p>																

⁵ Good compliance (GC) defined as compliance with SMBG ≥ 80% compared with the initially recommended rate.

⁶ Participants were identified as adherent SMBG users if they were wither treated with OHS's and/or insulin and performed SMBG one or more times per day or were managed by diet and undertook any SMBG.

<p>Care 2006; 29(8):1764-1770.</p> <p>Ref ID: 4913</p>	<p>these T2Ds 2+</p>	<p>(not mentioned if these were randomly selected or were all patients who completed the 6 assessments)</p>	<p>Baseline characteristics: of the cross sectional study, participants who performed SMBG were more likely to be younger, married, exercising, on insulin therapy, to have self-reported episodes of hypoglycaemia, to have attended diabetes education and to have seen a diabetes specialist in the previous year than those who did not perform any SMBG.</p> <p>The participants who completed the 5 follow up visits were significantly younger, more likely to be male, have shorter diabetes duration, better glycaemic control, fewer diabetes complications, less likely to have died during follow up (p≤0.001).</p>				<p>quality of life (DQOL) measured using modified DQOL scale and the Rosser index.</p>	<p>adherent and non-adherent users by treatment group (p≥0.09).</p> <p>SBMG frequency was not associated with FPG (trend p=0.19)</p> <p>There were no significant associations between FPG and A1C and SBMG frequency within diabetes treatment groups (p≥0.08).</p>			
<p>Kalergis M, Nadeau J, Pacaud D, Yared Z, Yale JF. Accuracy and reliability of reporting self-monitoring of blood glucose results in adults with type 1 and type 2 diabetes. <i>Canadian Journal of Diabetes</i> 2006; 30(3):241-247.</p>	<p>Case series 3</p>	<p>N=60 N=45 T2D N=15 T1D (results not reported here)</p>	<p>Inclusion criteria: Patients 18-65 years, attending metabolic day centre, Quebec, Canada, adults with T2D recruited into an 8-month nutrition-education trial. Participants were required to perform SMBG and record the results in a logbook as part of the trial.</p> <p>Exclusion criteria: not mentioned</p>	<p>T2D patients</p>		<p>8 months</p>	<p>Glycaemic control: HbA1c</p>	<p>There was no significant relationship between frequency of monitoring and glycaemic control.</p> <p>There was no significant relationship between accuracy of reporting and glycaemic control.</p> <p>Reliability of reporting/proportion of values accurately reported at study end(%):</p> <table border="1" data-bbox="1594 1270 2020 1327"> <tr> <td>Very reliable (>90%)</td> <td>59</td> </tr> </table>	Very reliable (>90%)	59	<p>MediSense Inc provided BG meters and test strips.</p>
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Ref ID: 4920			Baseline characteristics: age 57 ± 1.2 Sex (male:female) 30:15 T2D duration (years) 9 ± 1 BMI 30.2 ± 0.8					<table border="1"> <tr> <td>Fairly reliable (50-90%)</td> <td>17</td> </tr> <tr> <td>Unreliable (<50%)</td> <td>24</td> </tr> </table>	Fairly reliable (50-90%)	17	Unreliable (<50%)	24		
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<p>Moreland EC, Volkening LK, Lawlor MT, Chalmers KA, Anderson BJ, Laffel LM. Use of a blood glucose monitoring manual to enhance adherence in adults with diabetes: a randomized controlled trial. <i>Archives of Internal Medicine</i> 2006; 166(6):689-695.</p> <p>Ref ID: 4917</p>	RCT 1+	N=199 65% T2D	<p>Inclusion criteria: Adult diabetics at high risk (HbA1c≥8.0%)</p> <p>Exclusion criteria: Medical history of established renal disease (serum creatinine ≥2.0 mg/dL), major visual impairment, myocardial infarction within the last 6 months, or major psychiatric disorder, pregnancy.</p> <p>Baseline characteristics: Mean age 49.2 ± 13.0 yrs Duration of diabetes 10.7 6.2 yrs BMI 30.1 ± 6.3 kg/m² HbA1c 9.1 ± 1.1% T2D monitoring 1.6 ± 1.2 times/day</p> <p>The 3 groups were similar with respect to age, sex, ethnicity, education level, BMI, type of diabetes, therapy, and duration of diabetes.</p> <p>HbA1c was slightly higher in the BGM+ group compared with the SC</p>	<p>N=50 Blood Glucose Monitoring Owners Manual (BGM+)</p> <p>N=50 BG meter only (MT)</p> <p>Both groups received a 30 min diabetes education session focussed on BG monitoring and support from a certified diabetes educator.</p>	N=99 Standard care (SC) involving individual or group standard diabetes education accredited by ADA.	6 months	<p>Primary outcome: frequency of BG monitoring</p> <p>Secondary outcomes: glycaemic control, knowledge of HbA1c, affect regarding BG monitoring results.</p>	<p>Frequency of BG monitoring: BGM+: 2.8 ± 1.5 times daily MT: 2.0 ± 1.3 times daily (p=0.01 cf to BGM+) SC: 2.1 ± 1.7 times daily (p=0.04 cf to BGM+)</p> <p>InT2D frequency of BG monitoring increased from 1.5 ± 1.3 times daily to 2.3 ± 1.4 times daily (p=0.007). No significant change in daily monitoring frequency in the MT group.</p> <p>Glycaemic control: HbA1c change BGM+: -0.3 ± 1.28% MT: -0.04 ± 1.31% SC: 0.04 ± 1.10% (not reported if difference between arms is significant). No significant differences between T1D and T2D.</p> <p>In multivariate analyses, assignment to the BGM+ group was a significant predictor of improvement in glycaemic control (p=0.03), after controlling for age, sex, duration of diabetes, education level, socioeconomic status and baseline HbA1c level.</p>	Roche Diagnostics, NIH, Charles H. Hood foundation, Katherine Adler Astrove Youth Education Fund.					

			group (p=0.06) Not mentioned if ITT, do not mention randomisation method, allocation concealment, blinding, or loss to follow up.									
Schutt M, Kern W, Krause U, Busch P, Dapp A, Grziwotz R et al. Is the frequency of self-monitoring of blood glucose related to long-term metabolic control? Multicentre analysis including 24,500 patients from 191 centers in Germany and Austria. <i>Experimental & Clinical Endocrinology & Diabetes</i> 2006; 114(7):384-388. Ref ID: 4914	Cross sectional study 3 N=191 centres in Germany	N=24 500 N=1949 1 T1D N=5009 T2D (N=202 1 on insulin, N=2988 on OAD/diet)	Inclusion criteria: Patients recruited from the DPV-Wiss-database. No exclusion criteria mentioned Baseline characteristics for T2D patients: Mean duration: 5.8 years HbA1c 8.5% SMBG (insulin) 2.7/day SMBG (OAD/diet) 2.0/day Not mentioned on what basis these participants were selected from the database, or whether these were all the patients in the database.	German T1D and T2D on the DPV-Wiss-Database.	n/a	n/a	Glycaemic control	HbA1c change in T2D's: More frequent SMBG was associated with better metabolic control Insulin treated patients: HbA1c reduction of 0.16% for one additional SMBG/day (p<0.0001) OAD/Diet patients: HbA1c increase of 0.14% for one additional SMBG/day (p<0.0001)				
Siebolds M, Gaedeke O, Schwedes U, SMBG Study Group. Self-monitoring of blood glucose--psychological aspects relevant to	RCT 1+ Multicentre, parallel group study in Germany and Austria.	N=223 N=113 SMBG N=110 no SMBG	Inclusion criteria: T2D, treated with diet alone or diet and oral antidiabetic agents. Exclusion criteria: not mentioned Baseline characteristics:	SMBG group use a blood glucose device Measure blood glucose 6 x on 2	Unstructured counselling	6 months	Change in HbA1c after 24 weeks of SMBG Body weight QOL ⁷		SMBG	No SMBG	p	Bayer AG
								HbA1c (%)	-1.0 ± 1.08	-0.54 ± 1.41	0.0086	
								Body weight (kg)	-2.3 ± 3.3	-1.6 ± 3.5	-	
								Treatment	3.52 ± 7.19	3.6 ± 7.63	-	

