

Behaviour change in diabetes: creating and using evidence

Dr Molly Byrne

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**HEALTH BEHAVIOUR CHANGE
RESEARCH GROUP**

Behaviour change in diabetes: creating and using evidence

1. DIABETES AND BEHAVIOUR

2. WHAT DO WE KNOW ABOUT BEHAVIOUR CHANGE?

3. WHY DON'T WE KNOW MORE?

4. HOW CAN WE DO THIS STUFF BETTER?

5. HEALTH BEHAVIOUR CHANGE RESEARCH GROUP

DIABETES AND BEHAVIOUR

Diabetes and behaviour



increase physical activity,
reduce overweight,
reduce sedentary
behaviour, reduce fat
intake, increase fibre
intake



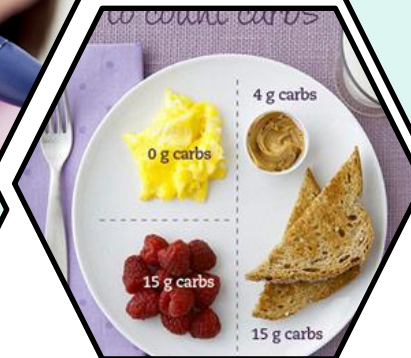
monitor blood glucose,
cholesterol and BP,
screen for complications:
dietetic, kidney, eyes and
foot review, advise about
lifestyle, prescribe meds



carbohydrate counting
and awareness, insulin
dose adjustment, self-
monitoring of blood
glucose



managing hypoglycaemia,
managing equipment and
injection sites; and
accessing health care.



**WHAT DO WE
KNOW ABOUT
BEHAVIOUR
CHANGE?**

Behaviour change: individual approaches

Issued: January 2014

NICE public health guidance 49
guidance.nice.org.uk/ph49

NICE recommendations

Plan & evaluate interventions carefully

- Take account of local and national context
- Use evidence-based techniques
- Describe mechanisms of change

Train practitioners in evidence-based behaviour change skills & competencies

Effective interventions:

- Target multiple 'levels': individual, community and population
- Individual level: evidence for planning and goal setting; feedback and monitoring; employ social support; increasing motivation



BMJ Open Theorising and testing environmental pathways to behaviour change: natural experimental study of the perception and use of new infrastructure to promote walking and cycling in local communities

Changing the environment promotes walking and cycling

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► Prepublication history and additional material is available. To view please visit the journal (<http://dx.doi.org/10.1136/bmjopen-2015-007593>).

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effectiveness of environmental interventions to promote physical activity, but few have examined how such interventions work. We investigated the environmental mechanisms linking changes in the environment to behaviour change.

Design: Natural experimental study.

Setting: Three UK municipalities (Southampton, Cardiff and Kenilworth).

Participants: Adults living within 5 km of new walking and cycling infrastructure.

Intervention: Construction or improvement of walking and cycling routes. Exposure to the intervention was defined in terms of residential proximity.

Outcome measures: Questionnaires at baseline and 2-year follow-up assessed perceptions of the supportiveness of the environment, use of the new infrastructure, and walking and cycling behaviours. Analysis proceeded via factor analysis of perceptions of the physical environment (step 1) and regression analysis to identify plausible pathways involving physical and social environmental mediators and refine

- In the context of an intervention to change environmental determinants of health, we systematically identified the environmental mediators of changes in walking and cycling in a population-based sample.
- Such evidence for *how* an intervention achieves its effects (causal explanation) can be combined with the evidence for the size of those effects (causal estimation) to provide a stronger basis for causal inference.
- We cannot be certain if changes in mediators led to changes in physical activity, or vice versa, as these were assessed over the same time period. However, most existing research on the mediators of the relationship between physical activity and the environment has been limited to cross-sectional associations, whereas our analysis used longitudinal data from an intervention study.
- We restricted our analysis to participants with complete data on all mediators, which produced a



Interventions to Improve the Management of Diabetes in Primary Care, Outpatient, and Community Settings

A systematic review

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Multifaceted professional and organisational interventions can improve diabetic care

OBJECTIVE — To review the effectiveness of interventions by professionals and/or the structure of care to improve the management of diabetes in primary care, outpatient, and community settings.

RESEARCH DESIGN AND METHODS — A systematic review of controlled trials evaluating the effectiveness of interventions by professionals and/or the structure of care to improve the management of diabetes in primary care, outpatient, and community settings. Standardized versions of the Cochrane Effectiveness Review and Registration Manual were used.

RESULTS — A total of 41 studies met the inclusion criteria. The studies identified were heterogeneous in terms of intervention type. In 12 studies, the interventions were multifaceted, involving both professionals and the structure of care. In 9 studies, the interventions involved professionals only, and in 20 studies, the interventions involved the structure of care only. Complex professional interventions improved the process of care, but the effect on patient outcomes remained less clear because such outcomes were rarely assessed. Organizational interventions that facilitated the structured and regular review of patients also showed a favorable effect on process measures. Complex interventions in which patient education was added and/or the role of a nurse was enhanced led to improvements in patient outcomes as well as the process of care.

CONCLUSIONS — Multifaceted professional interventions and organizational interventions that facilitate structured and regular review of patients were effective in improving the process of care. The addition of patient education to these interventions and the enhancement of the role of nurses in diabetes care led to improvements in patient outcomes and the process of care.

Diabetes is a major and growing public health problem. In the United States, the number of people with diabetes is expected to increase from 10 million in 1990 to 20 million in 2010 (1). It is expected that the number of people with diabetes will increase from 10 million in 1990 to 20 million in 2010 (2). Diabetes is a huge burden on society and a major cause of micro- and macrovascular complications (3,4). However, it is now clear that strict control of blood glucose levels can reduce the risk of complications (5,6). To achieve strict control, structured care is needed (9).

Over the past 20 years, the responsibility for the care of people with diabetes has moved away from hospitals to primary care (10,11). During this period, randomized trials have demonstrated that if regular review of patients is guaranteed, the standard of primary care can be as good or better than hospital outpatient care in the short term (9). Several guidelines and diabetes management programs have been developed nationally and locally to improve diabetes care in the community. However, empirical data suggest that compliance with diabetes clinical practice recommendations is inadequate in primary care (12–14) and that a large proportion of patients with diabetes

Effectiveness of Self-Management Training in Type 2 Diabetes

A systematic review of randomized controlled trials

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Educational interventions

with patient collaboration

improve glycaemic control in

patients with T2DM in short

term

OBJECTIVE — To systematically review the effectiveness of self-management training in type 2 diabetes.

DESIGN AND METHODS — We searched the literature for randomized controlled trials of the effectiveness of self-management training in people with type 2 diabetes. Relevant data on study design, population demographics, interventions, outcomes, and external validity were extracted and categorized. Outcomes were categorized as: (1) clinical outcomes (glycemic control, cardiovascular disease risk factors, and economic measures and health service utilization); (2) psychological outcomes; (3) quality of life; (4) glycemic control; (5) cardiovascular disease risk factors; and (6) economic measures and health service utilization.

RESULTS — We identified 10 randomized controlled trials. Interventions that used regular reinforcement throughout follow-up were more effective in improving glycemic control. Educational interventions that involved patient collaboration may be more effective than didactic interventions in improving glycemic control, weight, and lipid profiles. No studies demonstrated the effectiveness of self-management training on cardiovascular disease-related events or mortality; no economic analyses included indirect costs; few studies examined health-care utilization. Performance, selection, attrition, and detection bias were common in studies reviewed, and external generalizability was often limited.

CONCLUSIONS — Evidence supports the effectiveness of self-management training in type 2 diabetes, particularly in the short term. Further research is needed to assess the effectiveness of self-management interventions on sustained glycemic control, cardiovascular disease risk factors, and ultimately, microvascular and cardiovascular disease and quality of life.

quality of life while keeping costs reasonable (3). One of the goals of Healthy People 2010 is to increase to 60% (from the 1998 baseline of 40%) the proportion of individuals with diabetes who report good control of their diabetes (4). Approximately 50–60% of individuals with diabetes have poor and ideal glycemic control (HbA_{1c} <7.0%) (5). Diabetes-related complications were estimated to cost \$10 billion in 1997 (8), although the burden of diabetes education as a disease prevention strategy is not well defined. Diabetes education and its effectiveness are still under debate, including several important questions: Should education be short-term or long-term? Should it be individualized or generic? What are the types of interventions (9,10) and do they identify the most effective form of diabetes education for specific populations? Moreover, educational techniques have evolved since the 1970s (9–11) and have shifted from patient presentations to interventions that emphasize patient “empowerment” (12).

The objective of this study was to systematically review reports of randomized controlled trials to assess the effectiveness of self-management training in type 2 diabetes, to provide summary information to guide the development of self-management programs a

to go here



DAFNE Study Group

Skills training

dietary tre

Quality of li

The impact of diabetes on dietary freedom was significantly improved ($P < 0.0001$), as was the impact of diabetes on overall quality of life ($t = 2.9$, $P < 0.01$). General wellbeing and treatment satisfaction were also significantly improved, but severe hypoglycaemia, weight, and lipids remained unchanged. Improvements in "present quality of life" did not reach significance at 6 months but were significant by 1 year.

Conclusion Skills training promoting dietary freedom improved quality of life and glycaemic control in people with type 1 diabetes without worsening severe hypoglycaemia or cardiovascular risk. This approach has the potential to enable more people to adopt intensive insulin treatment and is worthy of further investigation.

glycaemic control.² However, the intensive approach used in the trial involved frequent outpatient visits with close supervision of insulin dose adjustment and has not been incorporated into general diabetes practice. The increased risk of severe hypoglycaemia in the trial is an example of the potential for harm to be experienced by patients if the approach is beyond the scope of most healthcare systems.

Freedom and glycaemic control in people with type 1 diabetes

For over 3 years, a team from Dusseldorf has used a five-day structured inpatient training programme in which women learn to self-manage, producing sustained improvements in glycaemic control without increasing severe hypoglycaemia. Participants are taught to match insulin doses to their food choices, while keeping their blood glucose close to normal. In contrast to the diabetes control and complications trial, patients maintain this behaviour with minimal support from healthcare professionals.

We tested this approach in a UK multicentre randomised controlled study, the dose adjustment for normal eating (DAFNE) trial, in which we measured biomedical and psychological outcomes, including

Members of study group: Stephanie Amiel, Sue Beveridge, Clare Bradley, Carla Francisco, Patricia Hogg, Margaret Jones, Newton, Linda Oliver, Helen Reid, Sue Roberts, Susan Thomas, Jackie Wainwright, Susan Wainwright, Gillian Thompson, Eileen Turner, Frances Wright

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bmj.com 2006;332:46



**WHY DON'T WE
KNOW MORE?**



What's the problem....?

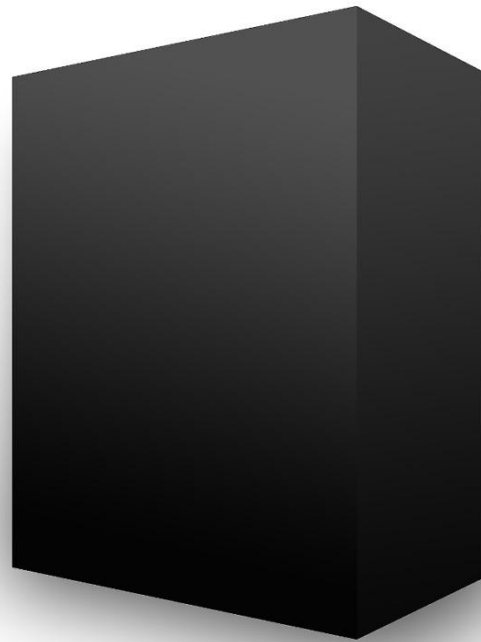
Many interventions designed according to the ISLAGIATT principle

It **S**eemed **L**ike **A** Good **I**dea **A**t **T**he **T**ime

Patient has changed their behaviour!
Intervention worked!

But how did it work?
Can we do it again?
Can we train others to do the same?





Specify intervention content

Descriptions of “behavioural counselling” in two interventions

Title of journal article	Description of “behavioural counseling”
The impact of behavioral counseling on stage of change fat intake, physical activity, and cigarette smoking in adults at increased risk of coronary heart disease	“ educating patients about the benefits of lifestyle change, encouraging them, suggesting what changes could be made” (Steptoe et al. <i>AJPH</i> 2001)
Effects of internet behavioral counseling on weight loss in adults at risk for Type 2 diabetes	“ feedback on self-monitoring record, reinforcement , recommendations for change, answers to questions, and general support” (Tate et al. <i>JAMA</i> 2003)



So what's the problem?

- Poor definition of interventions
 - Limited ability to develop science/theory
 - Limited ability to generalise findings
- No understanding of mechanisms of change
 - If effective, unclear why it worked, can't replicate...
 - If ineffective, not sure why...



**HOW CAN WE DO
THIS STUFF
BETTER?**



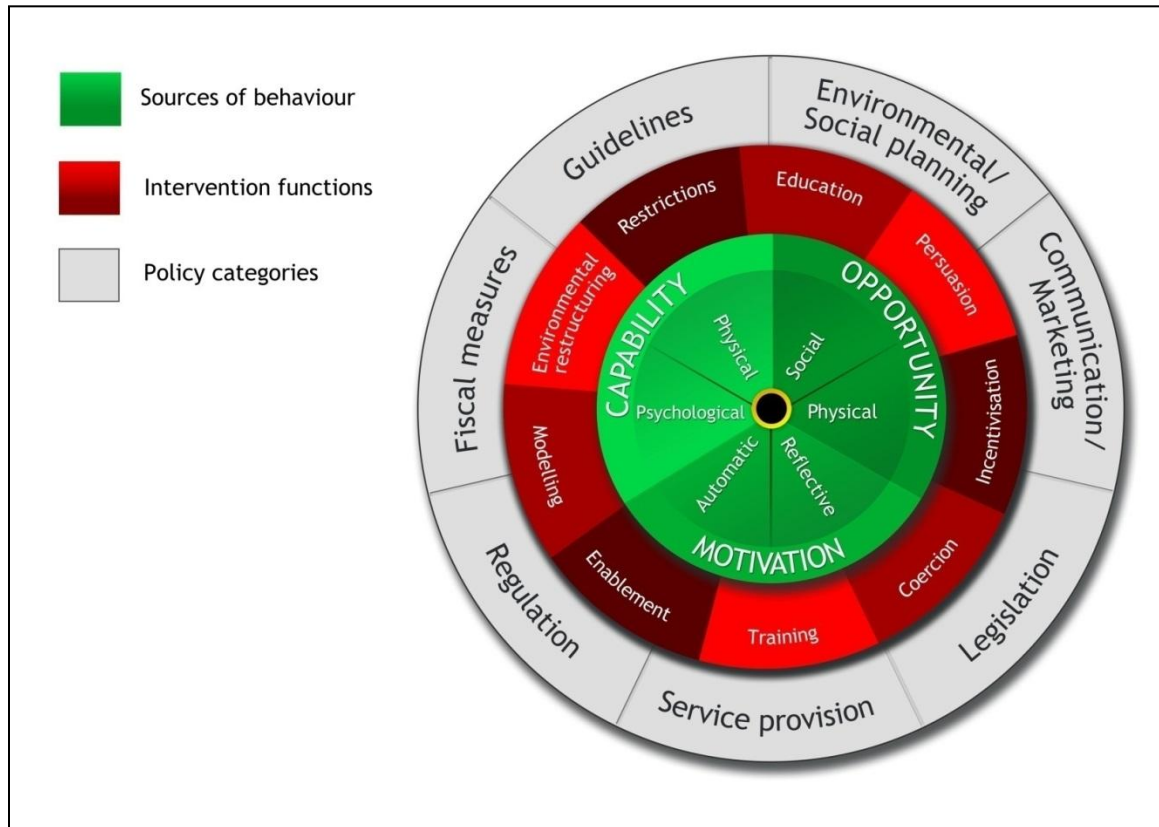
Importance of scientific methods

How to improve behaviour change interventions

1. **Specify** target behaviour precisely
2. Use behavioural **theory** to develop interventions **systematically**
3. Describe **mechanisms** through which these work
4. Specify **behaviour change techniques**, linking these to theory
5. Improve **reporting**, using standardised, shared terminology



The Behaviour Change Wheel



Research Highly accessed Open Access

The behaviour change wheel: A new method for characterising and designing behaviour change interventions

Susan Michie^{1*}, Maartje M van Stralen² and Robert West³

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For all author emails, please [log on](#).

Implementation Science 2011, **6**:42 doi:10.1186/1748-5908-6-42

Published: 23 April 2011

Abstract

Background

Improving the design and implementation of evidence-based practice depends on successful behaviour change interventions. This requires an appropriate method for characterising interventions and linking them to an analysis of the targeted behaviour. There exists a plethora of frameworks of behaviour change interventions, but it is not clear how well they serve this purpose. This paper evaluates these frameworks, and develops and evaluates a new framework aimed at overcoming their limitations.



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BCT Taxonomy (2013)

ann. behav. med. (2013) 46:81–95

DOI 10.1007/s12160-013-9486-6

ORIGINAL ARTICLE

The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behavior Change Interventions

Susan Michie, DPhil, CPsychol • Michelle Richardson, PhD • Marie Johnston, PhD,
CPsychol • Charles Abraham, DPhil, CPsychol • Jill Francis, PhD, CPsychol •
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Caroline E. Wood, PhD

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Electronic Supplementary Materials Table 3. BCT Taxonomy (v1): 93 hierarchically-clustered techniques

Page	Grouping and BCTs	Page	Grouping and BCTs	Page	Grouping and BCTs
1	1. Goals and planning 1.1. Goal setting (behavior) 1.2. Problem solving 1.3. Goal setting (outcome) 1.4. Action planning 1.5. Review behavior goal(s) 1.6. Discrepancy between current behavior and goal 1.7. Review outcome goal(s) 1.8. Behavioral contract 1.9. Commitment	8	6. Comparison of behaviour 6.1. Demonstration of the behavior 6.2. Social comparison 6.3. Information about others' approval	16	12. Antecedents 12.1. Restructuring the physical environment 12.2. Restructuring the social environment 12.3. Avoidance/reducing exposure to cues for the behavior 12.4. Distraction 12.5. Adding objects to the environment 12.6. Body changes
3	2. Feedback and monitoring 2.1. Monitoring of behavior by others without feedback 2.2. Feedback on behaviour 2.3. Self-monitoring of behaviour 2.4. Self-monitoring of outcome(s) of behaviour 2.5. Monitoring of outcome(s) of behavior without feedback 2.6. Biofeedback 2.7. Feedback on outcome(s) of behavior	9	7. Associations 7.1. Prompts/cues 7.2. Cue signalling reward 7.3. Reduce prompts/cues 7.4. Remove access to the reward 7.5. Remove aversive stimulus 7.6. Satiation 7.7. Exposure 7.8. Associative learning	17	13. Identity 13.1. Identification of self as role model 13.2. Framing/reframing 13.3. Incompatible beliefs 13.4. Valued self-identify 13.5. Identity associated with changed behavior
5	3. Social support 3.1. Social support (unspecified) 3.2. Social support (practical) 3.3. Social support (emotional)	10	8. Repetition and substitution 8.1. Behavioral practice/rehearsal 8.2. Behavior substitution 8.3. Habit formation 8.4. Habit reversal 8.5. Overcorrection 8.6. Generalisation of target behavior 8.7. Graded tasks	18	14. Scheduled consequences 14.1. Behavior cost 14.2. Punishment 14.3. Remove reward 14.4. Reward approximation 14.5. Rewarding completion 14.6. Situation-specific reward 14.7. Reward incompatible behavior 14.8. Reward alternative behavior 14.9. Reduce reward frequency 14.10. Remove punishment
6	4. Shaping knowledge 4.1. Instruction on how to perform the behavior 4.2. Information about Antecedents 4.3. Re-attribution 4.4. Behavioral experiments	11	9. Comparison of outcomes 9.1. Credible source 9.2. Pros and cons 9.3. Comparative imagining of future outcomes	19	15. Self-belief 15.1. Verbal persuasion about capability 15.2. Mental rehearsal of successful performance 15.3. Focus on past success 15.4. Self-talk
7	5. Natural consequences 5.1. Information about health	12	10. Reward and threat 10.1. Material incentive (behavior) 10.2. Material reward (behavior) 10.3. Non-specific reward 10.4. Social reward 10.5. Social incentive 10.6. Non-specific incentive 10.7. Self-incentive	19	16. Covert learning 16.1. Imaginary punishment



**HEALTH
BEHAVIOUR
CHANGE
RESEARCH
GROUP**



HEALTH BEHAVIOUR CHANGE RESEARCH GROUP

Aim: To promote the application of Behavioural Science to the development and evaluation of behavioural interventions within population health and health services research

Vision: To be a national hub and internationally recognised centre of excellence in evidence-based health behavioural intervention development, evaluation and implementation



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RESEARCH GROUP

HEALTH BEHAVIOUR CHANGE RESEARCH GROUP ADVISORY BOARD



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**CHANGED PRIORITIES
AHEAD**

Diabetes Research Prioritisation

To identify, and agree on a prioritised list of the most important provider and service user behaviours for research

3 key diabetes areas:

- (1) Managing Type 1 DM
- (2) Managing Type 2 DM
- (3) Preventing Type 2 DM

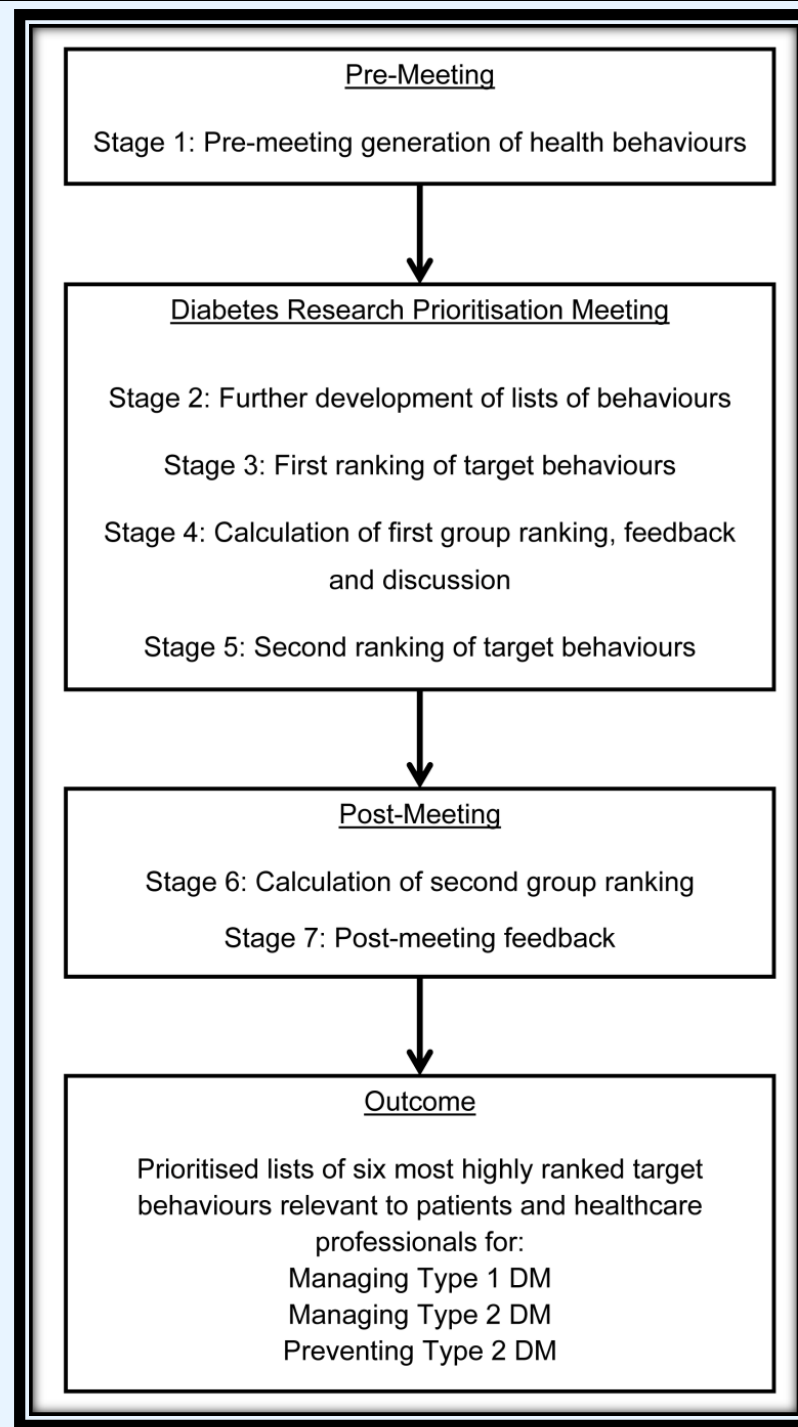
Participant Profile	Number of Participants
Hospital Based Practitioner	7
Primary Care Practitioner	3
Public Health Practitioner	3
Researcher in Diabetes	2
Policy Leader	1
Patient Organisation Representative	1
Psychologist	1
Patient with Type 1 DM	3
Patient With Type 2 DM	3



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NAME:
 BEHAVIOURS: Managing Type 2 Diabetes: People with Diabetes

Please rank the top 8 behaviours you believe are most important as targets for research. Rank your top choice as 1, your next choice as 2 etc.

Behaviour	Behaviour Name	Ranking
1	Take insulin as required	
2	Accurately monitoring blood sugar every few weeks - especially if daily routine is changed	
3	Take medication as prescribed	
4	Eat healthy food/diet as often as recommended	
5	Monitor blood sugar levels to make daily decisions	
6	Get regular exercise	
7	Consume foods with a lower glycaemic index	
8	Participate in local and online support groups	
9	Be active	
10	Manage stress	
11	Seek information on how diabetes impacts your personal goals/lifestyle	
12	Attend scheduled appointments and consults in specialist clinic	
13	Attend annual screening for complications	
14	Foot care	

Diabetes Research Prioritisation

Healthcare Professional Behaviour

Key diabetes area	Highest ranked behaviour in Ranking 2
Treatment of Type 1 DM – Patients	Take insulin as required
Treatment of Type 1 DM – Healthcare Professionals	Engage in collaborative treatment goal setting with patients
Treatment of Type 2 DM – Patients	Attend and engage with structured education
Treatment of Type 2 DM – Healthcare Professionals	Engage in collaborative treatment goal setting with patients
Preventing Type 2 DM – General Population	Engage in healthy behaviours as a family
Preventing Type 2 DM – Healthcare Professionals/Health Services	Attend and engage with behaviour change training



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GOALS



Milou Fredrix
PhD student

Diabetes Research Prioritisation

Patient Behaviour

Key diabetes area	Highest ranked behaviour in Ranking 2
Treatment of Type 1 DM – Patients	Take insulin as required
Treatment of Type 1 DM – Healthcare Professionals	Engage in collaborative treatment goal setting with patients
Treatment of Type 2 DM – Patients	Attend and engage with structured education
Treatment of Type 2 DM – Healthcare Professionals	Engage in collaborative treatment goal setting with patients
Preventing Type 2 DM – General Population	Engage in healthy behaviours as a family
Preventing Type 2 DM – Healthcare Professionals/Health Services	Attend and engage with behaviour change training



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X-PERT significantly.....

Improves:

- glycaemic control
- cholesterol levels
- quality of life
- dietary intake
- physical activity
- empowerment

Reduces:

- diabetes medication
- blood pressure
- body weight
- waist circumference
- risk of complications
- volume of HbA1c

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www.xp



Dr Jenny McSharry

Aim: To explore perceived barriers to attendance at structured education in Ireland





Development of an intervention to improve outcomes for young adults with Type 1 Diabetes

Systematic Review & Qualitative study to understand young adults' perspective and develop intervention

Sean Dinneen, Mary Clare O' Hara, Lisa Hynes, Maire O'Donnell M,
Molly Byrne, Dympna Casey, Simon Heller

for the Irish Type 1 Diabetes Young Adult Study Group



Developing a core outcome set (COS) for clinical studies of young adults with type 1 diabetes mellitus

[« Previous study](#)[Next study »](#)

General Information

Summary:

Young adults (18-25 years) with type 1 diabetes are a high risk group as their diabetes control is often sub-optimal and they have a significantly raised risk of mortality compared to the general population. This group are at significant risk of developing acute metabolic complications and many may develop complications at this stage which endure into later stages of adulthood. In addition, young adults with type 1 diabetes are more likely to report negative mental health (such as depression) than those without disease.

Given the additional vulnerabilities of this population, interventions are needed to improve outcomes. However, assessing the effectiveness of these various programs is complicated by variations in the choice and definitions of outcome measures used by researchers.

The development of a core outcome set for use across this research area would allow for the results of trials and other studies to be effectively compared, contrasted and combined as appropriate.

Contributors:

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Mr Anthony O'Connell, Research Assistant Health Behaviour Change Research Group, School of Psychology, National University of Ireland Galway, Ireland.

Most recent search criteria

Shown below is a summary of the search criteria used in your most recent search.

Health Area - Disease Name (Number of matches)

13 matching studies found

[Back to results](#)[More](#)



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Designing Effective Interventions for Health Behaviour Change: An Introduction

One Day Workshop
Monday 23
November 2015
10am – 5pm

In this workshop, participants will have an opportunity to learn about, and practice using, emerging methods for designing and evaluating behavioural interventions. The workshop is for researchers, practitioners, policy makers and students interested in behaviour change.

Details and registration, visit www.tinyurl.com/hbcrg15

For further information, contact Valerie Parker

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Health Behaviour Change Research Group, School of Psychology, NUI Galway www.nuigalway.ie/psy

**Limited Places
Available!**

To register now
visit
[www.tinyurl.com/
hbcrg15](http://www.tinyurl.com/hbcrg15)

Cost €100
(€40 students)

Supported by



In association with



Dr. Marta Marques
University of Lisbon, Portugal
Faculty of Human Kinetics



Motivation & Self-Regulation

Physical Activity, Eating, Obesity & Weight Management

Wednesday, June 10th 2015 / Room G065, AMBE
9:30 – 10:30AM

PhD Pot-Pourri Seminar
May 27th 2015
Room G065
AMBE

Caragh Flannery:
'Exploring the feasibility and potential effectiveness of technology supported behaviour change interventions for physical activity during pregnancy'

Milou Fredrix:
'Goal-Setting as a Behavioural Change Technique for Diabetes Self-Management'

Eimear Morrissey:
'Can mHealth interventions enhance medication adherence and increase walking in at risk populations?'

**Seminar Title: Nutrition from infancy to adolescence-
A health promotion perspective**



Thursday 12th
November 2015
1:00-2:00pm
AMBE Room G065

Dr Colette Kelly, Health Promotion,
School of Health Science, NUI Galway



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For more on the HBCRG: valerie.parker@nuigalway.ie or molly.byrne@nuigalway.ie