X-PERT National Audit Results 2019

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Introduction

On average, a person with diabetes spends approximately three hours with a healthcare professional every year. For the remaining 8,757 hours they have to manage their condition themselves. Diabetes education is key in giving people the skills, knowledge and confidence to self-manage their condition.

Current guidelines recommend that every person with diabetes and/or their carer should be offered well-designed and well-implemented structured education. Whilst there has been an increase in the number of people offered structured education in recent years, nationwide attendance is still low. An improvement in attendance, engagement, and support of diabetes structured education for adults is needed as programmes have been shown to:

➢ improve day-to-day diabetes management, which affects quality of life and engagement with care
➢ improve clinical markers such as blood glucose levels, blood pressure, blood lipid profile, body weight and waist circumference
➢ reduce the risk of developing serious complications such as cardiovascular disease, amputations and sight loss

X-PERT Health has developed a range of structured education programmes that meet nationally agreed criteria (NICE 2016/SIGN 2017). The X-PERT Diabetes programme has been shown to be effective in improving health and quality of life outcomes in people with newly diagnosed and existing diabetes both in a randomised controlled trial (RCT) and in routine national implementation (Deakin et al, 2006 & 2011).

The X-PERT Diabetes self-management programme has also been investigated and was shown to be the most cost effective self-management diabetes education programme in a review paper, with one quality-adjusted life-year (QALY) gained costing less than €20,000 (Jacobs-Van Der Bruggen, 2009). The published 2011 X-PERT Audit of 16,031 participants demonstrated that national implementation of the X-PERT Diabetes Programme could result in a cost saving to the NHS of £367 million per annum (Deakin 2011).

Audit of the programme is one of the key criteria in the implementation of structured diabetes education. The X-PERT audit database was developed so that organisations can audit X-PERT implementation against X-PERT audit standards, which are based on the outcomes of the X-PERT RCT and national targets (see page 3), and can compare their effectiveness to the all centres mean. It is crucial to assess whether implementation of the X-PERT Programme results in the improvement to health and wellbeing that was seen in the published clinical trial.

There were 72 organisations registered on the national X-PERT audit database for 2017-2018. Fifty-eight of these organisations (80.5%) entered sufficient data to be included in the 2019 national audit report.

Audit standards

The following audit standards have been used to benchmark the outcomes from X-PERT Programme implementation.

Outcome	Audit standard from RCT	Audit standard from national target
Number of participants	------------------	Structured education should be offered to every person and/or their carer at diagnosis, with annual reinforcement and review. The audit standard is to deliver to at least 1,000 participants per year.
Participant attendance	≥ 95% attend at least one session ≥ 80% attend 4 or more sessions	People will complete the programme if they feel they are benefitting from attending. If organisations experience poor attendance they should contact participants to investigate the reason for the poor attendance and how it could be improved.
Participant satisfaction	≥ 90%	NICE Quality Statements 2 & 3, Outcome: "patient satisfaction with ability to self-manage their diabetes after attending a structured education programme".
Participant empowerment	≥ 10% increase from baseline	NICE Quality Standard for adults with diabetes.
Glycated haemoglobin	≥ 4 mmol/mol reduction at six months and ≥ 6 mmol/mol reduction at 12 months	< 48 mmol/mol normoglycaemia < 53 mmol/mol good diabetes control < 58 mmol/mol QOF target

Outcome	Audit standard from RCT	Audit standard from national target
Body weight / BMI	No increase	4 kg or 5-10% weight loss
Waist circumference	≥ 2 cm reduction	< 80 cm females < 94 cm males
Systolic blood pressure	≥ 5 mmHg reduction (if relevant)	< 130 mmHg Type 1 and Type 2 with microvascular complications < 140 mmHg Type 2 (no complications)
Diastolic blood pressure	-------------------	< 80 mmHg
HDL cholesterol	-------------------	≥ 1.2 mmol/l females ≥ 1.0 mmol/l males
Total cholesterol to HDL	-------------------	------------------
Triglycerides	------------------	< 1.7 mmol/l
Triglyceride to HDL ratio	------------------	< 0.87
Prescribed diabetes medication	50% of participants will have either reduced diabetes medication or have remained on the same dose.	---

All centres results – data collected since launch (full mean data set)

The *all centres* report changes almost on a daily basis as organisations enter data, but the main outcomes have remained consistent for several years. All audit standards from the RCT have been met for the full data set, except for waist circumference, which fell slightly short of the ≥ 2 cm reduction target, and uptake (percentage who attended ≥ 1 session), which fell short of the 95% target at 83.3%.

*N.B. This report includes matched participant data, i.e. data is only included for each variable for participants who had the relevant data recorded at baseline **and** the stated post-programme time point. The six and 12 month results are not necessarily based on data from the same participants.*

X-PERT Programmes Report: All Localities (matched)- All Course Types- 01 Sep 2005

to 01 Sep 2019

Number of X-PERT programmes run in this period	11,918	
Total number participants registered	129,355	
Total number who attended 1 session	107,803	
Total percentage who attended 1 session	83.3%	
Total number who attended 4 or more sessions	86,436	
Total percentage who attended 4 or more sessions	80.2%	
Mean number of attendees per programme	9	
Attended Annual Update Module	26.3%	
Evaluation	**6 Weeks**	
Mean program evaluation score	94.4%	
No.(%) programmes with evaluation score	7,355 (70.1%)	
Empowerment	**Baseline:**	**6 Weeks:**
Participant Empowerment Score (1-5)	3.5	4.3
Participant Empowerment Score % Change		21.7%
No. (%) programmes with empowerment scores	7,900 (66.3%)	7,827 (65.7%)

Clinical Data

	6 month mean	SD (σ)	6 months change from baseline	95% CI	12 month mean	SD (σ)	1 year change from baseline	95% CI
Weight (Kg)	87.6	19.9	-1.9	-2.0, -1.8	85.9	20.0	-2.1	-2.1, -2.0
BMI (Kg/m²)	31.0	6.3	-0.7	-0.7, -0.7	30.6	6.2	-0.7	-0.7, -0.7
Waist Circumference (cm)	102.1	15.1	-1.7	-1.8, -1.6	102.9	14.5	-1.5	-1.6, -1.4
HbA1c (mmol/mol)	54.4	14.9	-7.0	-7.0, -7.0	55.0	15.0	-6.8	-6.8, -6.8
Fasting Blood Glucose (mmol/l)	7.3	2.5	-0.9	-1.0, -0.8	7.3	2.6	-0.8	-0.9, -0.7
Systolic Blood Pressure (mmHg)	132	14	-2	-2, -2	131	14	-2	-2, -2
Diastolic Blood Pressure (mmHg)	76	9	-2	-2, -2	76	9	-1	-1, -1
Total Cholesterol (mmol/l)	4.2	1.1	-0.3	-0.3, -0.3	4.2	1.0	-0.3	-0.3, -0.3
LDL Cholesterol (mmol/l)	2.3	0.9	-0.2	-0.2, -0.2	2.2	0.8	-0.3	-0.3, -0.3
HDL Cholesterol (mmol/l)	1.3	0.5	0.0	0.0, 0.0	1.3	0.5	0.0	-0.1, 0.1
Non HDL Cholesterol (mmol/l)	3.0	1.1	-0.3	-0.3, -0.3	2.9	1.0	-0.4	-0.4, -0.4
Total Cholesterol to HDL Ratio	3.5	1.4	-0.4	-0.4, -0.4	3.5	1.3	-0.4	-0.4, -0.4
Triglycerides (mmol/l)	1.7	1.0	-0.2	-0.2, -0.2	1.7	1.0	-0.2	-0.2, -0.2
Triglycerides to HDL Ratio	1.5	1.3	-0.2	-0.2, -0.2	1.5	1.4	-0.2	-0.2, -0.2

All centres mean results: 1st January 2017 to 31st December 2018

X-PERT Programmes Report: All Localities (matched)- X-PERT Diabetes 01 Jan 2017 to 31 Dec 2018

Number of X-PERT programmes run in this period:	2,198
Total number registered:	28,780
Total number who attended 1 session:	22,370
Total percentage who attended 1 session:	77.7%
Total number who attended 4 or more sessions:	17,452
Total percentage who attended ≥ 4 sessions:	78%
Mean number of attendees per programme:	10
Attended Annual Update Module:	10.9%

Evaluation	6 Weeks
Mean program evaluation score	96.4%
No.(%) programmes With evaluation score	1,733 (78.8%)

Empowerment	Baseline	6 Weeks
Participant Empowerment Score (1-5)	3.8	4.5
Participant Empowerment Score % Change		20.5%
No. (%) programmes With empowerment scores	1,738 (79.1%)	1,709 (77.8%)

Clinical Data

	6 month mean	SD (σ)	6 month change from baseline	95% CI	12 month mean	SD (σ)	1 year change from baseline	95% CI
Weight (Kg)	85.4	19.1	-3.2	-3.3, -3.0	84.2	19.9	-2.8	-2.9, -2.6
BMI (Kg/m2)	30.2	6.1	-1.1	-1.2, -1.0	30.1	6.1	-1.0	-1.1, -0.9
Waist Circumference (cm)	103.1	14.9	-2.0	-2.2, -1.8	103.7	16.8	-2.3	-2.6, -2.0
HbA1c (mmol/mol)	53.6	14.0	-9.7	-9.8, -9.6	54.4	14.7	-8.7	-8.8, -8.6
Fasting Blood Glucose (mmol/l)	6.6	2.2	-1.3	-1.5, -1.1	6.8	2.6	-0.8	-1.0, -0.6
Systolic Blood Pressure (mmHg)	130	13	-2	-2, -2	129	13	-2	-2, -2
Diastolic Blood Pressure (mmHg)	76	9	-2	-2, -2	76	9	-2	-2, -2
Total Cholesterol (mmol/l)	4.3	1.1	-0.3	-0.3, -0.3	4.2	1.0	-0.4	-0.4, -0.4
LDL Cholesterol (mmol/l)	2.4	0.9	-0.2	-0.3, -0.2	2.3	0.9	-0.3	-0.4, -0.2
HDL Cholesterol (mmol/l)	1.3	0.5	0.0	0.0, 0.0	1.3	0.4	0.0	0.0, 0.0
Non HDL Cholesterol (mmol/l)	3.0	1.0	-0.3	-0.3, -0.3	2.9	1.0	-0.4	-0.4, -0.4
Total Cholesterol to HDL Ratio	3.6	1.2	-0.3	-0.3, -0.3	3.5	1.1	-0.4	-0.4, -0.4
Triglycerides (mmol/l)	1.7	1.0	-0.3	-0.4, -0.2	1.7	1.0	-0.3	-0.4, -0.2
Triglycerides to HDL Ratio	1.6	1.2	-0.2	-0.3, -0.1	1.6	1.1	-0.2	-0.3, -0.1

Comparison with the X-PERT National Audit Report 2018

A greater emphasis on structured education means that 22% (n=28,780) of the 129,355 participants registered on the audit database have been invited to attend the X-PERT Programme between 1st January 2017 and 31st December 2018. Of these, the percentage of people taking up the opportunity to attend is 77.7%, which is lower than the full mean data set score of 83.3%. Great variation is still evident between organisations and so processes need to be put in place to help improve uptake. The number of people completing the programme has slightly decreased since the X-PERT National Audit Report 2018 from 81 to 78%, but the evaluation score has risen (from 95.8 to 96.4%). The change in empowerment score at six weeks has slightly decreased from 21.6% to 20.5%, although this is still significantly higher than the audit standard (10%). The mean number of participants per programme has increased to 10 (from 9 in the X-PERT National Audit Report 2018).

Matched participant data shows that, between 2017 and 2018, X-PERT Programme implementation has resulted in a mean weight loss of 3.2kg (six months) and 2.8kg (12 months). This is greater than the full mean data set and the X-PERT National Audit Report 2018 for six months (-1.9kg; -2.7kg) and 12 months (-2.1kg; 2.3kg), respectively. One reason for this may be because the curriculum has been updated with the scientific evidence that supports people in adopting a sustainable dietary approach which enables them to achieve their health goals, whilst recognising that one size does not fit all. A mean reduction in HbA1c values from baseline is evident at both six months (-9.7mmol/mol) and 12 months (-8.7mmol/mol). This is also an improvement on the full mean data set and the X-PERT National Audit Report 2018 at both six and 12 months (-7.0mmol/mol; -8.4mmol/mol and -6.8mmol/mol; -7.9mmol/mol respectively).

Comparison of individual organisation outcomes 1st January 2017 to 31st December 2018

The 2019 awards are for matched participant data entered between 1st January 2017 and 31st December 2018. The mean value for each outcome has been compared between organisations. Data was only included if more than five sets of matched participant data (five participants) had been recorded at baseline **and** at the relevant post-programme time point. The number of matched sets was taken into consideration for each health outcome award, i.e. outcomes were given greater weighting where they are based on a larger number of participants.

The best participant experience

This award looked at the following criteria: number of programmes delivered; number of participants per session; uptake (% attending at least one session); attendance (% attending four or more sessions); participant empowerment change and participant satisfaction.

No. of participants, no. of programmes and mean no. of participants per programme

Number of patients, number of programmes and mean number of patients per programme
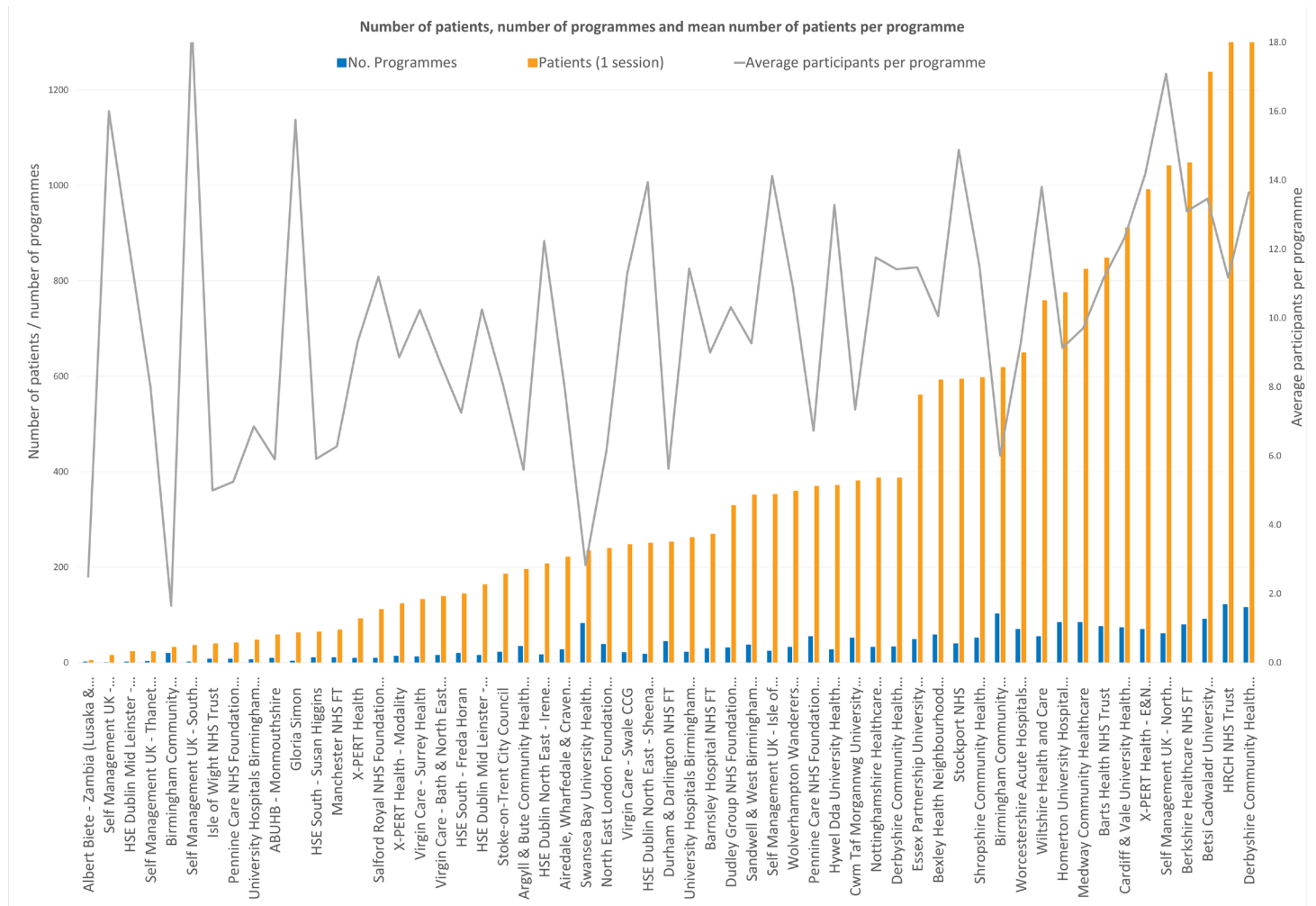
The graph above presents the number of participants per organisation who have attended the X-PERT Programme in 2017-2018. Between 1st January 2017 and 31st December 2018, 2198 X-PERT programmes were delivered with 22,370 participants attending one session. Fourteen organisations did not enter any participants' data during this time period. Derbyshire Community Health Services - South Derbyshire CCG entered the highest number of attendees in 2017-2018 (n= 1582), with a mean of 14 participants per programme. HRCH NHS Trust and Betsi Cadwaladr University Health Board had the second and third highest attendee numbers respectively. Self Management UK - South Kent Coast achieved the greatest mean number of participants per programme (19 participants).
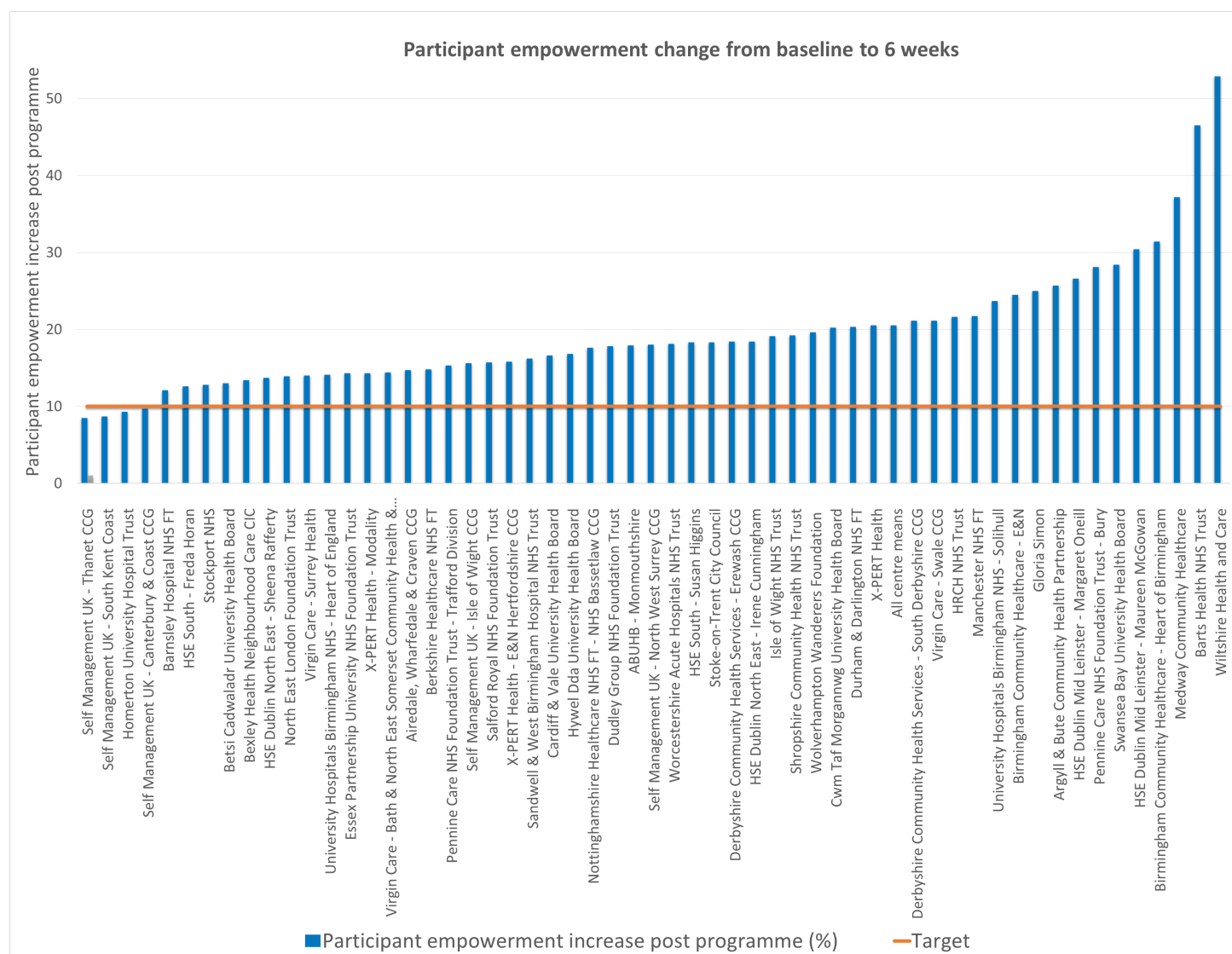
Participant attendance

Percentage of participants attending 4 or more sessions
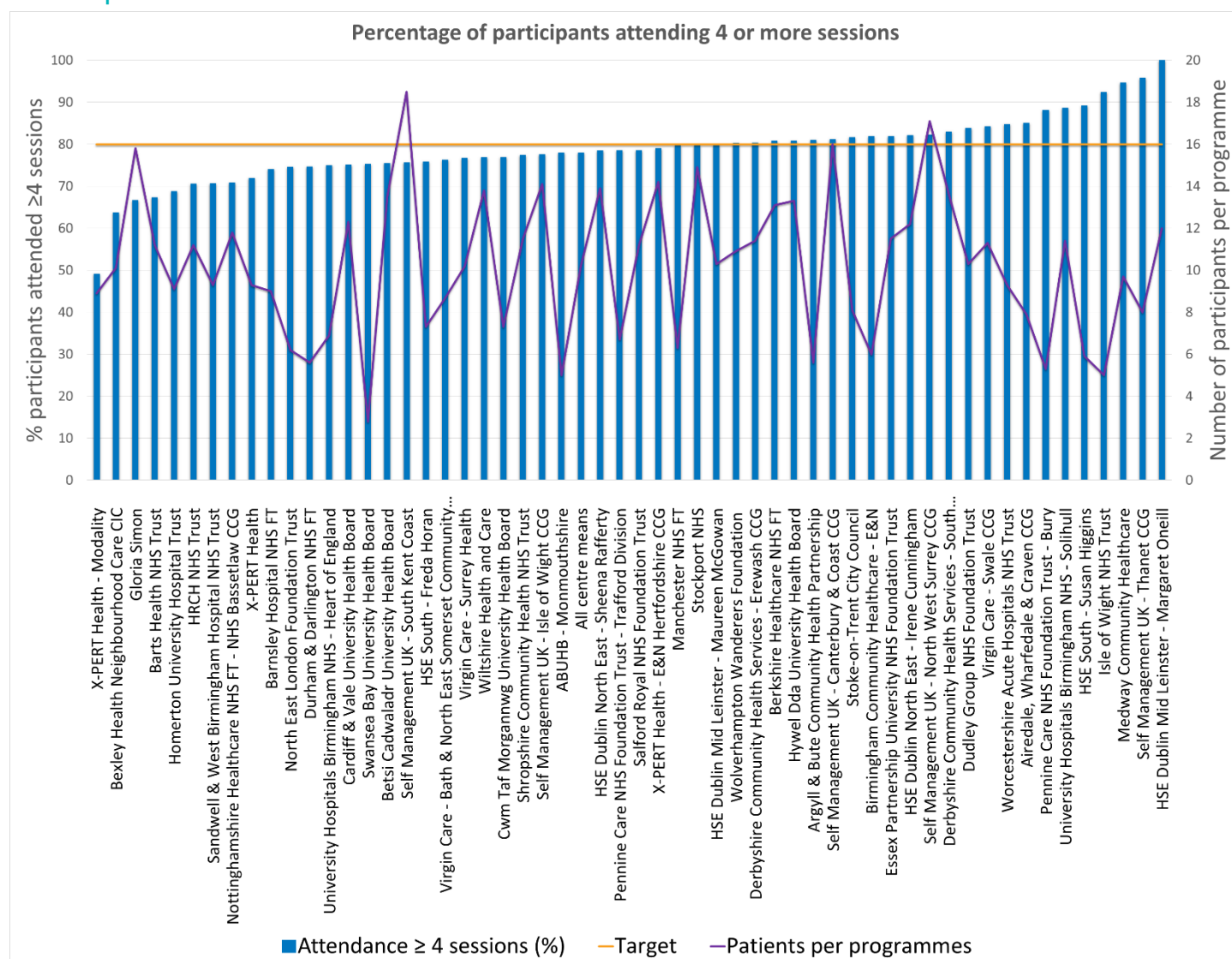
The mean *all centre* attendance score (percentage of X-PERT participants who attended four or more sessions) was 78%**.** The audit standard derived from the clinical trial was 80% (orange line in the graph above). Fifty-five organisations reported attendance and 23 organisations (42%) obtained a mean attendance score equal to or above the audit standard. Reasons for not meeting the audit standard need to be explored, i.e. whether this is due to incomplete data entry or is related to programme implementation.

Participant satisfaction & empowerment

Participants complete an evaluation questionnaire in Session Six of the X-PERT programme, and a validated empowerment questionnaire in Sessions One and Six. Mean scores for satisfaction and empowerment are calculated per programme and entered onto the audit database.
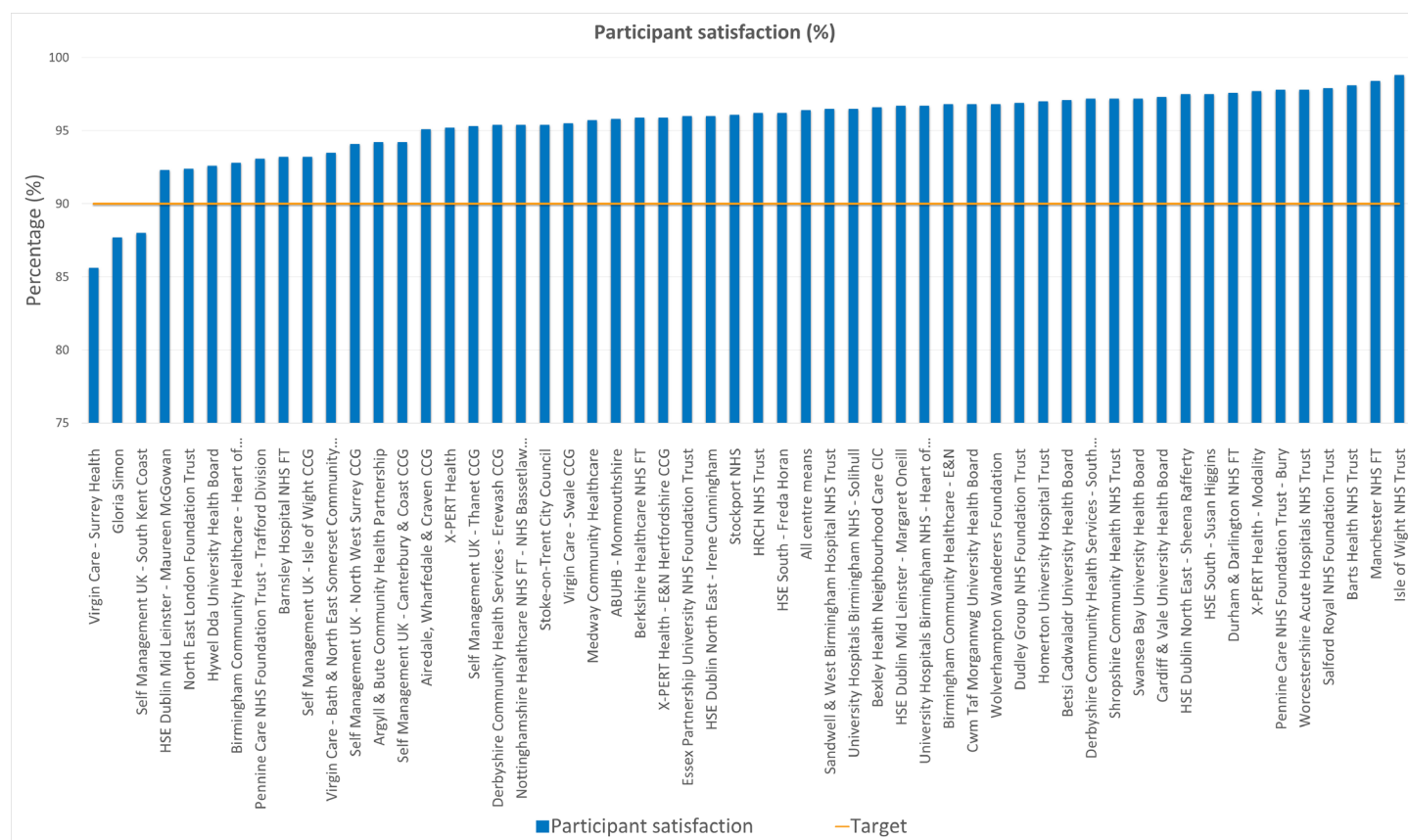
At six weeks the mean *all centre* X-PERT participant satisfaction score is 96.4%. The audit standard is 90% (orange line in the graph above). Fifty-two organisations (95% of organisations who had entered data) achieved the audit standard for participant satisfaction. Exploration into why some organisations are obtaining lower satisfactions scores is required. Isle of Wight NHS Trust achieved the best results with a mean participant satisfaction score of 98.8%.

Participant empowerment change from baseline to 6 weeks

Participant empowerment increase post programme (%) — Target

The clinical trial demonstrated a 24% increase in participant empowerment at six weeks; the *all centres mean* in the audit is +20.5%. The audit standard for implementation has been set at 10% (see orange line above). Fifty-two organisations (93%) exceeded the audit standard for empowerment.

Taking all these criteria into account, the best participant experience award goes to University Hospitals Birmingham NHS – Solihull who delivered 23 programmes, achieved 99.2% attendance, 88.6% completion, a 23.7% increase in empowerment at six weeks, and 96.5% satisfaction whilst averaging 11 participants per session. Medway Community Healthcare have been awarded 2nd place. They delivered 85 programmes, achieved 91.5% attendance, 94.7% completion, a 37.2% increase in empowerment at six weeks, and 95.7% satisfaction whilst averaging 10 participants per session. 3rd place has been awarded to Pennine Care NHS Foundation Trust – Bury, who delivered a total of eight programmes and achieved 100% attendance, 88.1% completion, a 28.1% increase in participant empowerment and 97.8% satisfaction.
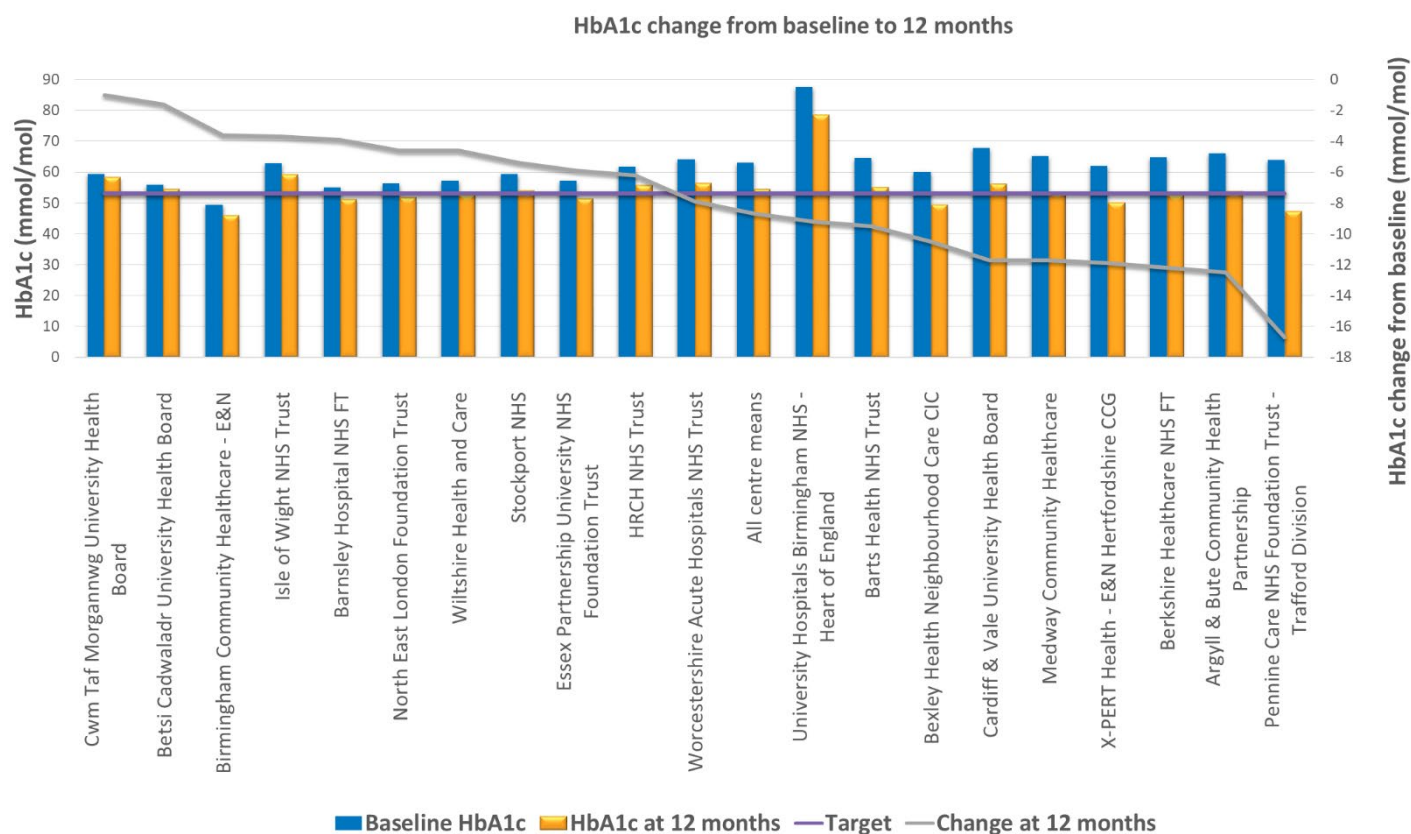
Greatest improvement in glycated haemoglobin

To be considered for an award the following criteria were taken into consideration: HbA1c reduction at both six and 12 months; number of participants for whom matched data had been entered; percentage of attendees that had matched data, robust six and 12 months 95% confidence intervals.

Glycated haemoglobin (HbA1c)

HbA1c change from baseline to 6 months
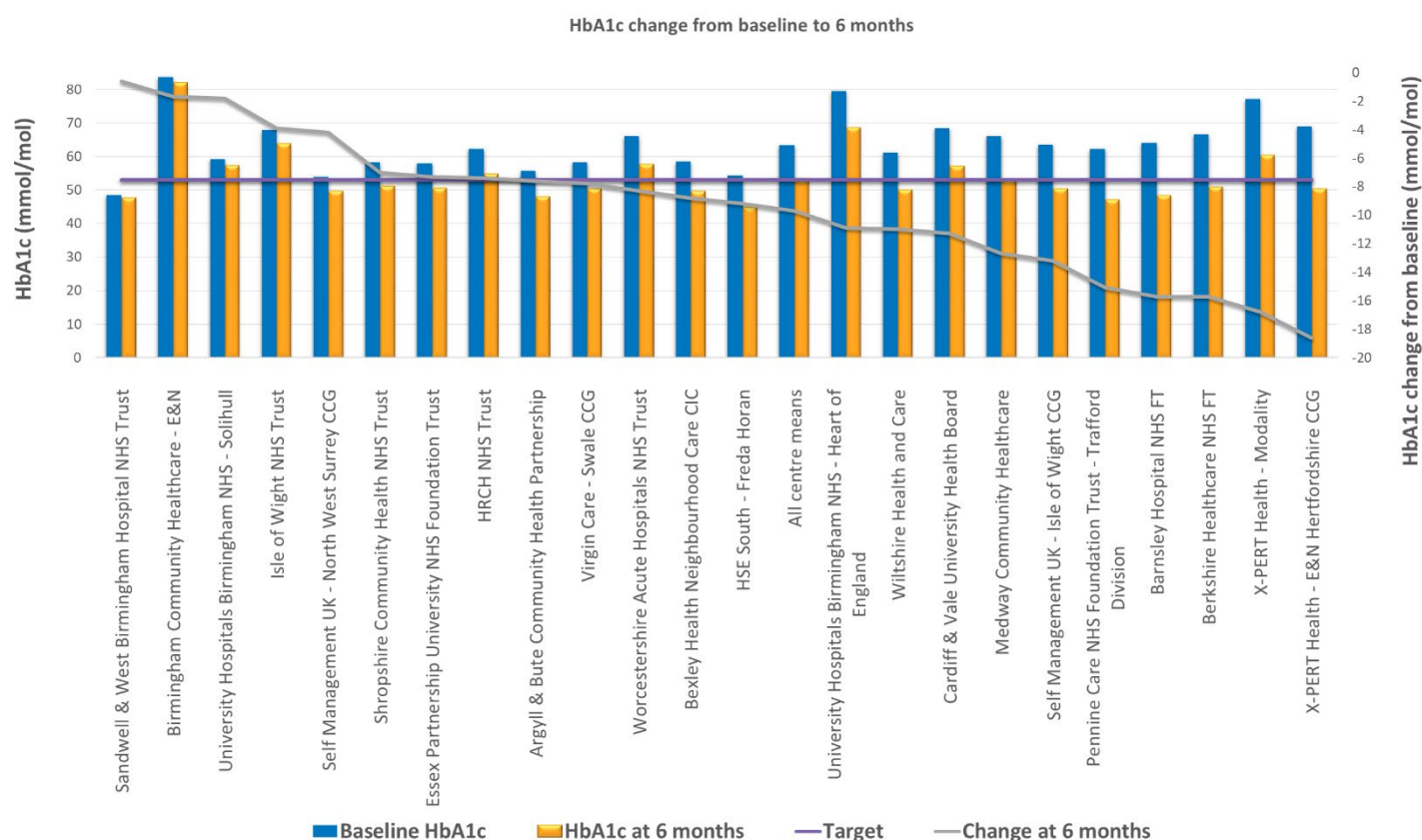
At six months the mean *all centre* reduction in glycated haemoglobin for X-PERT participants is 9.7 mmol/mol (95% CI: -9.8, -9.6), to 53.6 mmol/mol. The clinical trial demonstrated a 4 mmol/mol improvement in glycated haemoglobin at four months. The audit standard for both six and 12 months is an HbA1c value of ≤53mmol/mol (the purple line on both graphs). Twenty-three organisations reported HbA1c at six months. Although only 14 organisations (61%) achieved the audit standard for glycated haemoglobin at six months (≤53mmol/mol), all 23 organisations demonstrated a mean reduction in HbA1c (grey line and axis on the right side in the graphs above). X-PERT Health - E&N Hertfordshire CCG achieved the greatest reduction at 6 months of 18.6 mmol/mol (95% CI: -19.7, -17.5) for 37 participants.

HbA1c change from baseline to 12 months

Legend: ■ Baseline HbA1c ■ HbA1c at 12 months — Target — Change at 12 months
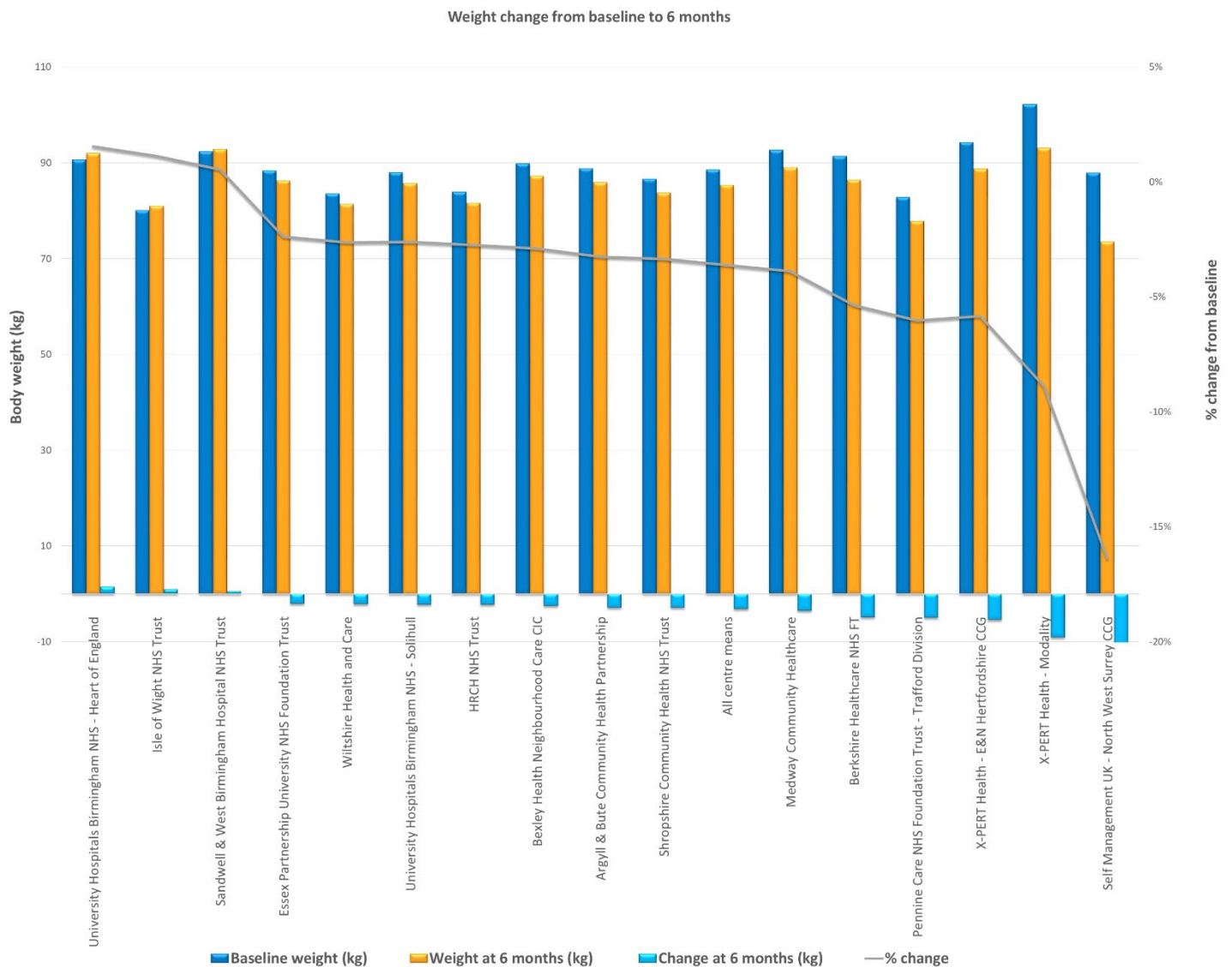
At 12 months the mean *all centre* reduction in glycated haemoglobin is an 8.7 mmol/mol reduction, to 54.4 mmol/mol (95% CI: -8.8, -8.6). The clinical trial demonstrated a 7.7 mmol/mol at 12 months. Twenty organisations reported HbA1c at 12 months, all of which demonstrated a mean reduction in HbA1c (grey line and axis on the right side in the graphs above). Nine organisations met the audit standard at 12 months (43%). Pennine Care NHS Foundation Trust - Trafford Division achieved the greatest reduction at 12 months of 16.7 mmol/mol (95% CI: -17.7, -15.7) for 37 participants.

Medway Community Healthcare overall achieved the best results with a mean six and 12 month reduction of 12.7 mmol/mol (95% CI: -13.0, -12.4) in 609 participants and 11.7 mmol/mol (95% CI: -12.0, -11.4) in 548 participants respectively. In second place Berkshire Healthcare NHS Foundation Trust achieved the greatest reduction with a 15.7 mmol/mol mean reduction at six months in 177 participants (95% CI: -16.2, -15.2) and a 12.2 mmol/mol mean reduction at 12 month in 139 participants (95% CI: -12.7, -11.7). In third place, X-PERT Health – E&N Hertfordshire CCG achieved a 18.6 mmol/mol (95% CI: -19.7, -17.5) reduction in HbA1c at six months for 37 participants and an 11.9 mmol/mol reduction at 12 months in 101 participants (95% CI: -12.5, -11.3).

The largest impact on body weight and waist circumference

For the anthropometric award category, the following criteria were taken into consideration: body weight and waist circumference reduction at six and 12 months; number of participants for whom matched data was available, and average number of attendees per programme.

Body weight

**Weight change from baseline to 6 months**

At six months the mean *all centre* reduction in body weight for X-PERT participants was 3.2kg (95% CI: -3.3, -3.0) from 88.6kg to 85.4kg; a 4% weight loss. Sixteen organisations entered data for weight at six months and 13 of these organisations (81%) documented a mean weight loss between 2.1kg and 14.4kg (blue bar). The percentage change from baseline was between +2% and -16% (grey line and axis on the right side). Self Management UK – North West Surrey CCG achieved the best results at six months with a mean weight loss of 14.4kg (95% CI: -17.3, -11.5), however there was only matched data for eight participants.

Weight change from baseline to 12 months
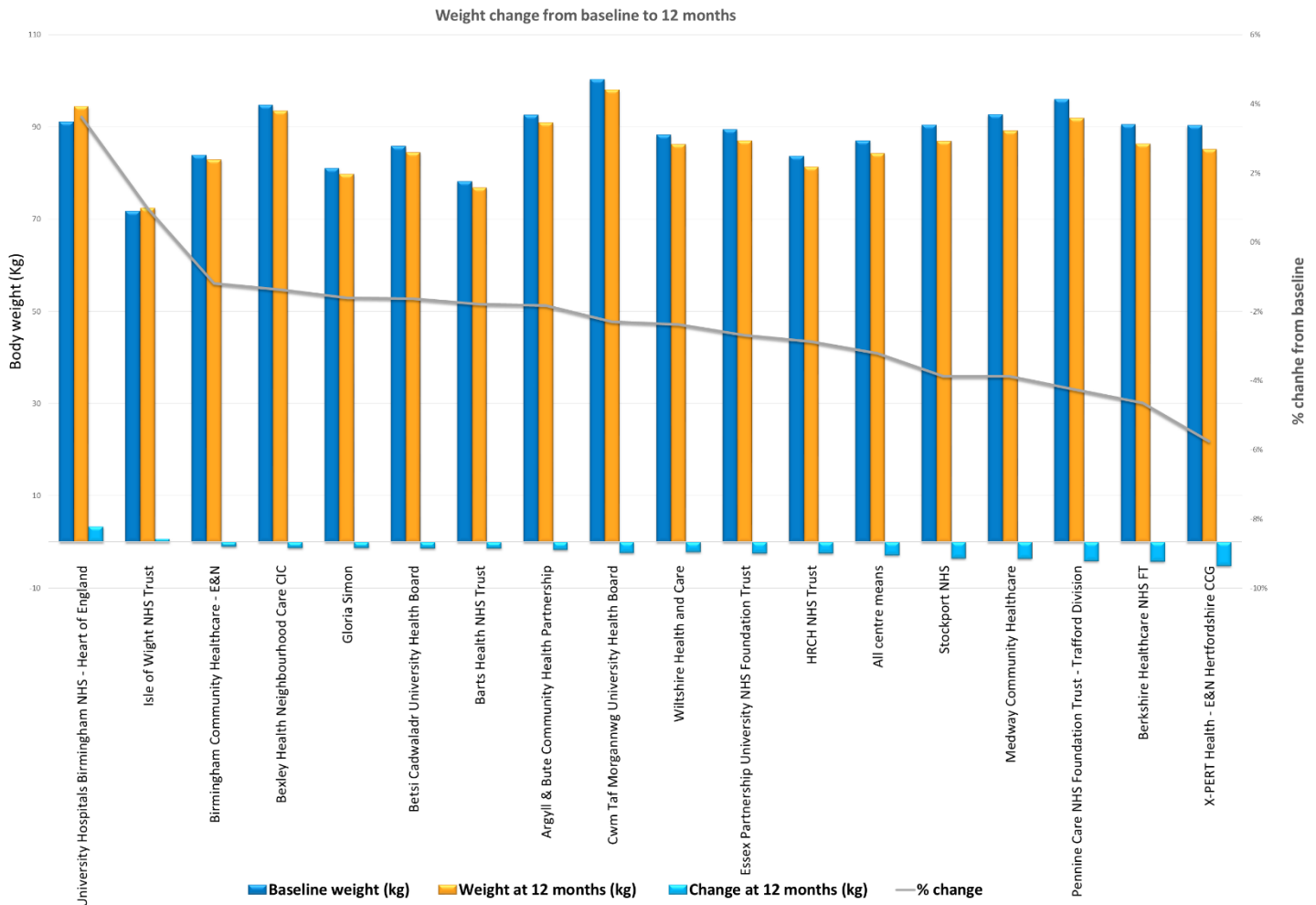
At 12 months the mean *all centre* reduction in body weight for X-PERT participants was 2.8kg (95% CI: -2.9, -2.6) from 87.0kg to 84.2kg**.** Eighteen organisations entered data for weight at 12 months, and 16 (88.8%) demonstrated a mean weight reduction (blue bars and left vertical axis in graph above [kg change] and grey line and right vertical axis in the graph above [% change]) between 1.0kg and 9.1kg (1-9%). X-PERT Health - E&N Hertfordshire CCG achieved the best results at 12 months with a mean weight loss of 5.2kg (95% CI: -5.8, -4.6) for 111 participants.

Body Mass Index (BMI)

BMI change from baseline to 6 months
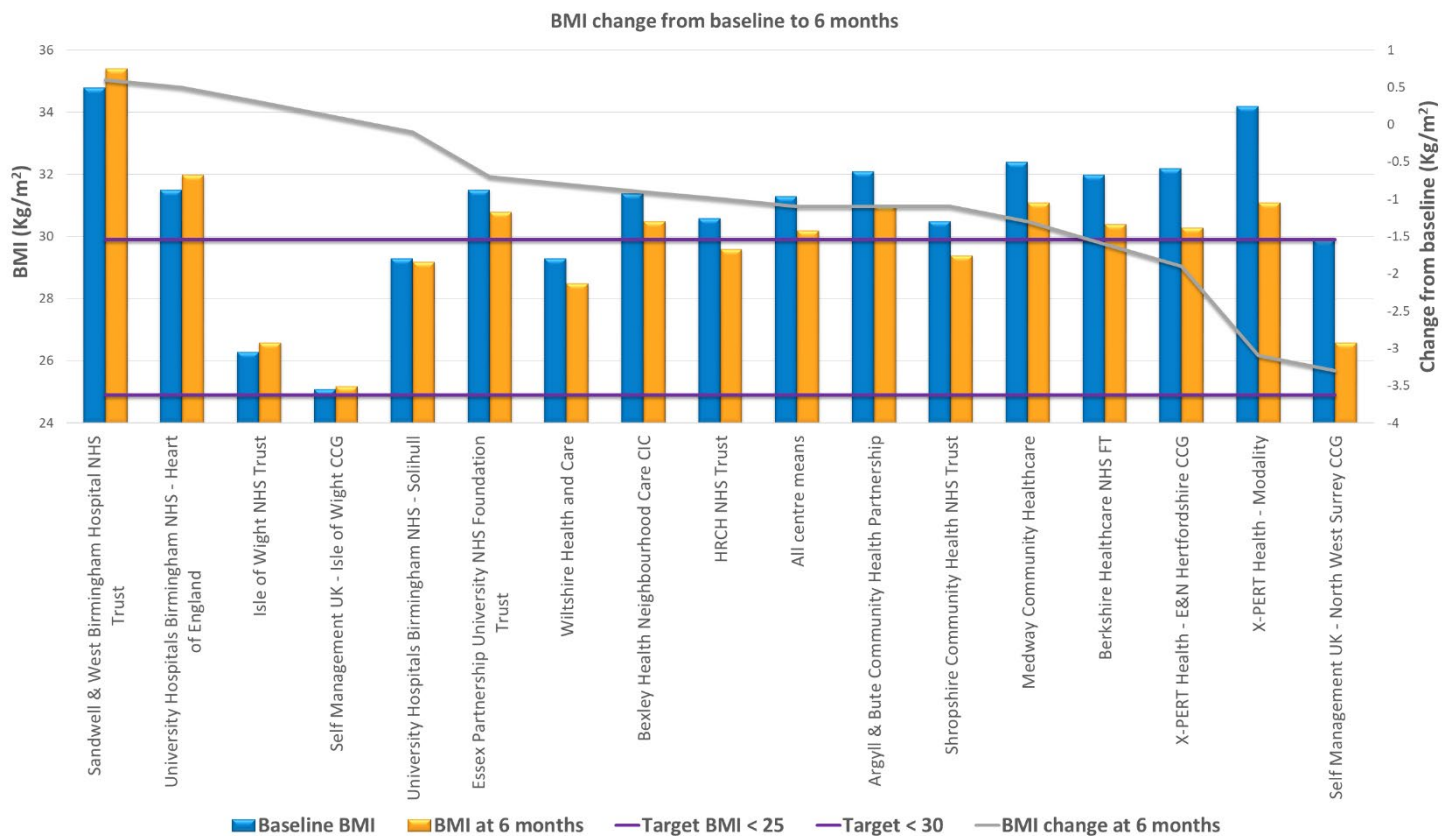
At six months the mean *all centre* reduction in BMI for X-PERT participants was 1.1 kg/m² (95% CI: -1.2, -1.0), from 31.3 kg/m² to 30.2 kg/m². The target lines of BMI <30 kg/m² and BMI <25 kg/m² have been inserted into the graph above for reference. Seventeen organisations entered BMI data at six months. At baseline all organisations had a mean BMI in the overweight or obese range. Twelve organisations (71%) demonstrated a mean reduction in BMI (grey line and axis on the right side in the graph above). Self Management UK - North West Surrey CCG achieved the greatest mean reduction, of 3.3 kg/m² (95% CI: -4.2, -2.4), however there was only matched data for 13 participants.
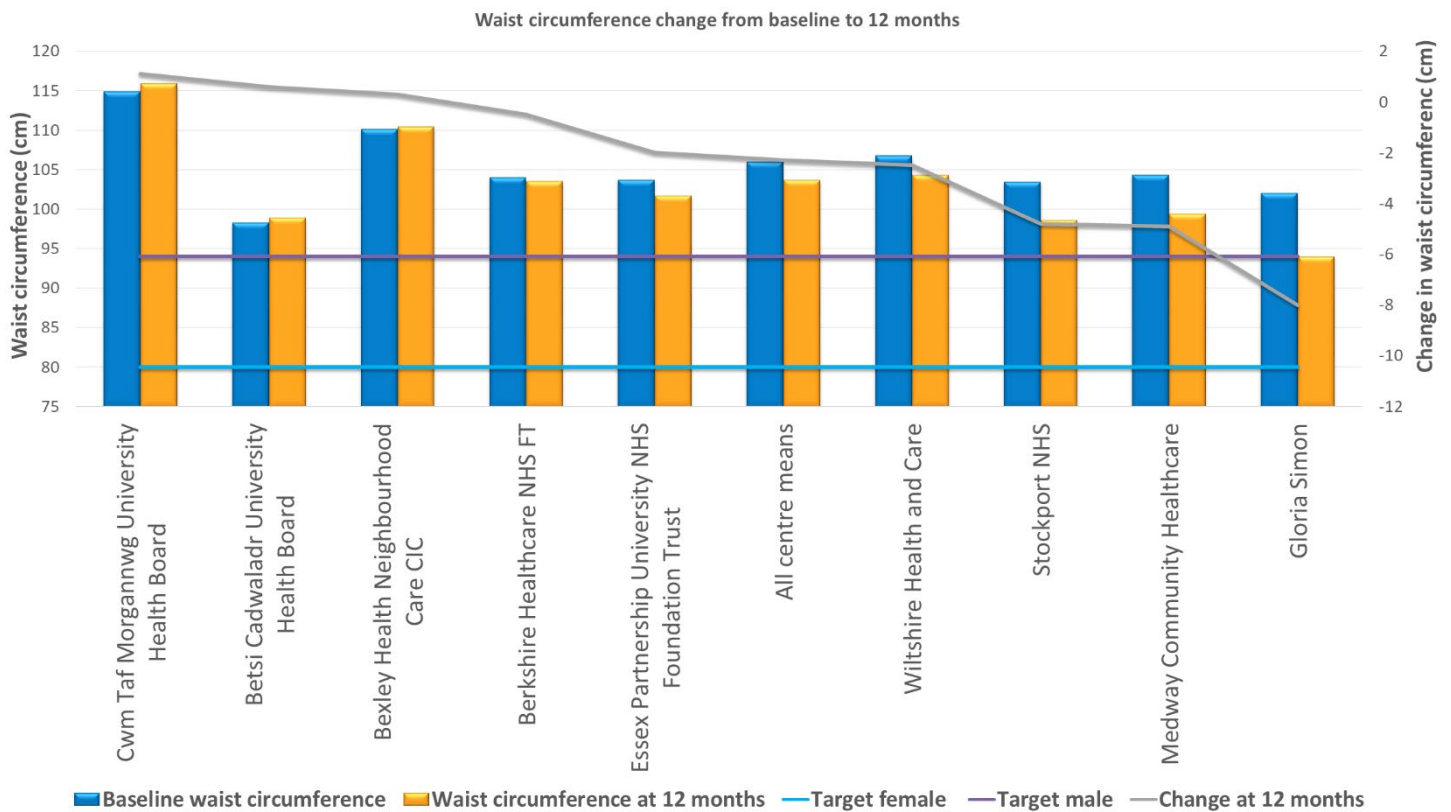
BMI change from baseline to 12 months
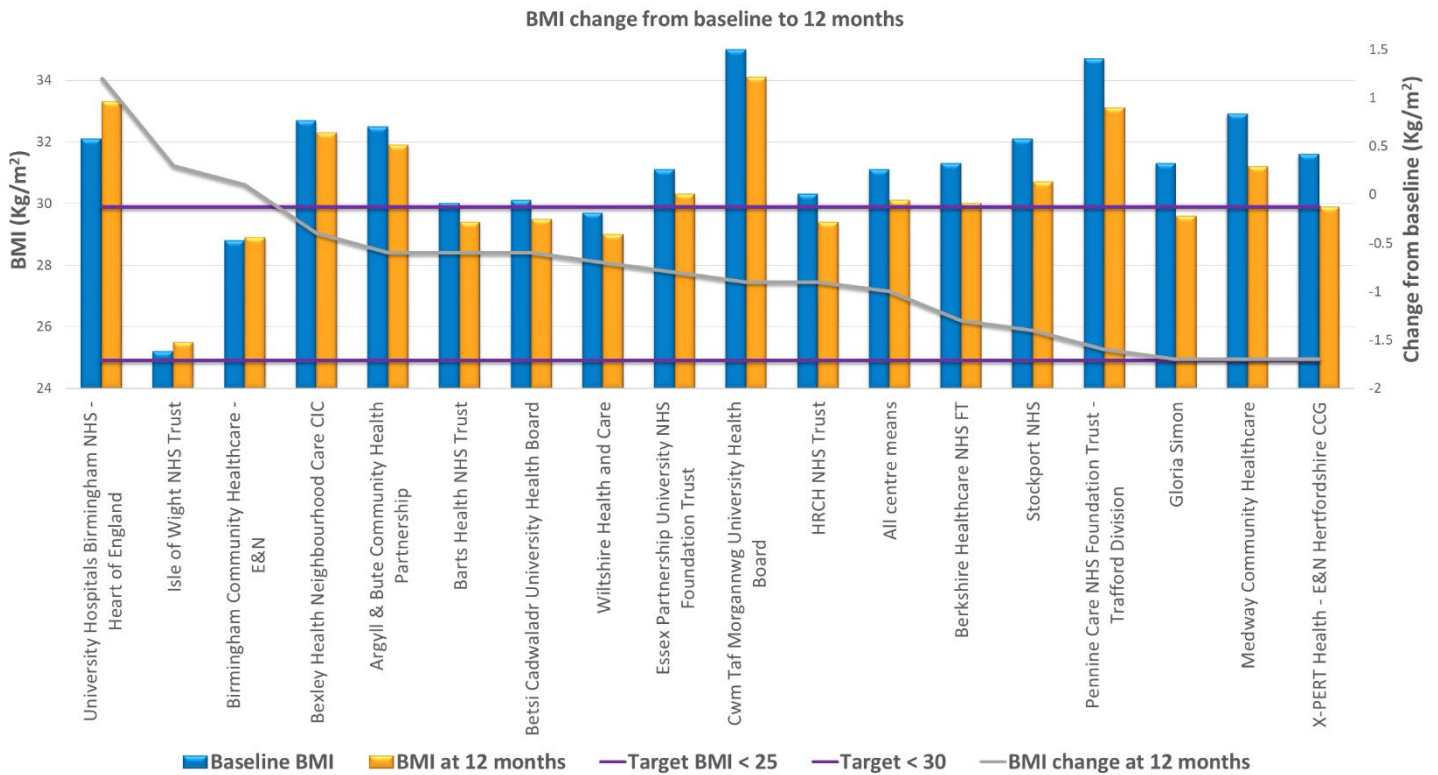
At 12 months the mean *all centre* reduction in BMI for X-PERT participants was 1.0 kg/m^2 (95% CI: -1.1, -0.9), from 31.1 kg/m^2 to 30.1 kg/m^2. Eighteen organisations entered BMI data at 12 months. Of these, 15 (83%) had baseline mean BMI values in the obese range (≥30 kg/m^2). Fifteen organisations (83%) demonstrated a mean reduction in BMI (grey line and axis on the right side in the graph above). X-PERT Health - E&N Hertfordshire CCG achieved the greatest reduction in BMI, of 1.7 kg/m^2 (95% CI: -2.0, -1.4) for 114 participants.

Waist circumference
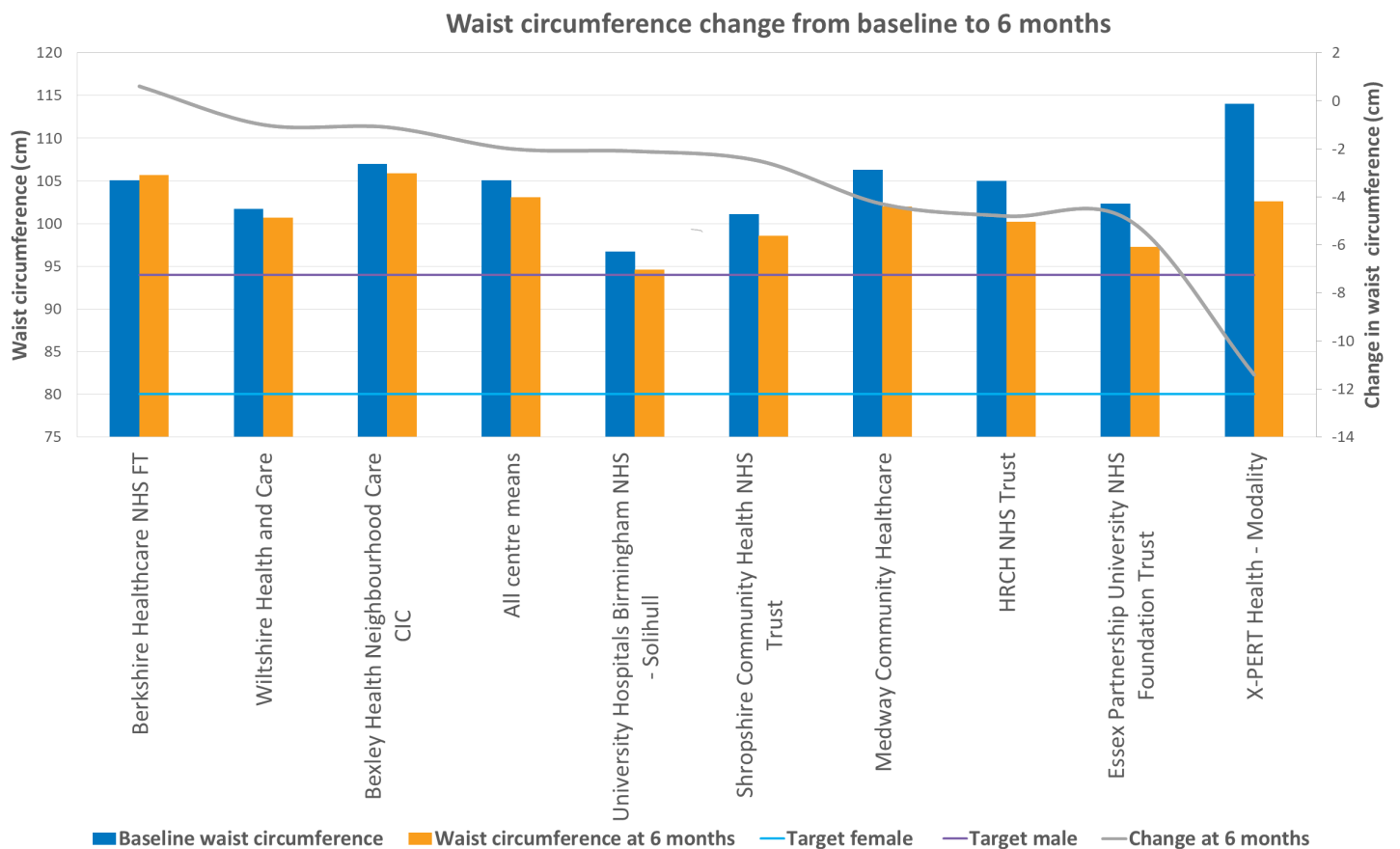
Waist circumference change from baseline to 6 months

At six months the mean *all centre* reduction in waist circumference for X-PERT participants was 2cm (95% CI: -2.2, -1.8), from 105.1cm to 103.1cm. The recommended waist circumference for a female is ≤80cm (blue line on the graph above) and for males is ≤94cm (purple line on the graph above). Only nine organisations entered waist circumference data at six months. The graph above demonstrates that the mean waist circumference in every organisation was above the ideal range. At six months, eight organisations (89%) demonstrated a mean reduction in waist circumference (grey line and axis on the right side in the graph above). X-PERT Health - Modality achieved the best results at six months, with a mean reduction of 11.4cm (95% CI: -12.1, -10.7) for 28 participants.

Waist circumference change from baseline to 12 months

Baseline waist circumference ■ Waist circumference at 12 months ─Target female ─Target male ─Change at 12 months

At 12 months the mean *all centre* reduction in waist circumference for X-PERT participants was 2.3cm (95% CI: -2.6, -2.0) from 106.0cm to 103.7cm**.** Only nine organisations reported waist circumference at 12 months, of which six (67%) demonstrated a mean reduction (purple line on graph above). Gloria Simon achieved the greatest mean reduction, of 8.0cm (95% CI: -9.3, -6.7), however there was only matched data for six participants.

Taking all these criteria into account, the largest impact on body weight and waist circumference award goes to Medway Community Healthcare with 4.3cm reduction in waist circumference at 6 months (27 matched data sets), 4.9cm reduction at 12 months (20 matched data sets). 3.6kg reduction in body weight at 6 months (153 matched data sets), 3kg reduction in body weight at 12 months (99 matched data sets). Essex Partnership University NHS Foundation Trust have been awarded 2nd place, with 3rd place being awarded to Wiltshire Health and Care.

Cardiovascular disease (CVD) risk reduction

This award category considered the following criteria: reduction in systolic and diastolic blood pressure at six and 12 months; reduction in total cholesterol to HDL ratio; reduction in triglyceride to HDL ratio; number of participants for whom matched data was available; robust 95% confidence intervals.

Systolic blood pressure
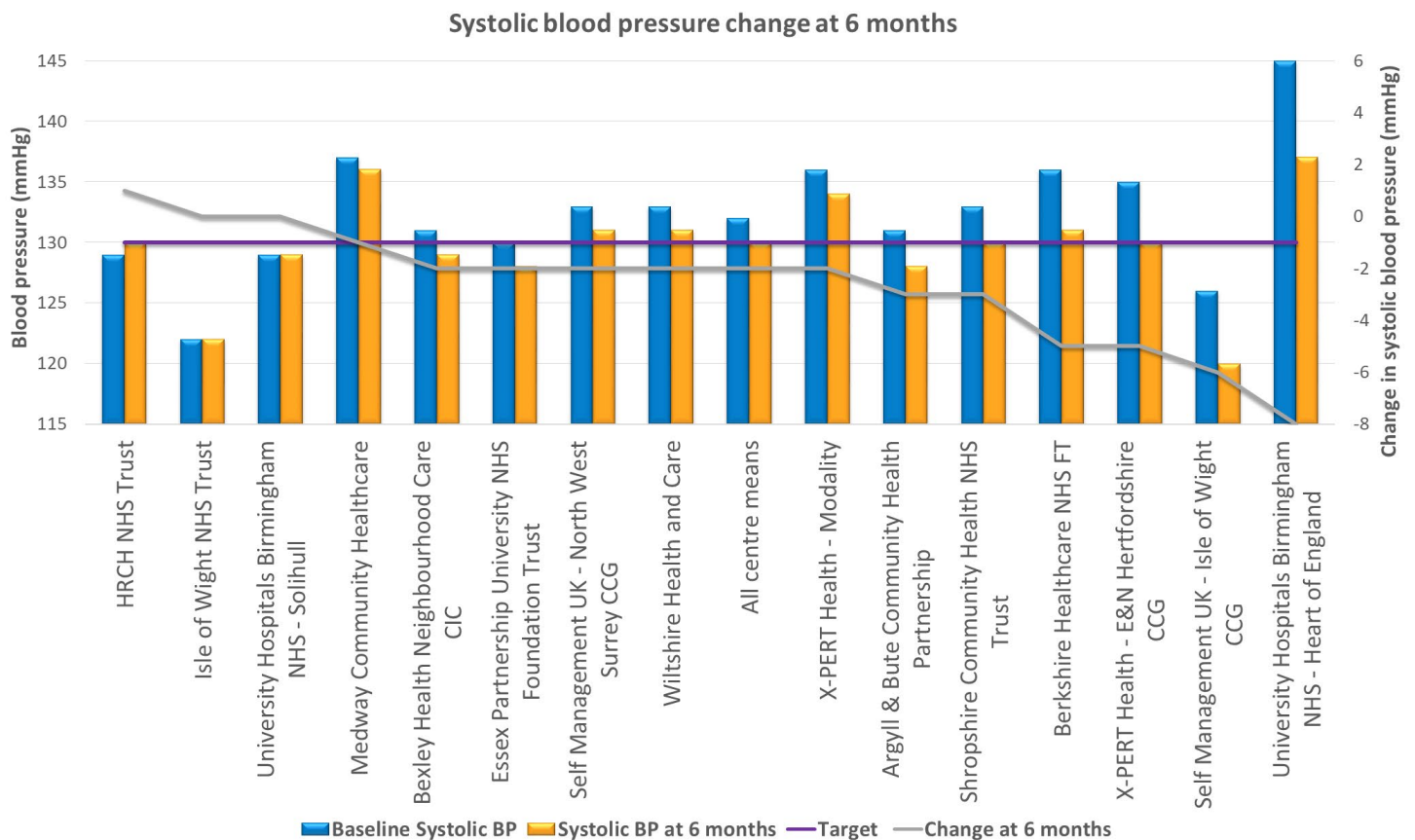
Systolic blood pressure change at 6 months

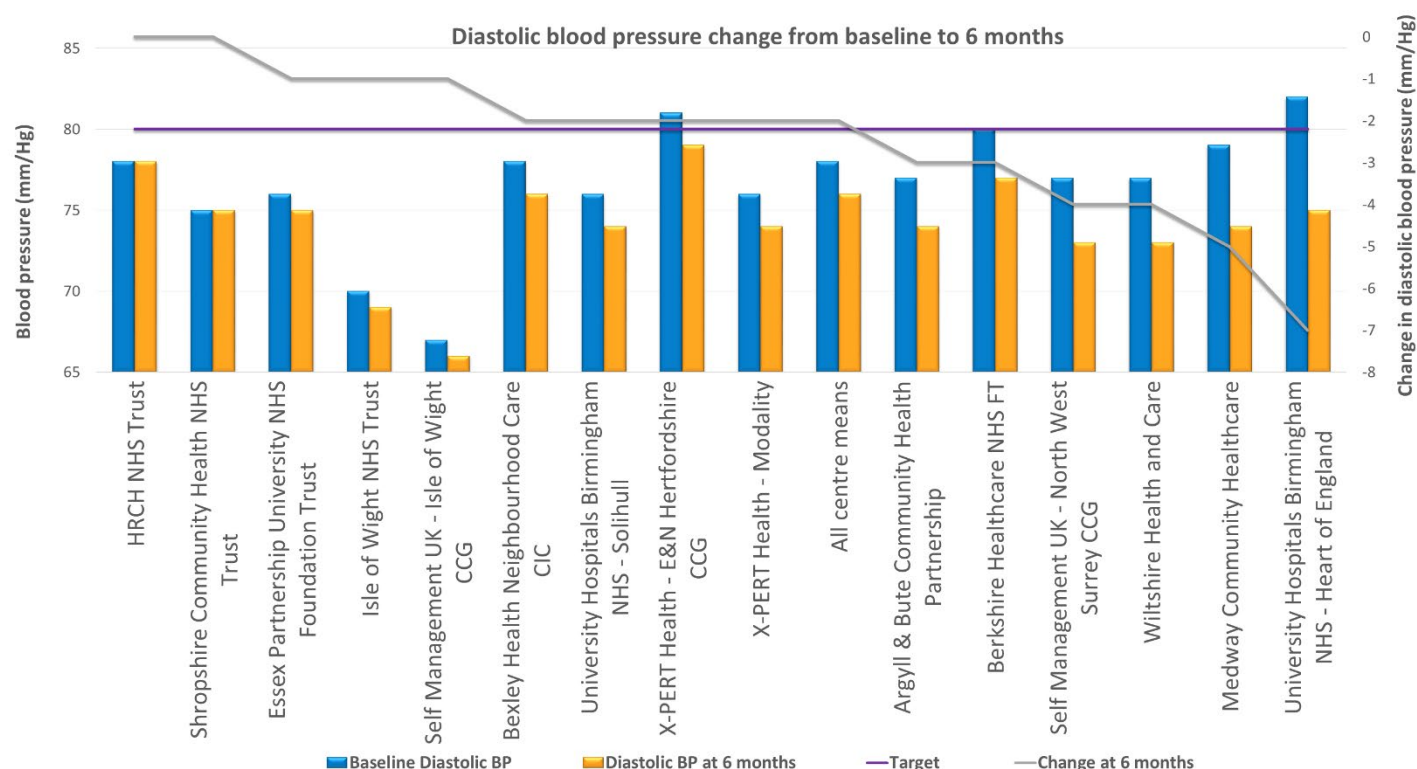Baseline Systolic BP   Systolic BP at 6 months   Target   Change at 6 months

At six months the mean *all centre* reduction in systolic blood pressure for X-PERT participants was 2 mmHg (95% CI: -2, -2), from 132 to 130 mmHg. **T**arget systolic blood pressure for an individual with Type 2 diabetes with no microvascular complications is ≤ 140 mmHg and the recommendation for Type 1 diabetes and for those with retinopathy or nephropathy is ≤ 130 mmHg (purple target line). Fifteen organisations provided systolic BP data at six months. Mean blood pressure was already below target at baseline for five organisations. At six months, 12 organisations demonstrated a mean reduction in systolic blood pressure (blue line in the graph above), moving them towards or below the 130 mmHg target. Nine out of the 15 organisations achieved a mean blood pressure at or below this target at six months. University Hospitals Birmingham NHS - Heart of England achieved the greatest results at six months, with a mean reduction of 8 mmHg (95% CI: -9, -7). However, there was only matched data available for 15 participants.
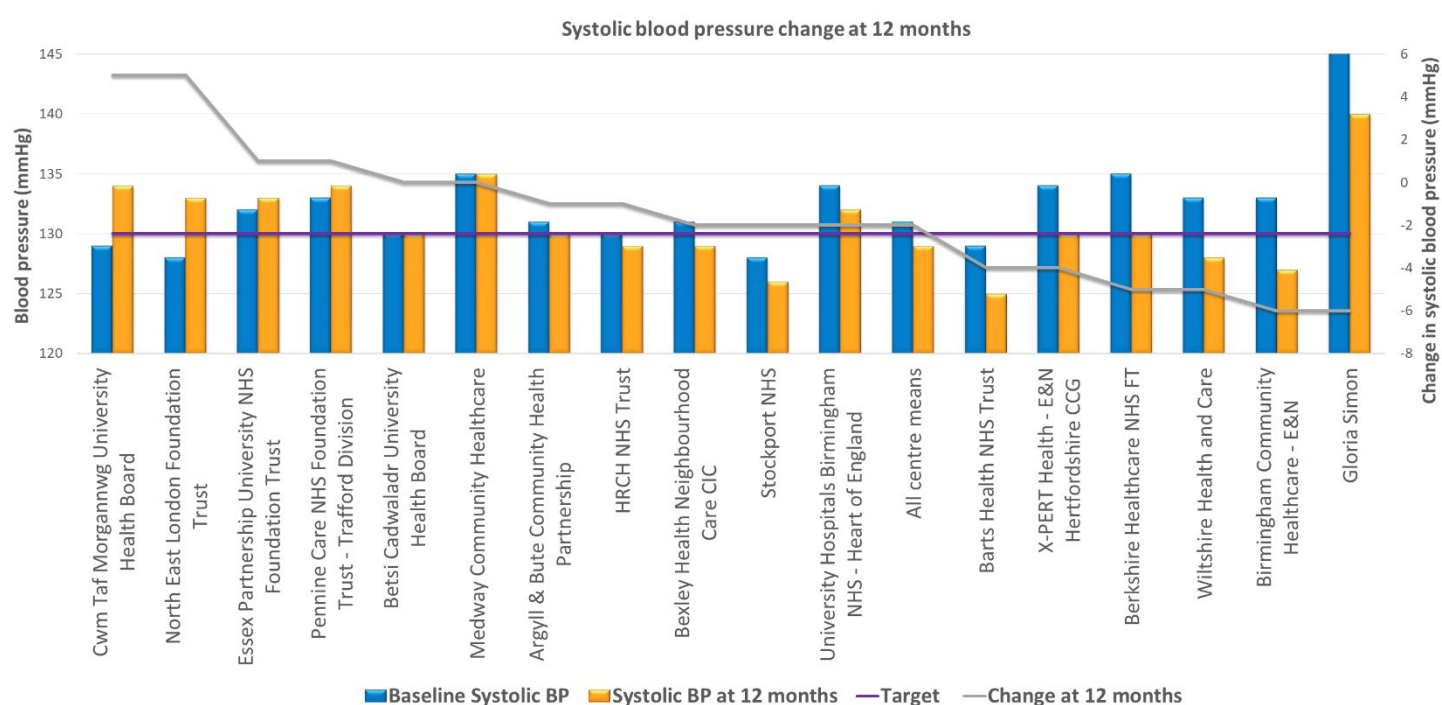
Systolic blood pressure change at 12 months

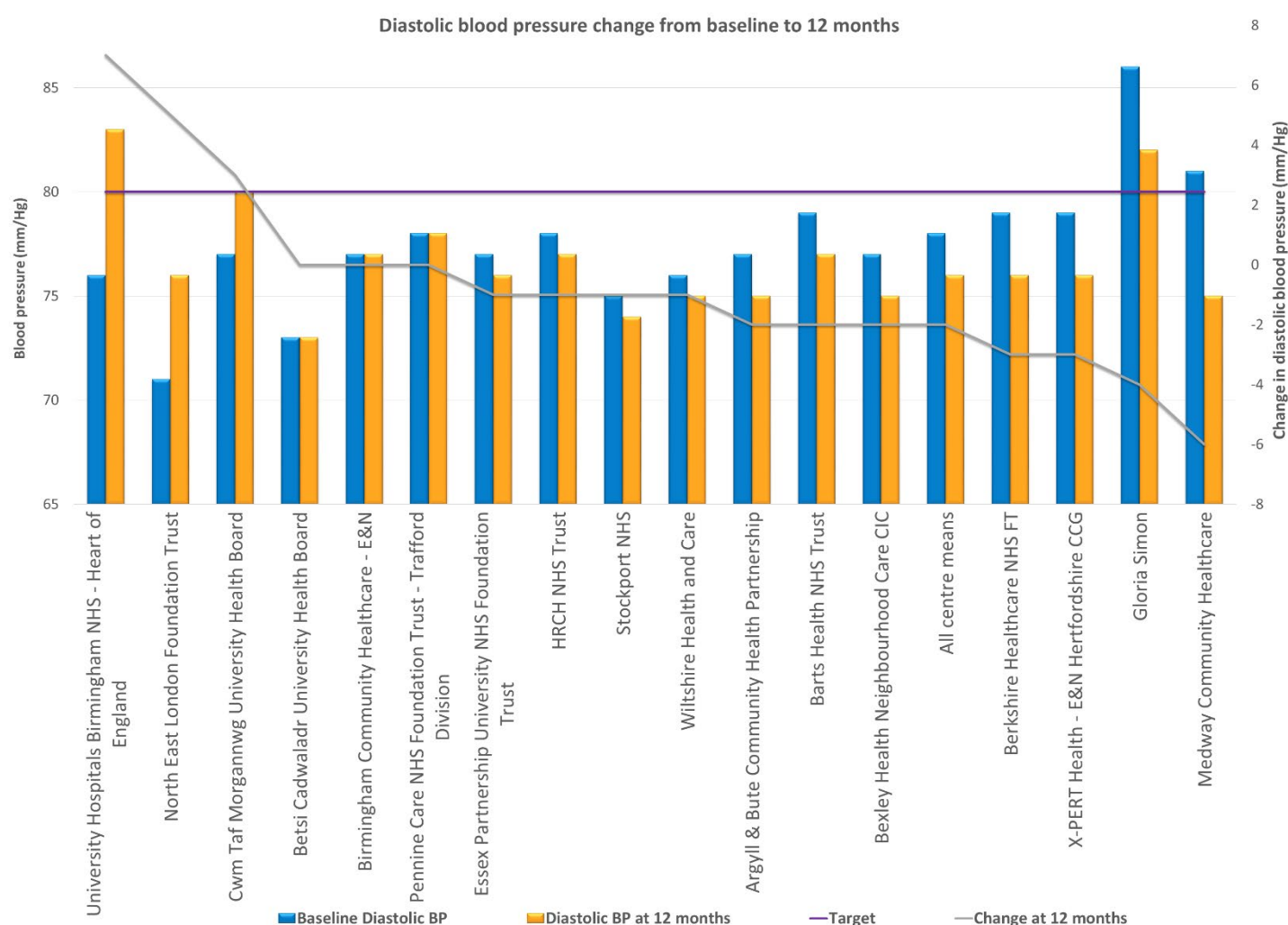Baseline Systolic BP ▪ Systolic BP at 12 months ▪ Target ▪ Change at 12 months

At 12 months the mean *all centre* reduction in systolic blood pressure for X-PERT participants was 2 mmHg (95% CI: -2, -2), from 131 to 129 mmHg. Sixteen organisations reported systolic blood pressure at 12 months and 11 (69%) reported a mean reduction (grey line in the graph above), with two organisations reporting no change. For six organisations (38%) systolic blood pressure was below the 130 mmHg target at baseline, and 10 organisations (63%) achieved this target by 12 months. Birmingham Community Healthcare - E&N (95% CI: -7, -5) and Gloria Simon (95% CI: -7, -5) both obtained the greatest results with a 6 mmHg reduction in systolic blood pressure at 12 months, however only nine and 12 matched data sets were recorded, respectively.

Diastolic blood pressure

At six months the mean *all centre* reduction in diastolic blood pressure for X-PERT participants was 2 mmHg (95% CI: -2, -2), from 78 to 76 mmHg. The recommended diastolic blood pressure for people with diabetes is ≤80 mmHg (purple target line in the graph above). Fifteen organisations entered data for diastolic blood pressure at six months and the baseline figures demonstrate that 13 (87%) the organisations had mean diastolic blood pressure readings equal to or below the 80 mmHg target. Thirteen organisations demonstrated a mean reduction in diastolic blood pressure (grey line in the graph above), with the other two organisations reporting no change. University Hospitals Birmingham NHS - Heart of England achieved the best results, with a mean reduction of 7 mmHg (95% CI: -8, -6). However, there were only 15 matched participant data sets available.

**Diastolic blood pressure change from baseline to 12 months**

At 12 months the mean *all centre* reduction in diastolic blood pressure for X-PERT participant was 2 mmHg (95% CI: -2, -2), from 78 to 76 mmHg. Seventeen organisations reported diastolic blood pressure at 12 months and 11 organisations (65%) demonstrated a mean reduction of between 1 and 6 mmHg (grey line and right-hand axis in the graph above). Medway Community Healthcare achieved the best results with a mean reduction of 6 mmHg (95% CI: -6, -6) for 57 participants.

Total cholesterol to HDL cholesterol ratio

Total cholesterol to high-density lipoprotein (HDL) cholesterol ratio is as a good predictor of cardiovascular risk. This ratio is calculated by dividing total cholesterol level by HDL. Ideally it should be below 4.5, with a higher ratio indicating an increased risk of heart disease. A ratio above six is regarded as representing a high risk of heart disease. Where organisations enter total cholesterol and HDL cholesterol into the X-PERT audit database this ratio is automatically calculated.


Total cholesterol: HDL ratio change from baseline to 6 months
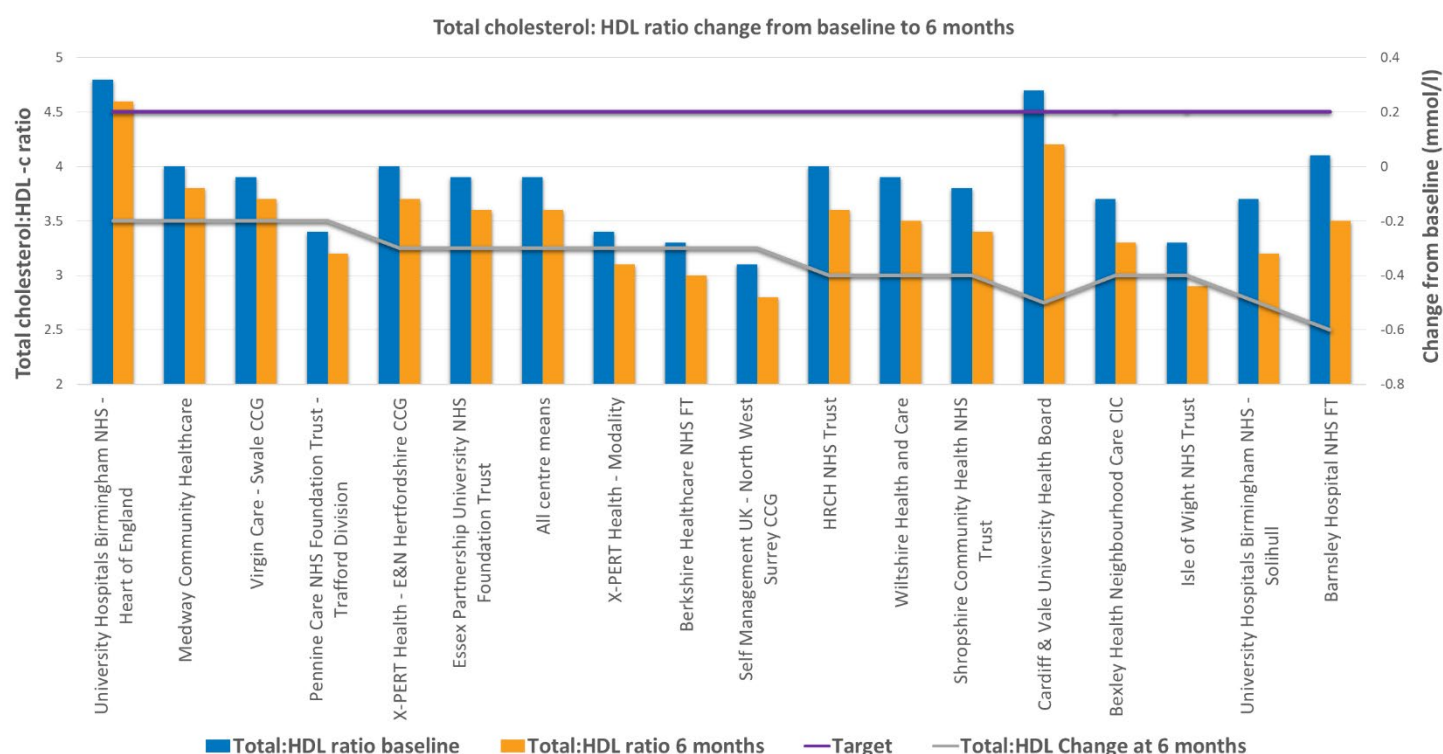
At six months the mean *all centre* reduction in total cholesterol to HDL cholesterol ratio was 0.3 (95% CI: -0.3, -0.3), from 3.9 to 3.6. Total cholesterol to HDL cholesterol ratio was calculated for 17 organisations, of which all demonstrated a reduction between 0.2 and 0.6 mmol/l (grey line and right-hand axis in the graph above). The baseline figures demonstrate that 15 organisations (88%) had a total cholesterol to HDL cholesterol ratio below or equal to the target of 4.5. Barnsley Hospital NHS FT achieved the greatest results with a 15% mean reduction of 0.6 (95% CI: -0.9, -0.3). However, there were only eight matched participant data sets available for this organisation.

Total cholesterol: HDL ratio change from baseline to 12 months
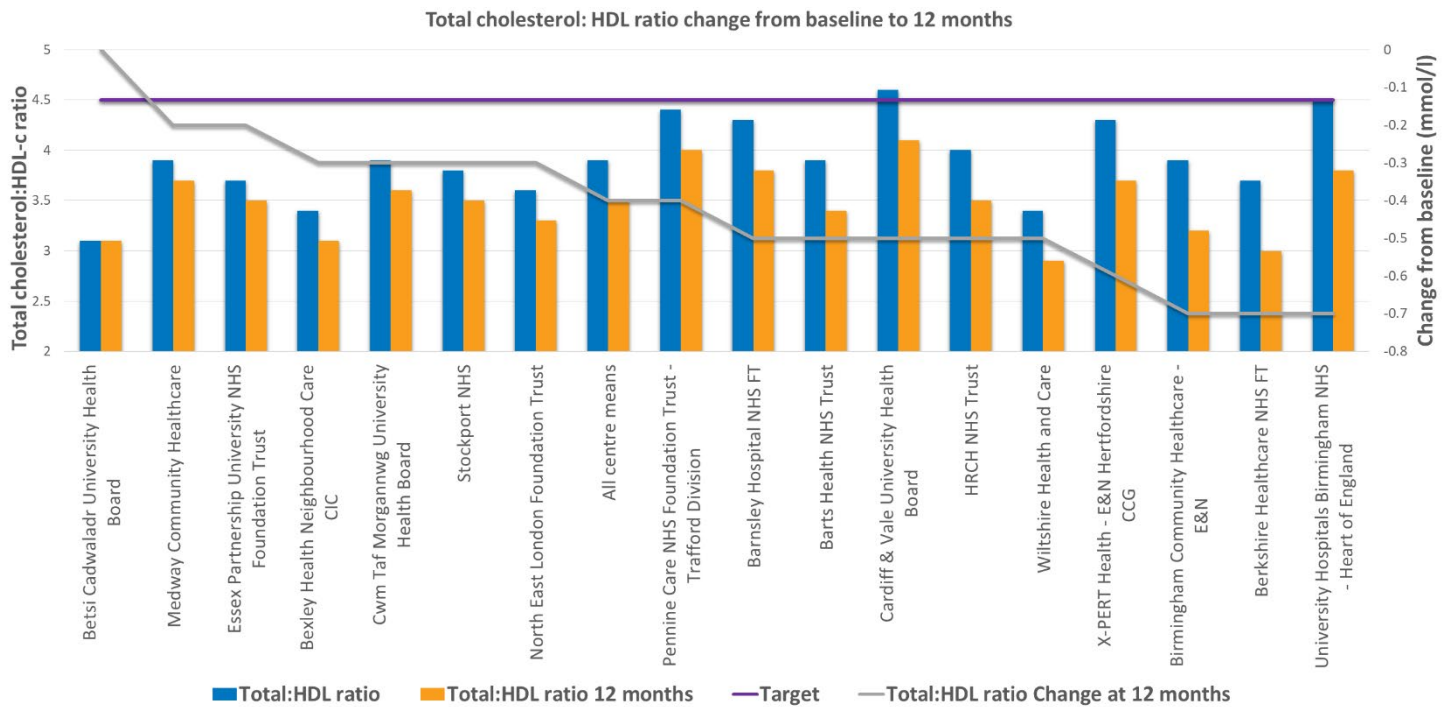
At 12 months the mean *all centre* reduction in total cholesterol to HDL cholesterol ratio for X-PERT participants was 0.4 (95% CI: -0.4, -0.4), from 3.9 to 3.5. Seventeen organisations entered data for total cholesterol and HDL cholesterol at baseline and 12 months to enable the ratio to be calculated. Sixteen organisations (94%) demonstrated a mean ratio reduction of between 0.2 and 0.7 (grey line and axis on the right side in the graph above), with the other organisation reporting no change. University Hospitals Birmingham NHS - Heart of England achieved the best results with a 16% mean reduction of 0.7 (95% CI: -1.3, -0.5), from 4.5 to 3.8, however there was only matched data for eight participants.

Triglyceride to HDL cholesterol ratio

The triglyceride to HDL cholesterol ratio (TG:HDL-C ratio) correlates CVD risk in both men and women. The ideal ratio is <0.87, with higher levels indicating increased risk. Where organisations enter triglyceride and HDL cholesterol into the X-PERT audit database this ratio is automatically calculated.

Triglyceride: HDL-C ratio change baseline to 6 months
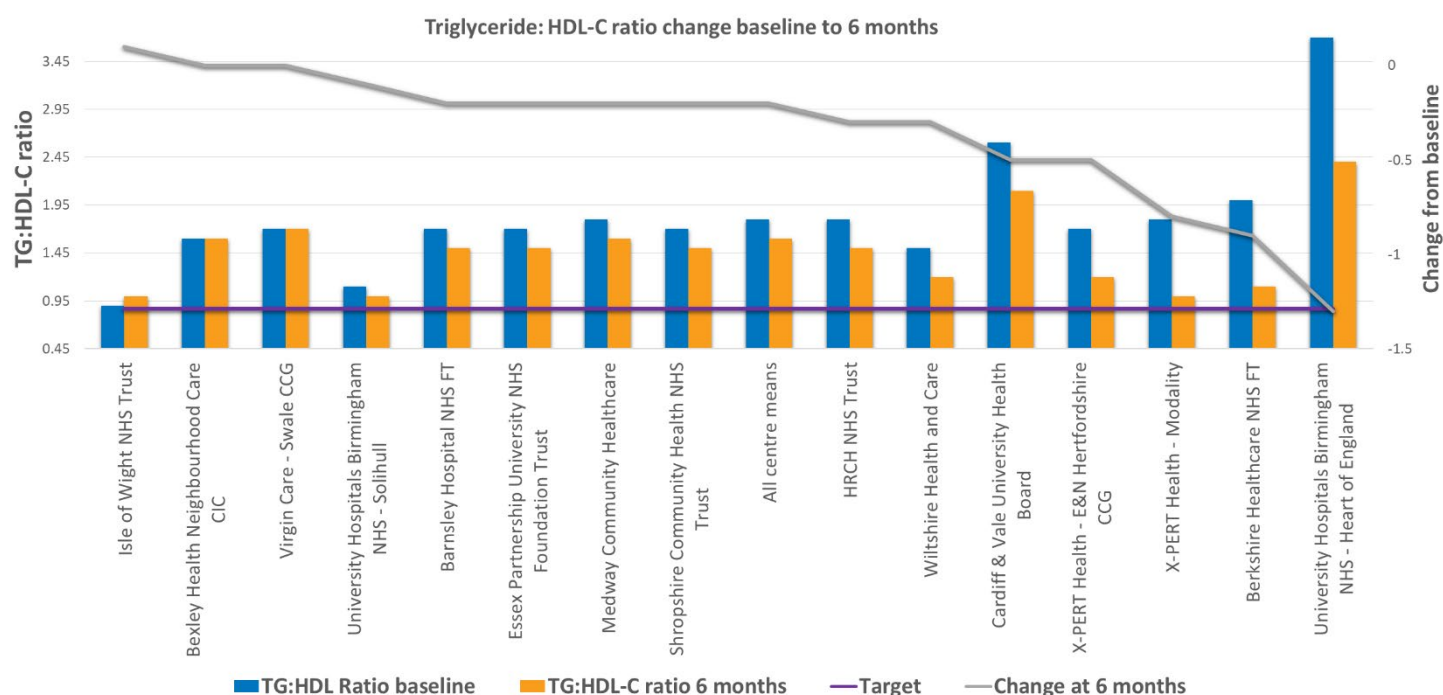
At six months the mean *all centre* reduction in TG:HDL-C ratio was 0.2 (CI 95%: -0.3, -0.1), from 1.8 to 1.6. Fifteen organisations provided triglyceride and HDL-C results at baseline and six months to enable this ratio to be calculated. Twelve organisations (80%) demonstrated a reduction in the TG:HDL-C ratio of between 0.1 and 1.3 (grey line and axis on the right-hand side in the graph above). However, all organisations remained above the stated target, suggesting an elevated risk of CVD. University Hospitals Birmingham NHS - Heart of England achieved the best result with a mean 1.3 (95% CI: -2.9, 0.3) reduction, from 3.7 to 2.4. However, there were only eight matched participant data sets available for this organisation and the wide confidence intervals suggests the data were not robust.

Triglyceride: HDL-C ratio change baseline to 12 months
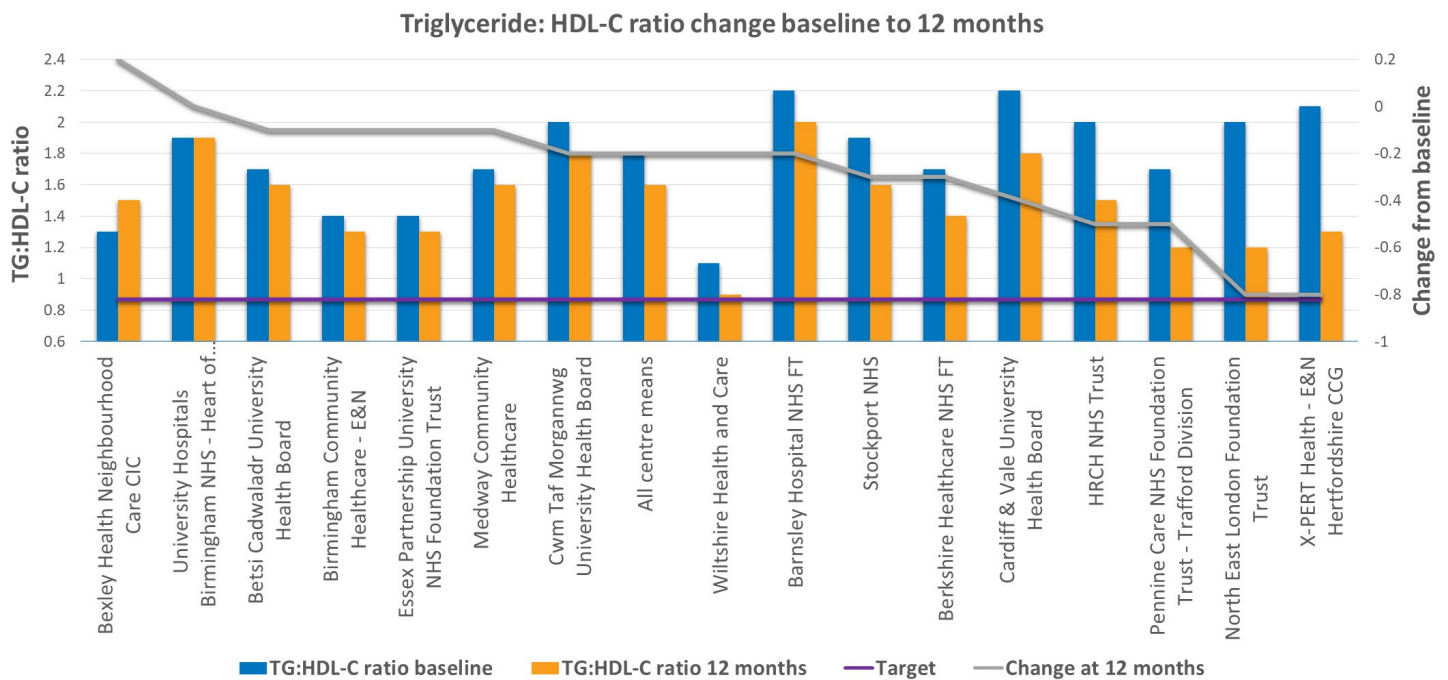
At 12 months the mean *all centre* reduction in TG:HDL-C ratio was 0.2 (95% CI: -0.3, -0.1), from 1.8 to 1.6. Sixteen organisations provided triglyceride and HDL-C results at baseline and 12 months to enable this ratio to be calculated. Fourteen organisations (88%) demonstrated a reduction in the TG:HDL-C ratio of between 0.1 and 0.8 (grey line and axis on the right-hand side in the graph above). However, all organisations remained above the 0.87 target suggesting an increased risk of CVD. Two organisations obtained the best results, both with a mean reduction of 0.8; X-PERT Health - E&N Hertfordshire CCG (95% CI -1.2, -0.4) and North East London Foundation Trust (95% CI -2.0, 0.4).

Taking all these criteria into account, the organisation with the greatest improvement in cardiovascular disease risk factors is Berkshire Healthcare NHS FT. The organisation saw a 5mmHg reduction in systolic blood pressure at six (192 matched data sets) and 12 months (157 matched data sets); 3mmHg reduction in diastolic blood pressure at six (197 matched data sets) and 12 months (154 matched data sets); 0.3 reduction in total : HDL ratio at 6 months (162 matched data), 0.7 reduction in total : HDL ratio at 12 months (89 matched data); 0.9 reduction in TG : HDL ratio at 6 months (30 matched data) and 0.3 reduction in TG:HDL ratio at 12 months (34 matched data sets). X-PERT Health – E&N Hertfordshire have been awarded 2nd place, with 3rd place being awarded to Wiltshire Health and Care.

Discussion

The evidence base demonstrating the success of the X-PERT Programme has already been established from the randomised controlled trial. The purpose of the audit is to benchmark the results from implementation against the published evidence base to determine whether national implementation is as effective as the clinical trial.

This year's results are encouraging and demonstrate that implementation of the X-PERT Programme continues to be effective. Audit standards from the RCT have largely been met for the mean *all centre data*, although attendance and completion of the programme fell just short of the stated targets. This indicates that more work is required to encourage participants to attend X-PERT Programmes and in supporting them to complete the course. All organisations demonstrated an improvement in glycaemic control and clinically meaningful improvements to body weight, blood pressure and lipid outcomes by 12 months.

Limitations

On-going audit does not have the same meticulous regulation as collecting data as part of a controlled trial, and as such there are a number of limitations. Principle amongst these is the lack of time available for healthcare professionals to follow up with participants and/or to enter data. Audit is essential however to assess whether programme implementation is effective, and so it is important that efforts are made to maximise the collection and entry of relevant data.

To maximise the validity of the presented data X-PERT only uses matched data as part of its audit process, in contrast to many other organisations who compare baseline and post-programme averages despite these averages being based on different sets of participants. This method does however also reduce the amount of data that is available. For example, some organisations have only entered baseline results and therefore no matched data is available. Other organisations have not entered sufficient six or 12 month follow-up data, meaning that the number of matched data sets is often limited. As data was discounted from the audit report if less than five matched data sets had been entered for any one outcome, some organisations were excluded from the audit.

Many organisations are obtaining excellent results whilst others are struggling to meet the audit standards for some outcomes. Some organisations have obstacles in obtaining or entering the data. Educators need to scrutinise less favourable results to ascertain whether it is due to the small sample sizes at follow-up or due to programme delivery. This audit report should help to identify priorities for continuous quality improvement within organisations and X-PERT Health are happy to help and assist with this process.

Annual awards

The X-PERT Health awards recognise best practice on an annual basis. There are four categories, where awards are presented to the organisations who have obtained the best audit results. These categories are:

- ➢ The best participant experience
- ➢ The greatest improvement in glycated haemoglobin
- ➢ The largest impact on body weight and waist circumference
- ➢ The greatest improvement in cardiovascular disease risk factors (lipids and BP)

The winners were announced at the award ceremony on Thursday 19th September 2019 at the Marriott Renaissance City Centre Hotel, Manchester.

Winners for each category

The best participant experience

The following criteria were taken into consideration: number of programmes delivered; number of participants per session; uptake (% attending at least one session); attendance (% attending four or more sessions); participant empowerment change and participant satisfaction.

- ➢ Winner: University Hospitals Birmingham NHS - Solihull
- ➢ 2nd place: Medway Community Healthcare
- ➢ 3rd place: Pennine Care NHS Foundation Trust - Bury

The greatest improvement in glycated haemoglobin

The following criteria were taken into consideration: HbA1c reduction at six months and 12 months; number of participants for whom matched data was available; robustness of 95% confidence intervals.

- ➢ Winner: Medway Community Healthcare
- ➢ 2nd place: Berkshire Healthcare NHS Foundation Trust
- ➢ 3rd place: X-PERT Health – E&N Hertfordshire CCG

The largest impact on body weight and waist circumference

The following criteria were considered: body weight and waist circumference reduction at six months and 12 months; number of participants for whom matched data was available; average number of attendees per programme; robustness of 95% confidence intervals.

- ➢ Winner: Medway Community Healthcare
- ➢ 2nd place: Essex Partnership University NHS Foundation Trust
- ➢ 3rd place: Wiltshire Health and Care
- ➢ Highly commended for six month data: Self Management UK – North West Surrey CCG and X-PERT Health - Modality

The greatest improvement in cardiovascular disease risk factors (lipids and BP)

The following criteria were taken into consideration: reduction in total to HDL cholesterol ratio, triglyceride to HDL ratio and blood pressure (systolic and diastolic) at six and 12 months; number of participants for whom matched data was available; robustness of 95% confidence intervals.

- ➢ Winner: Berkshire Healthcare NHS FT
- ➢ 2nd place: X-PERT Health – E&N Hertfordshire
- ➢ 3rd place: Wiltshire Health and Care

The X-PERT Best Educator award 2019

Nominations were requested from healthcare professionals, participants and organisations. Nominees were scored anonymously based on educator impact and the following criteria from the audit database: participant satisfaction; change in empowerment; reductions in weight and HbA1c (based on matched data, with the robustness of 95% confidence intervals considered). A total of eight nominations were received.

- ➢ **Winner: Cay Carlow – Medway Community Healthcare**
  Between 1st January 2017 and 31st December 2018, Cay delivered 63 programmes to 745 participants. She achieved a 96.8% completion rate (participants attended 4 or more sessions) during this period. Participants reported a 95.9% mean satisfaction score and a 43.3% increase in empowerment after attending her courses. Clinical improvements in weight (reduction of 5.1kg, 95% CI: -5.7, -4.5) and HbA1c (reduction of 11.9mmol/mol, 95% CI: -12.2, -11.6) were seen as well as reductions in cardiovascular risk factors at both six months and one year post course.
- ➢ **2nd place: Catherine Washbrook – Cardiff and Vale UHB**
- ➢ **3rd place: Gloria Simon – Freelancer**

Conclusion

The results from the comprehensive audit of X-PERT implementation have demonstrated that it is feasible and practical to continue to evaluate the effectiveness of structured education outside a clinical research trial. Although the results of an audit are not as valid and robust as those published from a randomised controlled trial, the number of participants is greater and it is more of a true reflection of real-life practice. Audit standards from the RCT have largely been met for the *all centre* data between 2017-2018, except for attendance at one session (which fell short of the 95% target at 77.7%), and attendance at four or more sessions (which fell just short of the 80% target at 78%) . Therefore, more attention is needed to improve uptake and completion of the X-PERT structured education programmes. Where possible, organisations who have poor uptake or attendance should contact participants to investigate the reason for the poor attendance and how it could be improved.

Overall, results demonstrate that national implementation of the X-PERT Programme in the prevention and management of diabetes equips people with the skills to make informed decisions and take control of their condition, leading to improved health. The audit will continue to be repeated annually.

X-PERT Health is happy to advise and support organisations in achieving audit standards and improving key performance indicators. Please contact admin@xperthealth.org.uk for more information. Attending regular X-PERT Educator Update Training and the annual X-PERT Conference & Awards also helps with the sharing of good practice to further drive quality improvement.

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