

Appendix A

Table 1
Evaluation Table

Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Data Analysis	Findings	Decision for Use in Practice/Application to Practice
<p>Author: DPPRG (2002)</p> <p>Title: Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin</p> <p>Country: US</p> <p>Funding: NIH, NIDDKD, CDC; DA, ADA, Bristol-Myers Squibb, Parke-Davis</p> <p>Bias: Publication bias</p>	ITT	<p>Design: RCT</p> <p>Purpose: To evaluate whether a lifestyle intervention or metformin prevent or delay the onset of diabetes</p>	<p>N=3234</p> <p>Demographics: A 50.6, M 32.3%, BMI 34.0</p> <p>Setting: participants receiving lifestyle intervention or metformin</p> <p>Inclusion criteria: ≥25 years, BMI ≥ 24, BG 95-125 fasting, BG 140-199 OTT</p> <p>Exclusion criteria: taking BG altering meds or if illness limiting participation</p> <p>Attrition: 0%</p>	<p>IV1- SLRM IV2-SLRP IV3-ILM</p> <p>DV-BG DV2-HgA1C DV3-PA DV4-N</p>	<p>DM: BG & HgA1C</p> <p>Weight (kg)</p> <p>PA by Modifiable Activity Questionnaire</p> <p>N by Block food-frequency questionnaire</p>	Paired t-tests	<p>n = 3234</p> <p>WL: 0.1 kg SLRP 2.1 kg SLRM 5.6 kg ILM (P<0.001)</p> <p>DM 28.9% SLRP 21.7% SLRM 14.4% ILM</p>	<p>Level of Evidence: 2</p> <p>Strengths: variance in population, large sample size</p> <p>Weaknesses: Supporters included metformin drug company</p> <p>Conclusions: Intensive lifestyle modifications can make a clinically significant difference in weight reduction and incidence of diabetes</p> <p>Feasibility: Easy, low cost, widely applicable</p>
<p>Author: Wadden (2014)</p> <p>Title: Behavioral Treatment of Obesity in Patients Encountered in Primary Care</p>	TTM	<p>Design: SR</p> <p>Purpose: Review of behavioral counseling for overweight and obese patients recruited from primary care, as</p>	<p>N=12 studies N=3893 participants N=50-665 per study</p> <p>Demographics: BMI 32.0-38.5, A 49.4-55.7, Women 46.5-100%</p> <p>Setting: NA</p>	<p>IV1-PCP IV2-REI IV3-increased PA IV4-TBT IV5-TI IV6-IP IV7-PC</p> <p>DV1-WL</p>	Weight in kg	Independent review by paired authors	<p>PCP-quarterly or less behavioral counseling, mean loss of 0.6 to 1.7 kg in 6 to 24 months</p> <p>TBT- 12-month mean weight loss 0.6 kg (P = .15)</p>	<p>Level of Evidence: 1</p> <p>Strengths: solid study design, large participant population</p> <p>Weaknesses: None of studies had PCP that followed CMS</p>

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

<p>Settings A Systematic Review</p> <p>Country: US</p> <p>Funding: grant DK-65018 from NIDDKD</p> <p>Bias: NI</p>		<p>delivered by PCP working alone or with TI (eg, medical assistants, registered dietitians), or by TI working independently.</p>	<p>Inclusion criteria: RT, EL, recruited from primary care settings with BMI \geq 25, included behavioral WL counseling: N, PA, and behavioral strategies, offered behavioral counseling for at least 3 months and with at least 6 months follow-up, used PCP: working alone, with TI, or by TI alone who provided behavioral counseling IP or PC, included a comparator intervention, included objectively measured change in weight reported by: kg, BMI units, or % change, randomized 15 or more participants per treatment group</p> <p>Exclusion criteria: trials for weight gain prevention or use of pharmaceutical agents</p> <p>Attrition: NR</p>				<p>TI, IP, PC-mean 6-month weight losses at least 5 kg maintained at month 24 12-month mean weight loss 1.6 kg ($P = .15$)</p>	<p>guidelines for counseling, independent review by authors</p> <p>Conclusions: Intense counseling, by phone or in person, can lead to clinical significant weight loss. Interventions with decreased intake, increased PA, and behavioral counseling work best. Longer FU, less weight loss results</p> <p>Feasibility: low cost, convenient to counsel during appointments</p>
<p>Author: Spring (2013)</p> <p>Title: Integrating</p>	<p>ELM, DI</p>	<p>Design: RCT</p> <p>Purpose: Determine if physician-directed</p>	<p>N=70</p> <p>Demographics: A 57.7, M 85.5%, BMI 36.3-36.4</p>	<p>IV1-SG IV2-MG IV3-SMD IV4-PA IV5-PC</p>	<p>Weight in kg & % of WL</p> <p>Technology fluency</p>	<p>Randomization, computer generated using randomly</p>	<p>MG lost a mean of 3.9 kg more (3.1% more weight loss relative to SG)</p>	<p>Level of Evidence: 2</p> <p>Strengths: good sample size, tested technology fluency</p>

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

<p>Technology Into Standard Weight Loss Treatment A Randomized Controlled Trial</p> <p>Country: US</p> <p>Funding: VA Merit Review F442291 Rehabilitation Research and Development; PDA tool funded by grant HL075451 from the National Heart, Lung, and Blood Institute.</p> <p>Bias: NI</p>		<p>weight loss treatment can be improved by adding mobile technology</p>	<p>Setting: patients attending outpatient VA groups, recording N & PA with PDA, using PC</p> <p>Inclusion criteria: BMI 26-40, W < 181.4 kg, able to participate in moderate-intensity PA</p> <p>Exclusion criteria: Recent psychiatric hospitalization, current substance abuse, binge eating disorder, or severe mood disorder</p> <p>Attrition: 1.4%</p>	<p>DV1-WL 3, 6, 9, & 12 months</p>	<p>assessment</p>	<p>permuted blocks</p> <p>Longitudinal covariance pattern model, using unstructured variance-covariance matrix</p>	<p>(95% CI, 2.2-5.5 kg, P = .44)</p> <p>3 months MG 4.4 kg (95% CI, 2.7-6.1 kg) SG 0.86 kg (95% CI, 0.04-1.8 kg)</p> <p>6 months MG 4.5 kg (95% CI, 2.1-6.8 kg) SG 1.0 kg (95% CI, 0.7 to 2.5 kg)</p> <p>9 months MG 3.9 kg (95% CI, 0.8 to 6.9 kg) SG 0.9 kg (95% CI, 1.1 to 2.9 kg)</p> <p>12 months MG 2.9 kg (95% CI, 0.5 to 6.2 kg) SG 0.02 kg (95% CI, 2.1 to 2.1 kg)</p>	<p>before entry to reduce that as a limitation</p> <p>Weaknesses: predominantly male population</p> <p>Conclusions: Using mobile technology with biweekly phone calls & group sessions can lead to clinical significant weight loss</p> <p>Feasibility: high cost using PDA for participants</p>
<p>Author: Shaw (2013)</p> <p>Title: Mobile Health Messages Help Sustain Recent Weight Loss</p> <p>Country: US</p> <p>Funding: DUHSITF, NIH NRSA (1F31 NR012599), NINR,</p>	<p>ELM, DI</p>	<p>Design: RCT</p> <p>Purpose: To help people sustain weight loss by daily text messages</p>	<p>N=120 PRO N=41 PRE N=40 AC N=39</p> <p>Demographics: white 94%, college educated 81%, financially stable 80%, female 59%, working 58%, married 48%, mean weight 247.5 pounds, mean BMI 38.1</p> <p>Setting: participants</p>	<p>IV1-PRO IV2-PRE IV3-AC IV4-TM</p> <p>DV1-W 1 & 3 months</p>	<p>Weight self-reported by TM</p> <p>Height self-reported by TM</p> <p>Regulatory Focus Questionnaire to determine promotion or prevention focus for individuals</p>	<p>Permuted block randomization with a block size of 3</p> <p>Statistical analyses using SAS Version 9.3</p> <p>Nondirectional statistical tests with the significance level set at .05</p> <p>Nonparametric</p>	<p>3 month PRO, PRE mean WL 15 pounds AC mean WL 10 pounds (P = .08)</p>	<p>Level of Evidence: 2</p> <p>Strengths: appropriate statistical analyses of data obtained</p> <p>Weaknesses: patient reported weight & height</p> <p>Conclusions: TM based intervention using promotion & prevention effective for clinical</p>

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVASRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

<p>DVAHSRD (TPP-21-021 & RCS-08-027)</p> <p>Bias: NI</p>			<p>receiving daily text messages</p> <p>Inclusion criteria: own a mobile phone, able to receive text messages, lost 5% of their body weight since entering DFC</p> <p>Exclusion criteria: mentally incapable</p> <p>Attrition: Total 15%, PRO 9.8%, PRE 20%, AC 15%</p>			<p>methods applied when assumptions were not met</p> <p>Chi-squared Kruskal-Wallis tests to evaluate group baseline differences & covariates</p>		<p>significant WL and sustained WL</p> <p>Feasibility: low cost, highly applicable (most people have TM capable phones)</p>
<p>Author: Mastellos (2014)</p> <p>Title: Transtheoretical model stages of change for dietary and physical exercise modification in weight loss management for overweight and obese adults (Review)</p> <p>Country: UK</p> <p>Funding: Imperial College of London, UK; Public Service Department, Brunei Government, Brunei</p>	<p>TTM SOC</p>	<p>Design: SR</p> <p>Purpose: assess the effectiveness of dietary intervention or physical activity interventions, or both, and other interventions based on the TTM SOC to produce sustainable (one year and longer) weight loss in overweight and obese adults.</p>	<p>N=2971, from 3 studies IG: 1467 CG: 1504</p> <p>Demographics: BMI 25-39.9</p> <p>Setting: searches of The Cochrane Library, MEDLINE, EMBASE and PsycINFO</p> <p>Inclusion criteria: RCTs using TTM SOC, one of the outcome measures of the study was WL by BMI, participants were overweight or obese adults only, intervention was delivered by healthcare professionals or</p>	<p>IV1-LM IV2-UC DV1-W</p>	<p>W in kg</p>	<p>NI due to clinical and methodological heterogeneity of studies</p> <p>Summarized LM WL</p>	<p>WL: 0.2 kg – 2.1 kg LM at 24 months</p>	<p>Level of Evidence: 1</p> <p>Strengths: large participant population</p> <p>Weaknesses: small study number for review, variable method quality, self-reported measures, low level of evidence</p> <p>Conclusions: N & PA interventions can create meaningful WL compared to UC</p> <p>Feasibility: low cost, widely applicable</p>

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

Darussalam			trained lay people					
Bias: Selection bias			Exclusion criteria: Use of other framework, children, non-RCT study					
			Attrition: NR					
Author: Ali (2012)	ITT	Design: SR & MA	N= 3,797, 28 studies	IV1-LM DV1-WL	WL by %	Pooled mean sociodemographic characteristics-sample weighted	WL: -3.99 percent (95% confidence interval: -5.16, -2.83; I2 1/4 52:4 percent) at 12 months	Level of Evidence: 1
Title: How Effective Were Lifestyle Interventions In Real-World Settings That Were Modeled On The Diabetes Prevention Program?		Purpose: test the effects of a lifestyle intervention for people at high risk for diabetes	Demographics: A 55.1, M 31.1%, white 70.9%, mean BMI 34			Estimated pooled percentage weight by fitting a random-effects meta-analysis model	Each additional core session attended was associated with additional weight change of -0.26 percentage (95% confidence interval: -0.54, 0.01)	Strengths: large sample size, high quality studies included
Country: US			Setting: searched the MEDLINE, EMBASE, Cochrane Library, and ClinicalTrials.gov			I ² statistic for heterogeneity of studies		Weaknesses: Funding not reported
Funding: NR			Inclusion criteria: studies published between January 1, 2003 - April 30, 2011 & translated the Diabetes Prevention Program trial lifestyle intervention to real-world settings, original intervention studies, included adults at high risk for DM, reported starting W and WL at end					Conclusions: DPP based interventions for lifestyle modifications create clinically significant WL in real-world settings
Bias: NI			Exclusion criteria: studies after 2003, studies not using DPP intervention					Feasibility: low cost, widely applicable
			Attrition: < 20% for studies included					

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

<p>Author: Noel (2012)</p> <p>Title: Intensity and Duration of Obesity-Related Counseling: Association with 5-Year BMI Trends Among Obese Primary Care Patients</p> <p>Country: US</p> <p>Funding: DVAHSRD (project no. iiR 05-121)</p> <p>Bias: NI</p>	<p>TTM</p>	<p>Design: CS</p> <p>Purpose: Determine whether obesity-related education such as nutrition counseling or a weight management program was associated with declines in BMI.</p>	<p>N=179,881</p> <p>Demographics: M 94.1%, married 65.2%, A 60, mean baseline BMI 34.6, class I obesity 66.2%, class II obesity 23.4%, class III obesity 10.4%, hypertension 83.3%, hyperlipidemia 78.1%, diabetes 45.1%, osteoarthritis 43.9%, low back pain 40.8%, ischemic heart disease 39.3%, gastrointestinal reflux disease 32.9%, depression 27.4%</p> <p>Inclusion criteria: Veterans BMI \geq30 kg/m² and \geq1 PCP visit in fiscal year 2002 with W and H recorded</p> <p>Exclusion criteria: diagnosis of cancer other than nonmelanoma skin cancer, those who received an antiobesity medication, underwent bariatric surgery at any time during the 5-year study period, had insufficient number of quarterly BMI</p>	<p>IV1-IS IV2-IO IV3-IL IV4-L IV5-NC</p> <p>DV: BMI</p>	<p>BMI from H and W obtained during routine clinical encounters</p>	<p>Multinomial logistic regression</p> <p>Bivariate analysis of obesity-related counseling</p> <p>Multivariable GEE analyses</p>	<p>10% decrease in BMI vs. NC (OR, 95% CI):</p> <p>L 0.95 (0.91, 0.98) $P < 0.01$</p> <p>IL 0.93 (0.87, 0.99) $P < 0.05$</p> <p>IO 0.91 (0.75, 1.10) $P = ns$</p> <p>IS 0.91 (0.79, 1.05) $P = ns$</p>	<p>Level of Evidence: 4</p> <p>Strengths: decent representation of common diseases</p> <p>Weaknesses: Data entry error possible for H & W used to determine BMI</p> <p>Conclusions: IS counseling leads to clinical significant WL when compared to NC</p> <p>Feasibility: can be implemented into practice easily by increasing # of counseling appointments</p>
---	------------	--	--	---	---	--	--	---

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

			values, or BMIs were censored Attrition: NR					
Author: Norris (2005a) Title: Long-term non-pharmacological weight loss interventions for adults with type 2 diabetes mellitus (Review) Country: US Funding: CDC Bias: NI	NR	Design: SR Purpose: Assess the effectiveness of lifestyle and behavioral weight loss and weight control interventions for adults with type 2 diabetes	N=4,659; 22 studies Demographics: A 55, BMI 33.2, W 91.8kg Setting: search of MEDLINE, EMBASE, CINAHL, ERIC, PsychInfo, Web of Science, Biosis, Nutrition Abstracts and Review, The Cochrane Library, and the Cochrane Central Register of Controlled Trials Inclusion criteria: published or unpublished RCT, published up to 2004, any language, examined WL or weight control strategies using one or more N, PA, or behavioral interventions, with a follow-up interval of at least 12 months Exclusion criteria:	IV1-LM IV2-UC DV1-W	Weight in kg	Effects combined using a random effects model	LM WL: 1.7 kg (95 % CI, 0.3 to 3.2); 3.1% of baseline body weight	Level of Evidence: 1 Strengths: large sample size, high quality studies analyzed Weaknesses: participants self-selected, no unpublished studies used Conclusions: multicomponent interventions with very low/low calorie diets help WL in adults with type 2 DM Feasibility: low cost, easily applied to practice

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-male analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

			non-RCT studies, children, non-DM, interventions for pharmacologic therapy, surgery, acupuncture, and hypnosis with the purpose of WL					
Author: Norris (2005b) Title: Long-term non-pharmacological weight loss interventions for adults with prediabetes (Review) Country: US Funding: CDC Bias: NI	NR	Design: SR Purpose: Assess the effectiveness of N, PA, and behavioral WL, and weight control interventions for adults with prediabetes	N= 5,168; 9 studies Demographics: A 51.2, M ~50%, BMI 28.7, baseline weight 82.2 kg Setting: search of MEDLINE, EMBASE, CINAHL, ERIC, PsychInfo, Web of Science, Biosis, Nutrition Abstracts and Review, The Cochrane Library, and the Cochrane Central Register of Controlled Trials Inclusion criteria: published or unpublished RCT, published up to 2004, any language, examined WL or weight control strategies using one or more N, PA, or behavioral interventions, with a follow-up interval of	IV1-LM IV2-UC DV1-W DV2-BMI	Weight in kg BMI	Effects combined using a random effects model	LM WL: 2.8 kg (95% CI 1.0 to 4.7) (3.3% of baseline body weight) LM BMI: decreased by 1.3 kg/m ² (95% CI, 0.8 to 1.9)	Level of Evidence: 1 Strengths: Large sample size Weaknesses: Small study number included Conclusions: WL interventions using N, PA, or behavioral interventions can produce significant improvements in W among persons with prediabetes and a significant decrease in DM incidence Feasibility: low cost, easily applied to practice

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVASRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

			at least 12 months Exclusion criteria: children, not prediabetic, interventions for pharmacologic therapy, surgery, acupuncture, and hypnosis with the purpose of WL Attrition: 4-43%					
Author: Schellenburg (2013) Title: Lifestyle Interventions for Patients With and at Risk for Type 2 Diabetes Country: US Funding: AHRQ Bias: NI	NR	Design: SR & MA Purpose: Review the effectiveness of lifestyle interventions on minimizing progression to DM in high-risk patients or progression of clinical outcomes in patients with type 2 DM.	N= 39-3234 in 78 studies Demographics: M 88%, A 44-85, BMI 26.2 kg/m ² (SD, 3.9) to 38.3 kg/m ² (SD, 5.9) Setting: search of Cochrane Central Register of Controlled Trials, CINAHL, EMBASE, SCOPUS, MEDLINE Inclusion criteria: 1980 to June 2013, RCTs, LM for more than 3 months with N, PA, and one other component, EL, adults with type 2 DM or high risk for it (metabolic syndrome, prediabetes, insulin resistance, impaired fasting glucose,	IV1-LM IV2-UC DV1-W DV2-BMI	Weight (kg) BMI (W & H)	MA using a DerSimonian–Laird random-effects model Statistical heterogeneity was quantified using the I ² statistic Mean differences or standardized mean differences for continuous outcomes and risk ratios for dichotomous outcomes	High risk for DM: DM development RR 0.35 (CI 0.14 to 0.85) BMI MD 1.02 (95% CI, 1.43 to 0.61) Weight Change MD 7.00 (95% CI, 9.97 to 4.03) Patients with DM: All cause mortality RR _{meds} 0.75 (95% CI, 0.53 to 1.06) BMI MD _{all} 0.10 (95% CI, 0.91 to 0.72) Weight Change MD _{no meds} 1.53 (95% CI, 2.09 to	Level of Evidence: 1 Strengths: comprehensive analysis, large study inclusion therefore large population Weaknesses: Conclusions: Comprehensive LM decrease incidence of type 2 DM in high-risk patients and increase WL in patients with type 2 DM Feasibility: low cost, easily applied to practice

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

			<p>impaired glucose tolerance, syndrome X, dysmetabolic syndrome X, and the Reaven syndrome)</p> <p>Exclusion criteria: NS, assumed anything not meeting inclusion criteria</p> <p>Attrition: NR</p>				<p>0.97); MD_{meds} 11.62 (CI, 12.37 to 10.87)</p>	
--	--	--	--	--	--	--	--	--

Key: A-mean age, AC-attention control group, ADA-American Diabetes Association, AHRQ- Agency for Healthcare Research and Quality, BG-blood glucose, BMI-body mass index, CDC-Centers for Disease Control and Prevention, CI-confidence interval, CG-control group, CS-cohort study, DA-Diabetes Association, DI-Diffusion of Innovation, DFC-Duke Diet and Fitness Center, DM-diabetes mellitus, DPP-Diabetes Prevention Program, DPPRG-Diabetes Prevention Program Research Group, DUHSITF-Duke University Health System Information Technology Fellowship, DV-dependent variables, DVAHSRD-Department of Veteran Affairs Health Services Research and Development, EL-English language, ELM-Elaboration Likelihood Model, FU-follow up, GEE-generalized estimating equations, H-height, IG-intervention group, IHS-Indian Health Service, IL-irregular limited, ILM-intense lifestyle modifications, IO-intense-only, IP-in person, IS-intense-and-sustained, ITT-Intention-to-Treat Principle, IV-independent variables, L-limited, LM-lifestyle modifications, M-male, MA-meta analysis, MG-mobile group, N-nutrition, NA-not applicable, NC-no counseling, NI-none identified, NIDDKD-National Institute of Diabetes and Digestive and Kidney Diseases, NIH-National Institutes of Health, NINR-National Institute of Nursing Research, NR-not recorded, NRSA-National Research Service Award, NS-not stated, OR-odds ratio, OTT-oral tolerance test, PA-physical activity, PC-phone calls, PCP-primary care providers, PDA-personal digital assistant, PRO-promotion group, PRE-prevention group, REI-reduced energy intake, RCT-randomized control trial, RR-risk ratio, RT-randomized trials, SG-standard group, SLRM-standard lifestyle recommendations with metformin, SLRP-standard lifestyle recommendations with placebo, SMD-self-monitored diet, SOC-stages of change, SR-systematic review, TBT-traditional behavioral therapy, TI-trained interventionists, TM-text message, TTM-Trans-theoretical model, UC-usual care, UK-United Kingdom, US-United States, W-weight, WL-weight loss.

Appendix B

Table 2
Synthesis Table

	<i>DPPRG</i>	<i>Wadden</i>	<i>Spring</i>	<i>Shaw</i>	<i>Mastellos</i>	<i>Ali</i>	<i>Noël</i>	<i>Norris</i>	<i>Norris</i>	<i>Schellenburg</i>
<i>Year</i>	2002	2014	2013	2013	2014	2012	2012	2005a	2005b	2013
<i>LOE</i>	II	I	II	II	I	I	IV	I	I	I
<i>Study Design</i>	RCT	SR	RCT	RCT	SR	SR, MA	CS	SR	SR	SR, MA
<i>Demographics</i>										
Mean Age	50.6	49.4-55.7	57.7	52	NS	55.1	60	55	51.2	44-85
% Male	32.3	0-53.5	85.5	41	NS	31.1	94.1	NS	50	NS
Mean BMI	34.0	32.0-38.5	36.3-36.4	38.1	25.0-39.9	34.0	34.6	33.2	28.7	26.2-38.3
<i>Interventions & Outcomes</i>										
PC		↓	↓			↓				
IP-Individual	↓	↓			↓	↓	↓	↓	↓	↓
IP-Group	↓		↓					↓	↓	↓
MT (N & W)			↓							
TM				↓						

Key: BMI-body mass index, CS-cohort study, CSS-cross-sectional study, DPPRG-Diabetes Prevention Program Research Group, IP-in person, IPI-in-person individual, IPG-in-person group, LOE-level of evidence, MA-meta analysis, MT-mobile tracking, N-nutrition, NRCT-non-randomized control trial, NS-not specified, OS-online support, PC-phone calls, RCT- randomized control trial, RCVT-randomized crossover trial, SM-self managed, SR-systematic review, TM-text messages, W-weight ↓-weight reduction