



Objectives

- To model long-term clinical and cost-effectiveness of the Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) for people with newly diagnosed Type 2 diabetes, versus usual care in the UK.
- To consider issues arising in modelling education / behaviour modification programmes and how modelling can support the development of clinical research.

Methodology

The modelling undertakes a long-term cost-utility analysis with evidence from a 12-month multicentre cluster RCT using the Sheffield Type 2 Diabetes Model.

Short and long-term outcomes include

- HbA1c,
- lipids and
- systolic blood pressure,
- patients' weight and
- smoking status.

The model examines long-term use of therapies including oral hypoglycemic agents. Risk / disease progression models based on UKPDS and other evidence², estimate incidence of complications, mortality, costs³ and health-related quality of life^{4,5,6}.

Medication Use, NHS Resources in trial, Unit Costs and Overall Cost Difference

Medication	Average number of months use of medication per patient during the 12 months of the trial			Unit Cost £ per day	Effect of difference in usage on costs (intervention less control) £
	Control (unadjusted)	Intervention (unadjusted)	Difference* Mean (95% CI)		
Metformin	3.04	3.30	-0.35 (-0.92 to 0.22)	0.13	-1.38
Sulphonylurea	0.80	0.79	-0.15 (-0.48 to 0.18)	0.11	-0.50
Glitazone	0.20	0.20	-0.08 (-0.22 to 0.06)	1.14	-2.77
Lipid-lowering drugs	7.05	7.29	-0.17 (-0.87 to 0.53)	0.30	-1.55
Antihypertensive drugs	7.50	7.21	-0.04 (-0.48 to 0.40)	0.14	-0.17
Aspirin	4.43	4.45	+0.21 (-0.43 to 0.84)	0.04	0.26
Antidepressants	1.11	1.02	+0.10 (-0.15 to 0.34)	0.03	0.09
Total					-6.03

Use of Primary care	Mean number of visits			Unit Cost £	Effect of mean difference in usage on costs
	Control (unadjusted)	Intervention (unadjusted)	Difference* Mean (95% CI)		
Visits to a General Practitioner	4.34	4.33	+0.36 (-0.29 to 1.0)	30	+£10.80
Nurse visit	4.82	5.26	+0.25 (-0.45 to 0.94)	8	+£2.00
Physiotherapist	0.81	0.43	-0.35 (-0.82 to 0.11)	16	-£5.60
Podiatrist	1.36	1.23	-0.19 (-0.73 to 0.35)	9	-£1.71
Dietician	0.61	0.49	-0.15 (-0.36 to 0.07)	37	-£5.55
Optician	1.25	1.28	+0.10 (-0.09 to 0.28)	38.35	+£3.80
Total					+£3.74

Differences in Cardiovascular Risk Factors in the DESMOND Trial Biomedical Markers and Smoking Rates at Month 12

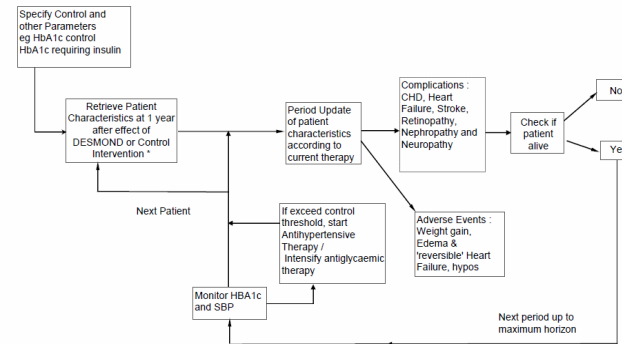
Marker	n	Cluster-adjusted difference between study arms (intervention minus control) : mean (95% CI)	
		Month 12	
HbA _{1c}	715	0.060 (-0.097 to +0.217)	
Total cholesterol (mmol/l)	709	-0.044 (-0.201 to +0.114)	
HDL (mmol/l)	526	0.015 (-0.043 to +0.073)	
Systolic Blood Pressure (mm Hg)	727	0.984 (-1.800 to +3.768)	

Conditional likelihood of smoking at month 12 given baseline status

	Control	Intervention	Difference
Probability smokes at month 12 given smoker at baseline	88.2% (0.774 to 0.990)	86.1% (0.748 to 0.974)	-2.1% (-0.026 to -0.016)
Probability smokes at month 12 given non-smoker at baseline	3.7% (0.010 to 0.064)	0% (0 - 0.000)	-3.7% (-0.010 to -0.064)

Conceptual Diagram for Sheffield Type 2 Diabetes Model

Long-term Disease State Progression Model

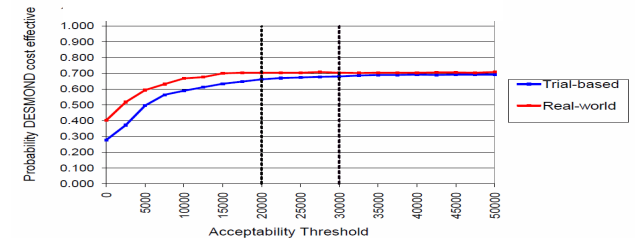


* Age, Gender, Smoking / former , smoker, HbA1c, SBP, Total Cholesterol, HDL, Ethnicity, Atrial fibrillation

Results

	Usual Care Control	DESMOND Intervention	Difference (95% CI)
Intervention Costs up to month 12			
(a) Intervention Cost based on Trial	-	£ 203	£ 203
(b) Intervention Cost 'real world'	-	£ 76	£ 76
Other Resource Use (per within-trial analysis)			
	£ 244	£ 260 *	£ 16 (- £ 24 to £ 56)
Remaining Lifetime discounted costs			
Therapy & monitoring	£5,286	£5,302	£ 17
Complications	£10,445	£10,419	£ 26
Adverse Events (Oedema, hypos)	£ 105	£ 104	-£1
Subtotal remaining lifetime costs	£15,826	£15,836	-£10
Combined total lifetime costs			
(a) Total Costs based on Trial	£16,080	£16,289	£ 209
(b) Total Costs 'real world'	£16,080	£16,162	(- £ 704 to £ 1137)
QALY gain up to month 12			
	0.7530	0.7600 *	0.0070 (-0.0026 to 0.0489)
Discounted QALYs in remaining lifetime			
Mean QALYs lived if not diabetic	13.9195	13.9195	0
Lost QALYs due to diabetes-related reasons during trial	-4.2809	-4.2526	0.0283*
Lost QALYs due to complications of diabetes	-0.3835	-0.3833	0.0002
Weight-related QALY change	-0.0447	-0.0410	0.0037
Subtotal QALYs in remaining lifetime	9.2104	9.2426	0.0322
Combined total lifetime QALYs gained			
	9.9634	10.0026	0.0392 (-0.0813 to 0.1786)
Incremental Cost per QALY gained			
(a) Total Costs based on Trial			£ 5,387
(b) Total Costs 'real world'			£ 2,069*

Cost Effectiveness Acceptability Curve



Conclusions

- Results suggest that DESMOND is cost effective compared to usual care.
- Further modelling should include:
 - whether maintenance of effect via longer-term top-up education is effective
 - subgroup analysis of those who respond / do not respond
 - direct modelling of exercise benefits
 - adaptation to Type 1 diabetes education programmes such as Dose Adjustment for Normal Eating (DAFNE)

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