Summary Evidence Tables of Included Studies Providing Economic Assessments of Combined Diet and Physical Activity Promotion Programs to Reduce Type 2 Diabetes Among People at Increased Risk

Studies Providing Information on Intervention Costs*

DPP/DPPOS

Study, Year, Location	Population Size, *n*	Population Characteristics	Intervention Setting/ Intervention Format	Duration	Intervention Intensity (Number of Sessions)	Method	Type of Personnel	Cost Valuation for Identifying Clients (Recruitment; Screening)	Cost Valuation for Implementing the Intervention	Total Program Costs per Person	Cost per Person per Session
DPP Research Group, 2012 United States	3,243	Participants with IGT and fasting hyperglycemia, aged ≥25 y, BMI ≥24 kg/m^2, 68% women, 45% minority	Clinical trial Intensive lifestyle modification	10 y	Year 1-3: Same as DPP Year 4-10: 4 quarterly group visits, with the option of 2 additional sessions each year	Individual	Health professionals: Case managers Medical staff	–	Staff time: Questionnaire Training materials: Questionnaire Other components: Questionnaire	Year 1: $2,469 Year 2: $1,090 Year 3: $1,127 Year 4: $214 Year 5: $150 Year 6: $134 Year 7: $167 Year 8: $171 Year 9: $157 Year 10: $201 Total: $5,881	$102

Translational DPP Studies

Study, Year, Location	Population Size, *n*	Population Characteristics	Intervention Setting/ Intervention Format	Duration	Intervention Intensity (Number of Sessions)	Method	Type of Personnel	Cost Valuation for Identifying Clients (Recruitment; Screening)	Cost Valuation for Implementing the Intervention	Total Program Costs per Person	Cost per Person per Session
Kramer et al, 2009 United States	42	Adults with prediabetes and/or metabolic syndrome	Community setting Modified DPP (group lifestyle balance program)	1 y	Core: 12 group sessions Maintenance: 9 group sessions Total: 21 sessions	Group	Health professionals: Trained prevention professionals	–	Staff time: Staff report Training materials: NR Other components: NR	$335	$16

Study, Year, Location	Population Size, *n*	Population Characteristics	Intervention Setting/ Intervention Format	Duration	Intervention Intensity (Number of Sessions)	Method	Type of Personnel	Cost Valuation for Identifying Clients (Recruitment; Screening)	Cost Valuation for Implementing the Intervention	Total Program Costs per Person	Cost per Person per Session
Kramer et al, 2011 United States	81	Adults with prediabetes and/or metabolic syndrome	Community setting Modified DPP (group lifestyle balance program)	1 y	Core: 12 group sessions Maintenance: 9 group sessions Total: 21 sessions	Group	Trained laypeople: Diabetes educators	–	Staff time: NR Training materials: NR Other components: NR	$357	$17
Krukowski et al, 2013 United States	116	Older adults (aged ≥60 y) who were obese (BMI ≥30 kg/m^2) and who had no significant memory problems	12-session translational DPP per reference 20	1 y	Core: 12 weekly group sessions Total: 12 sessions	Group	Trained laypeople: Trained lay health educator	Recruitment: Staff compilation Screening: –	Staff time: Staff compilation Training materials: Staff compilation Other components: Staff compilation	$191	$16
Vadheim et al, 2010 United States	84	Adults at high risk for both diabetes and CVD	Community setting Adapted DPP	10 mo	Core: 16 weekly group sessions Maintenance: 6 monthly group sessions Total: 22 sessions	Group	Mixed health professional and trained laypeople: Diabetes educator, nurse	–	Staff time: NR Training materials: NR Other components: NR	$652	$30
Smith et al, 2010 United States	NR	BMI ≥25 kg/m^2 and metabolic syndrome	2 urban and 2 rural medical practices in Pennsylvania Modified DPP To help patients with metabolic syndrome lose weight and improve at least 1 metabolic syndrome component	3 mo	12 group sessions Total: 12 sessions	Group	Mixed health professional and trained laypeople: Trained health professional and lay health workers	Recruitment: – Screening: NR	Staff time: NR Training materials: NR Other components: NR	$407	$34

Study, Year, Location	Population Size, *n*	Population Characteristics	Intervention Setting/ Intervention Format	Duration	Intervention Intensity (Number of Sessions)	Method	Type of Personnel	Cost Valuation for Identifying Clients (Recruitment; Screening)	Cost Valuation for Implementing the Intervention	Total Program Costs per Person	Cost per Person per Session
Irvine et al, 2011 United Kingdom	3,887	At-risk individuals with diabetes (aged 45-70 y)	Community setting Delivered by Diabetes Prevention Facilitators Promote a 7% weight loss within 6 mo using both diet and exercise	7 mo	Core: 4 group educational sessions in 3 mo Maintenance: 4 monthly group sessions Total: 8 sessions	Group	Mixed health professional and trained laypeople: Diabetes prevention facilitators Physicotherapist Volunteers with diabetes	Recruitment: – Screening: NR	Staff time: Questionnaire Training materials: Questionnaire Other components: Questionnaire	$443	$55
Ockene et al, 2012 United States	312	Participants who were at high risk for type 2 diabetes	Community setting LLDPP between 2004 and 2007 Healthy food choices, walking 4000 steps per day	1 y	3 individual and 13 group sessions Total: 16 sessions	Mixed group and individual	Trained laypeople: Trained community health workers	–	Staff time: NR Training materials: NR Other components: NR	$839	$53
Lawlor et al, 2013 United States	301	Overweight or obese participants (BMI 25-39 kg/m^2) with elevated fasting blood glucose indicating prediabetes	Community setting HELP PD trial A DPP-based lifestyle weight-loss group	2 y	Core: 26 weekly group sessions and 3 individual sessions in 6 mo Maintenance: 18 monthly group sessions Total: 47 sessions	Mixed group and individual	Mixed health professional and trained laypeople: Trained community health workers and dietician	Recruitment: – Screening: NR	Staff time: Questionnaire Training materials: Questionnaire Other components: Questionnaire	Year 1: $613 Year 2: $305 Total: $918	$20

Translational non-DPP Studies

Study, Year, Location	Population Size, *n*	Population Characteristics	Intervention Setting/ Intervention Format	Duration	Intervention Intensity (Number of Sessions)	Method	Type of Personnel	Cost Valuation for Identifying Clients (Recruitment; Screening)	Cost Valuation for Implementing the Intervention	Total Program Costs per Person	Cost per Person per Session
Feldman et al, 2013 Sweden	142	KMSP in primary care, diagnosed with metabolic syndrome	Primary care Promote healthy lifestyles, in particular changes in dietary and physical activity habits	1 y	Core: 26 group lifestyle counseling and support sessions twice a week for 3 mo Maintenance: 18 biweekly group counseling and support sessions for 9 mo Total: 44 sessions	Group	Health professional: Practice nurses Health coordinator	Recruitment: Program documentation Screening: –	Staff time: Program documentation Training materials: Program documentation Other components: Program documentation	$427	$10<<
Sagarra et al, 2014 Spain	552	Aged 45-75 y at risk for diabetes with IGT and/or IFG	Primary care setting DE-PLAN project 6-h structured lifestyle intervention (diet and physical activity) similar to Finnish DPS using specific teaching techniques Individual or group format	4.2 y	Year 1: 4 sessions (6 h) Years 2-4: Continuous intervention through telephone calls, text message, letters, and interviews, scheduled for every 6-8 wk	Group or individual (2 groups)	Health professional: Physicians, nurses, and dieticians	Recruitment: Forms Screening: Forms	Staff time: Forms Training materials: Forms Other components: Forms	$1,133 for the whole intensive intervention group $1,077 for the group format $1,242 for the individual format	$4 for the group format* $43 for individual format*
Jacobs-van der Bruggen, 2007 Netherlands	NR	Adults with moderate risks for diabetes, obese adults aged 30-70 y	Community setting Nutrition and exercise for adults with moderate risks for diabetes	3 y	Year 1: 4 individual and 1 group session; 1 individual advice by a researcher; 52 weekly fitness programs Years 2-3: 3 individual and 1 group session;	Mixed group and individual	Health professionals: Dietitian, not clear who delivered the fitness program	–	Staff time: Questionnaire Training materials: Questionnaire Other components: Questionnaire	$1,416	Regular session: $64 Fitness: $8

					52 biweekly fitness programs Total: 114 sessions Nutrition: 9 sessions Fitness: 105 sessions						

* Only included cost to deliver lifestyle intervention

Abbreviations
BMI = body mass index
CVD = cardiovascular disease
DE-PLAN = Diabetes in Europe Prevention Using Lifestyle, Physical Activity, and Nutritional Intervention
DPP = Diabetes Prevention Program
DPPOS = Diabetes Prevention Program Outcome Study
DPS = Diabetes Prevention Study
HELP PD = Healthy Living Partnerships to Prevent Diabetes
IFG = impaired fasting glucose
IGT = impaired glucose tolerance
KMSP = Kalmar Metabolic Syndrome Program
LLDPP = Lawrence Latino Diabetes Prevention Project
NR = not reported

Studies Providing Information on Cost-Effectiveness Assessments

Within-Trial Analysis (*n* = 4)

Study, Year, Country	Population Characteristics	Duration of Intervention/Follow-up	Cost Data Source	Benefit Data Source	Effectiveness Outcome	Model	QALY/DALY/LYG	ICER Health System	ICER Society
DPP Research Group, 2003 United States*	IGT	3 y/3 y	Real DPP cost data	Survey, CMS fee schedule	Reduce incidence by 58%	Within trial	0.072 additional QALY	Individual: $50,694/QALY Group: $14,476/QALY	Individual: $83,130/QALY Group: $46,820/QALY
DPP Research Group, 2012 United States*	Participants with IGT and fasting hyperglycemia, ≥25 y, BMI ≥24 kg/m^2, 68% women, 45% minority	10 y/10 y	Real DPP cost data	Survey	DPPOS trial 0.12 additional QALY	Within trial	0.12 additional QALY	Individual: $15,846/QALY Group: $1,819/QALY	Individual: $24,373/QALY Group: $10,351/QALY
Irvine et al, 2011 United Kingdom	At-risk individuals with diabetes (aged 45-70 y)	7 mo/7 mo	Real cost data	Survey, NHS reference cost, drug formulary	0.012 additional QALY	Within trial	0.012 additional QALY	$40,347/QALY	†
Sagarra et al, 2014 Spain	Aged 45-75 y, at risk for diabetes with IGT and/or IFG	4.2 y/4.2 y	Real cost data	Forms	Reduce incidence by 36.5% 0.012 additional QALY	Within trial	0.012 additional QALY	$5,359/QALY	†

Modeling the Trial or Extension of Trials (*n* = 16)

Study, Year, Country	Population Characteristics	Duration of Intervention/Follow-up	Cost Data Source	Benefit Data Source	Effectiveness Outcome	Model	QALY/DALY/LYG	ICER Health System	ICER Society
Segal et al, 1998 Australia	Seriously obese Seriously obese with IGT or NGT	2-3 y/25 y	Based on literature	Survey, insurance scheme	Reducing incidence from 70% to 30%	Markov model	1 additional LYG	$4,561/LYG	†
Caro et al, 2004 Canada	Overweight or obese with IGT	5 y/10 y	Based on Finnish DPS	Literature, fee schedule, formularies	Based on DPP, Finnish DPS At 5th year, incidence −58%	Markov model	0.31 additional LYG	$806/LYG	†

Study, Year, Country	Population Characteristics	Duration of Intervention/Follow-up	Cost Data Source	Benefit Data Source	Effectiveness Outcome	Model	QALY/DALY/LYG	ICER Health System	ICER Society
					At 10th year, incidence −22%				
Palmer et al, 2004 Australia, France, Germany, Switzerland, United Kingdom	IGT	3 y/lifetime	DPP apply to fee schedule	Claims	Based on DPP, assuming the effect would not persist beyond the 3rd year	Markov model	0.08 (Australia) 0.07 (France) 0.07 (Germany) 0.06 (Switzerland) 0.16 (United Kingdom)	−$8,176/LYG (Australia) −$11,682/LYG (France) −$15,018/LYG (Germany) −$19,029/LYG (Switzerland) $8,565/LYG (United Kingdom) Mean: −$9,073/LYG	†
Eddy et al, 2005 United States*	IGT	Until diabetes onset/30 y	Year 1 to 3: DPP cost Year 4 and beyond: DPP year 3 cost	Accounting data	Effect of DPP persists as long as receiving the intervention At end of 30 y, incidence −15%	Archimedes Diabetes Model	0.159 additional QALY	Individual: $94,752/QALY Group: $18,409/QALY Individual: $221,549/QALY (HMO perspective) Group: $41,879/QALY (HMO perspective)	–
Herman et al, 2005 United States	IGT	Until diabetes onset/lifetime	Year 1 to 3: DPP cost Year 4 and beyond: DPP year 3 cost	Claims	The effect of DPP persists as long as receiving the intervention At the end of lifetime, incidence −24%	Markov model	0.57 additional QALY	Individual: $1,805/QALY Group: −$10,450/QALY	Individual: $13,574/QALY
Ackerman et al, 2006 United States	Overweight or obese 50-year-old adults with IGT	Until diabetes onset/lifetime	Year 1 to 3: DPP cost Year 4 and beyond: DPP year 3 cost	Claims	Based on DPP The DPP effect will continue as long as receiving intervention	Markov model	Age 50 y: 0.59 additional QALY Age 65 y: 0.27 additional QALY	Age 50 y: $2,070/QALY Age 65 y: $2,536/QALY	†
Hoerger et al, 2007	Aged 45-74 y, overweight and	Until diabetes onset/lifetime	Year 1 to 3: DPP cost	Claims	The effect of DPP persists as long as	Markov model	0.040 additional QALY	Individual: $14,154/QALY	Individual: $28,849/QALY

Study, Year, Country	Population Characteristics	Duration of Intervention/Follow-up	Cost Data Source	Benefit Data Source	Effectiveness Outcome	Model	QALY/DALY/LYG	ICER Health System	ICER Society
United States*	obese (BMI ≥25 kg/m^2) Groups		Year 4 and beyond: DPP year 3 cost		receiving the intervention			Group: $396/QALY	
Jacobs-van der Bruggen et al, 2007 Netherlands	Adults with moderate risks for diabetes, obese adults aged 30-70 y	3 y/lifetime	2 published Dutch trials	Literature	BMI: −0.3 to −1.5 kg/m^2 Physical activity: 50%-75% more from inactive to moderately active, 20% more from moderately to active	Markov model	1.17 additional QALY	$8,735/QALY	†
Lindgren et al, 2007 Sweden	IGT Age 60 y BMI >25 kg/m^2, FPG >6.1	6 y/lifetime	Finnish DPS	Literature	Based on Finnish DPS; no lasting effect if the intervention stops	Markov model	0.2 additional QALY	$14,852/LYG $13,367/QALY	$6,756/LYG $6,080/QALY
Gillies et al, 2008 United Kingdom	NR	Until diabetes onset/50 y	A systematic review of weight loss programs	Literature, such as UKPDS	Hazard ratio, −0.649 from review	Markov model	0.05 additional LYG 0.09 additional QALY	$25,083/LYG $14,352/QALY	†
Bertram et al, 2010 Australia	Age >55 y, or age >45 y plus high BMI, family history of type 2 diabetes mellitus or hypertension; people from "high-risk" groups	Average trial period/lifetime	A systematic review and meta-analysis of lifestyle interventions	Benefit schedule	Based on meta-analysis Relative risk: 0.49 Assuming 10% decay of effect after the intervention	Microsimulation model	0.05 additional DALY averted	$21,195/DALY	†
Smith et al, 2010 United States	BMI ≥25 kg/m^2 and metabolic syndrome	3 mo/3 y	A community-based DPP in Pennsylvania, United States	Literature (DPP, UKPDS, Framingham Heart Study)	By 1 y, metabolic risk: −16.2% By 3 y, risk: −19%	Markov model	0.01 QALY	$5,494/QALY	†
Neumann et al, 2011 Germany	FINDRISC between 11-20, or FINDRISC ≥21 and without	5 y/lifetime	SDPP	CODE-2 study calculation of average annual direct health care costs of persons	Based on literature, such as PREDIAS and SDPP in Germany	Markov model	0.02-0.03 QALY depending on sex and age	–	Age 30 y: −$41,772/QALY for men, −$52,136/QALY for women

Study, Year, Country	Population Characteristics	Duration of Intervention/Follow-up	Cost Data Source	Benefit Data Source	Effectiveness Outcome	Model	QALY/DALY/ LYG	ICER Health System	ICER Society
	diagnosis of diabetes			with NGT, IGT, and type 2 diabetes	Assuming the effectiveness of the intervention lasts only for 1 y after the intervention (disappears at 7th year)				Age 50 y: −$25,079/QALY for men, −$$35,217/QALY for women Age 70 y: $39,666/QALY for men, 32,259/QALY for women
Palmer et al, 2012 Australia	NR	10 y/lifetime	DPPOS, using medical benefits schedule in Australia	Survey, unit cost data in Australia	Based on DPPOS trial 0.12 additional QALY	Semi-Markov simulation	0.3 LYG 0.12 QALY	−$234/LYG −$411/QALY	†
Feldman et al, 2013 Sweden	NR	1 y/lifetime	Based on a lifestyle trial in Sweden	Swedish previously published studies	Based on the KMSP in Sweden Assuming effect continued at year 2 then gradually decreased, reaching the level at the start in year 5 and beyond (e.g., −0.4 to −1.1) in BMI in different risk groups +2 to −7 in waist circumference +0.2 to −0.6 in fasting glucose	Markov model	0.05-0.14 additional QALY	$4,104/QALY for men with high risk $23,327/QALY for women with high risk	Cost-saving for men with high risk $22,647/QALY for women with high risk
Png and Yoong, 2014 Singapore	IGT	3 y/3 y	DPP, applying unit cost obtained from the Singapore National University Hospital cost repository Singapore Household	Singapore National University Hospital cost repository	Based on 3-y DPP trial, not explicitly reporting the risk reduction	Markov model	0.05 QALY	$17,614/QALY	$37,580/QALY

Study, Year, Country	Population Characteristics	Duration of Intervention/Follow-up	Cost Data Source	Benefit Data Source	Effectiveness Outcome	Model	QALY/DALY/ LYG	ICER Health System	ICER Society
			Expenditure Survey						

Modeling Nationwide Diabetes Prevention Programs (*n* = 2)

Study, Year, Country	Population Characteristics	Duration of Intervention/Follow-up	Cost Data Source	Benefit Data Source	Effectiveness Outcome	Model	QALY/DALY/ LYG	ICER Health System	ICER Society
Colagiuri and Walker, 2008 Australia	Australians aged 45-74 y	10 y/10 y	An unspecified "lifestyle program" at Australia, $500 per person per year	Literature, such as UKPDS	Diabetes incidence in IGT: −60% In IFG: −30%	Markov model	36,009 additional DALY averted in the whole nation	$50,707/DALY	†
Zhuo et al, 2012 United States	18-64 y and 65-84 y U.S. population	Until diabetes onset/25 y	Year 1: Based on YMCA-DPP Year beyond: Based on DPPOS maintenance period	Claims	Year 1: Diabetes incidence: −40% to −50% Year 2: Diabetes incidence: −40% to −50% Year 3 and beyond: −10 to −15%	Markov model	0.04 additional LYG 0.03 additional QALY	16-64 y: −$8,378/QALY 65-84 y: −$5,760/QALY	†

Abbreviations

BMI = body mass index

CMS = Centers for Medicare & Medicaid Services

CODE-2 = Cost of Diabetes in Europe–Type 2

DALY = disability-adjusted life-year

DPP = Diabetes Prevention Program

DPPOS = Diabetes Prevention Program Outcome Study

DPS = Diabetes Prevention Study

FINDRISC = Finnish Type 2 Diabetes Risk Score

FPG = fasting plasma glucose

ICER = incremental cost-effectiveness ratio

IFG = impaired fasting glucose; IGT = impaired glucose tolerance; KMSP = Kalmar Metabolic Syndrome Program; LYG = life-year gained; NGT = normal glucose tolerance; NHS = National Health Service; NR = not reported; PREDIAS = Prevention of Diabetes Self-management Program; QALY = quality-adjusted life-year; SDPP = Saxon Diabetes Prevention Programme; UKPDS = United Kingdom Prospective Diabetes Study; YMCA = Young Men's Christian Association.

* Study reported from "societal perspective"; however, it was actually from "health system perspective" because only costs to the health system were included.

† Study did not include or report the cost or cost-effectiveness for the category.