TRITECH Sefydliad Institute

Evaluation Report

Real-world Evaluation of the Hywel Dda University Health Board Diabetes Prevention Programme: Final Report

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Report prepared by: **Dr Gareth Davies, Clinical Scientist, TriTech Institute, Hywel Dda University Health Board**

With input from: **Dr Matthew Lawrence, Deputy Head of TriTech, TriTech Institute, Hywel Dda University Health Board**

Eli Carter, Trainee Clinical Scientist, TriTech Institute, Hywel Dda University Health Board

Elena Stebbings, Trainee Clinical Scientist, TriTech Institute, Hywel Dda University Health Board

Joanne Connell, Research Nurse, TriTech Institute, Hywel Dda University Health Board

Clinical lead(s): **Claire Hurlin, Strategic Head of Community and Chronic Conditions, Hywel Dda University Health Board**

Evaluation Lead: **Professor Chris Hopkins, Consultant Clinical Scientist & Head of the TriTech Institute, TriTech Institute, Hywel Dda University Health Board**

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TRITECH Sefydliad Institute

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In 2021 the Tritech Institute was launched. We are a team based in a bespoke facility within the Hywel Dda University Health Board comprising of industry-leading engineers, scientists and clinicians.

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Executive Summary

This report presents the findings from the real-world evaluation of the Hywel Dda University Health Board Diabetes Prevention Programme (HDUHB DPP).

The HDUHB DPP, initiated in January 2023 and is designed to mitigate the risk of progression to Type 2 Diabetes Mellitus (T2DM) among individuals identified as being at elevated risk. The programme adopts a multifaceted approach, incorporating education, behavioural support, and lifestyle modification. It represents an enhanced regional adaptation of the national Diabetes Prevention Programme, supplemented by additional components specific to Hywel Dda, including the National Exercise Referral Scheme and the Foodwise for Life Programme, delivered as part of an integrated intervention. The programme is accessible to service users across all seven clusters within the Health Board, with the TriTech Institute commissioned to undertake a comprehensive evaluation across all participating sites.

The evaluation sought to assess changes in the prevalence of individuals at risk of developing T2DM from baseline to follow-up. Furthermore, it aimed to examine the broader value of the programme by exploring the impact on service users and staff, as well as the potential economic benefits of the programme for the Health Board.

Methodology

Evaluation data was supplied by the DPP team and comprised of referral counts and locations, clinical indicators (HbA1c), a Patient Reported Experience Measure (PREM) questionnaire and a Patient-Reported Outcome Measures (PROM) questionnaire (EQ-5D). Data were collected at baseline and follow-up clinics, which were carried out at 6 and 12 months. Differences between baseline and follow-up measures were examined using appropriate parametric and non-parametric statistical tests. Additionally, a cost-utility analysis was undertaken employing a validated model developed by the University of Sheffield Decision Support Unit (DSU) (Alava et al., 2023).

Results

3,328 individuals at risk of diabetes were identified following exclusion criteria and then invited to participate in the programme between January 1st 2023 and April 30th 2025, with 1,266 service users attending a clinic (38.0%). The largest cohort was from Carmarthenshire (n = 558), followed by Pembrokeshire (n = 368) and Ceredigion (n = 340). The mean age of service users was 68.5 ± 9.1 years, 53.2% of which were female. The mean HbA1c of those enrolled on the programme was 43.7 ± 1.5 mmol/mol (pre-diabetic range 42 – 47). 512 service users (40.4%) accepted a referral to the Foodwise For Life programme and 415 (32.8%) to the National Exercise Referral Scheme (NERS).

142 service users attended follow-up clinics at 12 months (11.2%). The programme is associated with a significant reduction in diabetes risk, (median HbA1c from 44 (43, 45) to 42 (41, 44), $p < 0.0001$, n = 223). Additionally, service users who attended both baseline and follow-up clinics experienced significant reductions in weight (83.87 ± 16.91 to 82.36 ± 16.34kg, $p < 0.0001$, n = 126) and waist to height ratio (0.64 ± 0.066 to 0.62 ± 0.064, $p < 0.001$, n = 46).

The estimated cost per Quality-Adjusted Life Year (QALY) gained was £2,698, based on the available data. This result suggests that the programme is cost-effective and represents good value for money within accepted health economic thresholds.

Conclusions

- The Diabetes Prevention Programme (DPP) has effectively engaged a substantial cohort of service users across all seven clusters within Hywel Dda University Health Board (HDUHB), supporting 1,266 individuals in reducing their risk of developing diabetes.
- The programme has demonstrated a significant positive impact on participant health, evidenced by clinically meaningful improvements in HbA1c, body weight, and body mass index (BMI).
- Notably, 89 individuals (40%) that were previously classified as pre-diabetic have achieved normoglycaemic status following participation.
- Current evidence indicates that the programme represents a highly cost-effective intervention for reducing diabetes prevalence within HDUHB.

Based on the findings of this evaluation, several recommendations are proposed to inform future development of the programme:

Recommendation 1: Investigate Poor Attendance of Follow-up
Consistent with the interim report, follow-up engagement remains limited, with only 11.2% of service users who attended an initial clinic returning for a follow-up. Improving follow-up rates is essential to maximise programme effectiveness and sustain health outcomes.

Recommendation 2: Investigate the Reasons for Low Uptake of Secondary Referrals
Fewer than 50% of service users attending an initial clinic accepted referrals to additional services (Foodwise for Life, NERS). It is recommended that further work is carried out to determine why fewer than 50% of service users accept a referral into Foodwise for Life and NERS.

Recommendation 3: Improve Data Collection Infrastructure
Current data management relies on Microsoft Excel spreadsheets, which present limitations that may compromise data integrity and service evaluation. Adoption of more robust data collection platforms, such as REDCap, is advised to enhance accuracy and efficiency.

Recommendation 4: Continue and Expand Evaluation Activities
Given the small proportion of follow-up data available at the time of this assessment and the absence of actual cost data, further evaluation is required. This should aim to provide a more comprehensive analysis of programme outcomes and cost-utility.

Table of Contents

Index of Tables and Figures

Abbreviations

BMI	Body Mass Index
DBP	Diastolic Blood Pressure
DPP	Diabetes Prevention Programme
HB	Health Board
HbA1c	Glycated Haemoglobin
HDUHB	Hywel Dda University Health Board
IQR	Interquartile Range
NERS	National Exercise Referral Scheme
NHS	National Health Service
NICE	National Institute of Health and Care Excellence
PHQ-2	Patient Health Questionnaire-2
PROM	Patient Recorded Outcome Measure
R&D	Research and Development
SBP	Systolic Blood Pressure
SD	Standard Deviation
T2DM	Type 2 Diabetes Mellitus
WG	Welsh Government

Acknowledgements

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1. Situation

1.1 Service Background and Context

More than 7% of the adult population in Wales (over 200,000 people) live with diabetes, with a further 350,000 people thought to be at risk of developing T2DM (Welsh Government, 2023). In 2017 the annual cost of treating diabetes in Wales was estimated at £500m, equating to approximately 10% of the NHS budget (Welsh Parliament, 2017). Since 2009 the number of people aged 17 or over living with diabetes in Wales has increased by 40%. If this trend continues, it is estimated that 1 in 11 adults in Wales will have diabetes by 2035/36 equating to approximately 260,000 people (Public Health Wales, 2023). In the UK, diabetes leads to more than 169 amputations, 680 strokes, 530 heart attacks and 2000 cases of heart failure each week (Diabetes UK, 2024). Approximately 90% of people with diabetes in the UK have T2DM, which is preventable (Diabetes UK, 2024).

The diabetes prevention programme (DPP) aims to reduce the risk of service users developing T2DM through education, support, and lifestyle changes for individuals identified as at risk. Initial pilot projects that were carried out in North Ceredigion and Afan indicated the potential benefits of the program in reducing the onset of diabetes. Following these pilots, it was agreed to use these findings for implementation of the program across the Hywel Dda University Health Board (HDUHB) region (Thatcher et al., 2022). In addition to the implementation of the DPP across HDUHB, it was agreed that a robust evaluation of the service would be provided to determine the value of the programme to service users, staff and the wider health care system.

1.2 HDUHB Diabetes Prevention Programme (DPP)

The HDUHB DPP commenced in January 2023, and targets individuals at risk in primary care, with DPP staff working with GP practices across HDUHB to identify and recruit suitable individuals to the programme.

1.2.1 Eligibility Criteria

Individuals in the community who are identified as high-risk for T2DM were offered the service. High risk was defined as:

- Individuals that had a glycated haemoglobin (HbA1c) level of between 42 and 47 mmol/mol as outlined by the National Institute for Health and Care Excellence (NICE) (National Institute for Health and Care Excellence, 2017) or;
- Individuals aged 18 to 79, with a BMI >25 or > 23 for African, Asian and Caribbean population.

The intervention was not available for individuals who already had diabetes. Individuals were also excluded if they had a BMI less than 20, were prescribed metformin, or it was deemed clinically inappropriate due to possible multi-morbidities and increased risk of frailty. Additional exclusion criteria requiring clinical review were those receiving palliative care, pregnancy and those being artificially fed. Towards the end of 2023, the AWDPP also included an exclusion criterion so that the intervention was not available for individuals aged over 79 years (Public Health Wales, 2025).

1.2.2 Intervention

The HDUHB DPP adopted a 'Hywel Dda plus model', that includes the national programme approach, with additional elements. For example, in the Hywel Dda plus model, the brief intervention is 45 minutes long (as opposed to 30 minutes in the national programme), with a trained health and wellbeing facilitator, in which there is a dietary and physical activity conversation with the service user, with goal setting and written resources provided. Service users are also given the option of attending an additional 8-week Foodwise for Life intervention and/or a 16-week national exercise referral scheme (NERS) intervention and referred to a wide range of additional support, for example, social prescribing, smoking cessation or community exercise programmes where appropriate.

1.2.3 Follow-up and Outcomes

Service users are invited to attend a follow-up appointment at 6 and 12 months, during which progress is monitored, data is collected, and service users are given the opportunity to be referred to the additional interventions if appropriate and they did not take up the intervention previously. Changes in HbA1c and other clinical markers are monitored at follow up, and depending on their HbA1c, the individuals are either discharged from the DPP (HbA1c in healthy range, ≤41mmol/mol), referred to the DM pathway (HbA1c increased into diabetic range, ≥48mmol/mol), or invited to continue with the pre-diabetes pathway (HbA1c remains in the pre-diabetic range, 42-47mmol/mol).

1.2.4 Location and Personnel of the HDUHB DPP

The DPP is offered across Carmarthenshire, Ceredigion and Pembrokeshire in HDUHB, and across all seven clusters:

Carmarthenshire:

- Amman Gwendraeth
- Llanelli
- Tywi / Taf

Ceredigion:

- North Ceredigion
- South Ceredigion & Teifi Valley

Pembrokeshire:

- North Pembrokeshire
- South Pembrokeshire

The programme is run by seven health and wellbeing facilitators working across the health board, a clinical lead dietitian and the Be Well Service Programme Manager in partnership with the National Exercise Referral Scheme (NERS).

1.3 All Wales Diabetes Prevention Programme (AWDPP)

The AWDPP is a national targeted programme being led by Public Health Wales offering support to those at an increased risk of developing T2DM. In the programme, brief

interventions are provided for people with increased risk of type 2 diabetes by healthcare support workers with oversight from dietitians. Referrals are made to additional programmes where appropriate, such as Foodwise for Life (a community-based 8-week weight management programme), and the National Exercise Referral Scheme (NERS, a chronic condition prevention and management programme, which aims to improve the health and wellbeing of sedentary and inactive adults). The risk of diabetes is determined by HbA1c, a measure of glycated haemoglobin that is indicative of the mean blood glucose over the past two or three months. Those with an HbA1c between 42-47mmol/mol are deemed at an increased risk of T2DM (National Institute for Health and Care Excellence, 2017). The AWDPP builds on pilot approaches carried out by GPs at local levels by offering a standardised approach to preventing type 2 diabetes nationally across Wales (Public Health Wales, 2025).

The programme was evaluated by Public Health Wales through a non-randomised stepped wedge trial involving nearly 3,500 individuals. This demonstrated a 23% lower risk of progression to diabetic blood glucose levels among participants compared to a historical control group. While the programme did not significantly increase the likelihood of reverting to normal glucose levels, blood glucose was effectively stabilised and a modest reduction in HbA1c was achieved in participants. The evaluation, despite limitations such as incomplete data and lack of process evaluation, supported the AWDPP as a feasible and beneficial public health strategy (Bailey et al., 2025).

Although the AWDPP has seen positive outcomes, the programme sends referrals to a waiting list of detached services that are not linked and waiting times can be months. The primary difference of the HDUHB DPP is that it has integrated these services into the programme, and as such waiting times should be reduced to weeks rather than months.

2. Evaluation Plan

2.1 Rationale of the Evaluation

Given that the Diabetes Prevention Programme (DPP) represents a newly implemented service within Hywel Dda University Health Board (HDUHB), incorporating several components specific to the region, an evaluation was undertaken to assess the overall benefits of the programme in West Wales and to determine the added value of these additional components.

In June 2022, the TriTech Institute based in HDUHB were commissioned to evaluate the project, to determine the effects of the different pathways on service user wellbeing and outcomes, and to determine the overall impact and value of the service on both service users and NHS staff and infrastructure in West Wales.

The primary outcome of the evaluation was to determine the impact of the programme on those at risk of developing T2DM, from baseline and follow up, which in the long term will potentially reduce the prevalence of T2DM in West Wales.

The evaluation was conducted over two phases; phase 1 included the findings from the first six months of implementation (the interim report (The TriTech Institute, 2024)). Phase two included this final report presenting the findings from 2 years of running the service. This timeframe was agreed so that the maximum follow up of service users could be include in the evaluation.

2.2 Evaluation Aims

- The primary outcome of the evaluation is to determine a change in the prevalence of those at risk of developing T2DM, from baseline to follow-up post intervention.
- Changes in service user reported outcome measures will also be evaluated to determine changes in health-related quality of life (EQ-5D).
- The evaluation aims to determine the value of the diabetes prevention programme, by considering the impact on service users, staff and the economic benefits towards the wider health board.

2.3 Changes in Scope

Due to delays in the commencement of the service and recruitment, it was agreed that the interim report would be produced in May 2024, to include data from the commencement of the service up until the end of March 2024. Similarly, to ensure adequate follow-up data was included in the final report, it was agreed that the final report include data from the period January 2023 to the end of April 2025.

2.4 Evaluation Methodology

A quantitative approach was utilised to meet the aim of the evaluation via the objectives and outcomes set out below.

2.4.1 Data collection

The HDUHB DPP team provided TriTech with anonymised service user data, which included:

- Demographics
- HbA1c
- BMI
- Blood Pressure
- Waist Circumference
- Patient Reported Outcome Measures (PROMs)
    - EQ-5D (Appendix 1)
- Patient Reported Experience Measures (PREMs)
    - Diabetes Prevention Programme Patient Questionnaire (Appendix 2)
- Referral to additional programmes e.g. Foodwise for Life, NERS.

Recruitment data were analysed and presented to provide a snapshot of the monthly uptake to the DPP. Quantitative data were reported as baseline characteristics for each group. Outcome measures were quantified at baseline and at 6 and 12-months where data was available. Follow-up parameters at 12 months were compared to baseline to determine changes from baseline to follow-up.

2.4.2 Value-Based Health Care Analysis

Long-term health outcomes were calculated using values from the literature. A cost utility analysis was derived from the EQ-5D 5L data for the programme. To calculate QALYs from EQ-5D-5L data in the UK, the 5L responses were mapped to EQ-5D-3L utility scores as recommended by NICE (National Institute for Health and Care Excellence, 2019). This was achieved using a validated model developed by the University of Sheffield's Decision Support Unit (DSU) (Alava et al., 2023). The mapping uses statistical algorithms that take each 5L health state and estimate the corresponding 3L utility score, incorporating age and sex. Once mapped, QALYs were calculated using the area under the curve method, assuming linear change between time points.

2.4.3 Statistical Analysis

Statistical analysis was carried out using R Studio v4.3.2. Distribution of data was assessed using a combination of the Shapiro-Wilk tests, Q-Q plots and histograms. Differences in normally distributed paired data were assessed using paired t-test, whereas differences in non-normally distributed paired groups were determined using Wilcoxon signed rank test. Differences in frequencies between groups were determined using chi-squared test.

3 Findings

3.1 Programme Uptake

The data analysis for the HDUHB DPP was carried out on data over a two-year period: from January 2023 to the end of April 2025. Figure 1 shows the cumulative recruitment for the programme highlighting the number of letters sent out, clinics held and instances where clinics were arranged, but the service user did not attend (DNA) for this period.

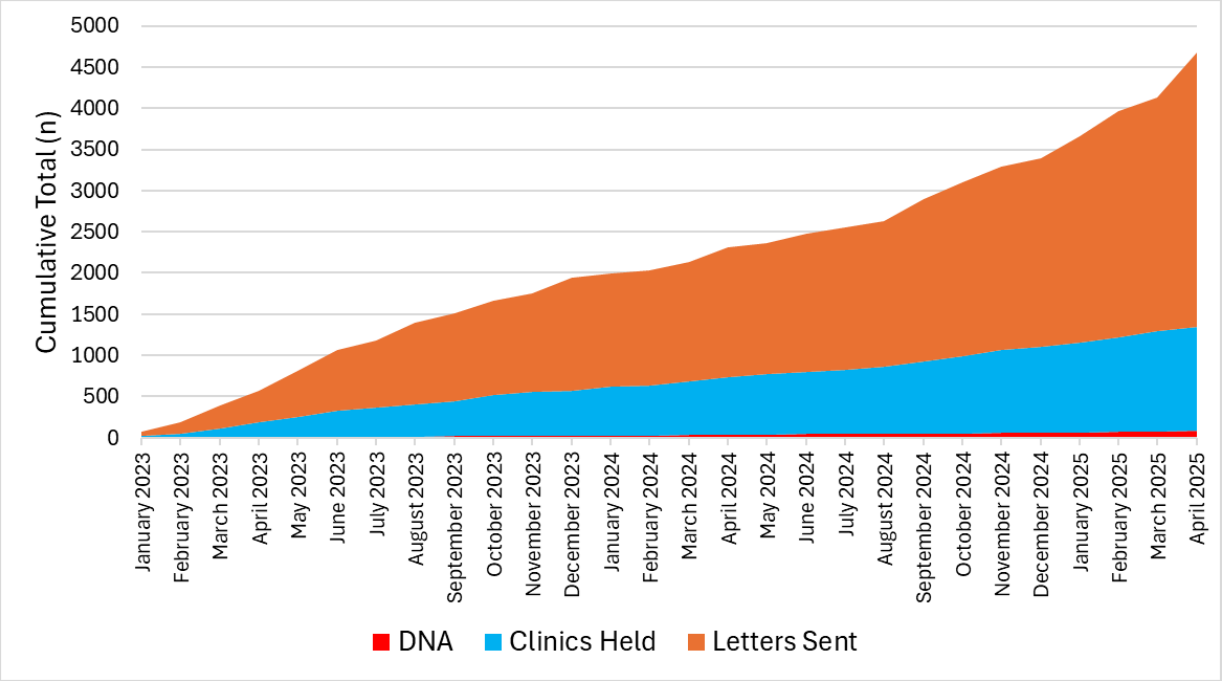

Figure 1. Cumulative recruitment for the DPP from January 2023 to April 2025.

On the programme, 35 surgeries were included across the health board in Carmarthenshire, Pembrokeshire, and Ceredigion. Table 1 shows the dates that the first letters were sent and the date that the first clinic was held for each site.

Table 1. DPP date of initial letters and clinics by surgery and GP cluster.

Surgery	GP Cluster	Date Initial Letter Sent	Clinic Date
Cardigan Health Centre	South Ceredigion	03 January 2023	09 January 2023
Ty Elli	Llanelli	06 January 2023	13 January 2023
Barlow House	North Pembrokeshire	12 January 2023	17 January 2023
Newport Surgery	North Pembrokeshire	18 January 2023	09 February 2023
Meddygfa Tywyn Bach	Llanelli	09 February 2023	13 February 2023
Ystwyth Surgery	North Ceredigion	16 February 2023	24 February 2023
Meddygfa Teilo	Carmarthen	24 February 2023	21 March 2023
Ash Grove	Llanelli	03 March 2023	10 March 2023
St Peter's Surgery	Carmarthen	22 March 2023	11 April 2023
Penygroes Surgery	Amman Gwendraeth	04 April 2023	20 April 2023
Saundersfoot Medical Centre	South Pembrokeshire	18 April 2023	19 May 2023
Furnace House	Carmarthen	30 May 2023	06 June 2023
St Davids	North Pembrokeshire	31 May 2023	15 June 2023
Fairfield	Llanelli	31 July 2023	09 August 2023
Meddygfa Sarn	Amman Gwendraeth	01 August 2023	10 August 2023
Llwynhendy	Llanelli	02 August 2023	14 August 2023
The Surgery Robert Street	North Pembrokeshire	29 August 2023	05 September 2023
Meddygfa Tumble	Amman Gwendraeth	31 August 2023	11 September 2023
Morfa	Carmarthen	08 September 2023	21 September 2023

Tanyfron	North Ceredigion	01 February 2024	16 February 2024
Meddygfa Minafon	Amman Gwendraeth	15 February 2024	23 February 2024
The Surgery New Quay	South Ceredigion	26 March 2024	11 April 2024
Neyland Surgery	North Pembrokeshire	5 April 2024	14 May 2024
Meddygfa Tywyn Bach	Llanelli	18 June 2024	TBD
Borth Surgery	North Ceredigion	21 June 2024	9 July 2024
Meddygfa Tywi	Carmarthen	29 August 2024	17 September 2024
Meddygfa Emlyn	South Ceredigion	3 September 2024	16 September 2024
Bro Pedr Medical Group	South Ceredigion	6 September 2024	13 December 2024
St Thomas Surgery	North Pembrokeshire	17 September 2024	10 October 2024
Argyle Surgery	South Pembrokeshire	16 October 2024	25 October 2024
Solva Surgery	North Pembrokeshire	12 February 2025	20 February 2025
Padarn Surgery	North Ceredigion	27 February 2025	7 March 2025
Coalbrook Surgery	Amman Gwendraeth	15 April 2025	TBD
Fishguard Health Centre	North Pembrokeshire	30 April 2025	TBD

From January 1st, 2023, to the end of April 2025, a total of 3,328 letters were sent to individuals at risk of diabetes in HDUHB, with 1,266 of these individuals attending a clinic (38.0%). The percentage uptake (number of letters sent against clinics held) was highest in Carmarthenshire (46.7%) and lowest in Pembrokeshire (27.3%). However, at the time of data extraction, a large number of letters were sent out for some of the Pembrokeshire sites, with the clinics yet to be arranged, making the percentage of uptake artificially low. Cardigan Health Centre in South Ceredigion was the surgery with the highest number of clinics held (140).

Table 2. Recruitment letters, clinics, and uptake by surgery and GP cluster.

	Recruitment		
Region	**Letters Sent**	**Clinics Held**	**Uptake %**
Carmarthenshire	**1194**	**558**	**46.7**
Taf / Tywi Cluster	**248**	**138**	**53.6**
Furnace House	45	26	57.8
St Peters Surgery	34	23	67.6
Meddygfa Teilo	81	43	53.1
Meddygfa Tywi	44	23	52.3
Morfa	44	23	52.3
Amman Gwendraeth Cluster	**604**	**288**	**47.7**
Penygroes Surgery	158	91	57.6
Meddygfa'r Sarn	155	61	39.4
Meddygfa'r Minafon	101	44	43.6
Tumble	48	27	56.3

Brynteg Surgery	117	65	55.6
Coalbrook Surgery	25	0	0.0
Llanelli Cluster	**342**	**132**	**38.6**
Ash Grove	60	30	50.0
Llwynhendy	50	18	36.0
Fairfield	44	14	31.8
Meddygfa Tywyn Bach	46	18	39.1
Ty Elli	142	52	36.6
Ceredigion	**787**	**340**	**43.2**
North Ceredigion Cluster	**349**	**128**	**36.7**
Ystwyth Medical Group	191	72	37.7
Tanyfron	66	26	39.4
Borth Surgery	56	17	30.4
Padarn Surgery	36	13	36.1
South Ceredigion and Teifi Cluster	**438**	**212**	**48.4**
Cardigan Health Centre	298	140	47.0
The Surgery New Quay	88	55	62.5
Bro Pedr Medical Group	1	1	100.0
Meddygfa Emlyn	51	16	31.4
Pembrokeshire	**1347**	**368**	**27.3**
North Pembrokeshire Cluster	**793**	**263**	**33.2**
Barlow House	241	104	43.2
The Surgery, Robert Street	37	15	40.5
St Davids	36	13	36.1
Newport Surgery	89	31	34.8
Fishguard Health Centre	55	0	0.0
Neyland Surgery	114	46	40.4
Solva Surgery	40	12	30.0

St Thomas Surgery	181	42	23.2
South Pembrokeshire	**554**	**105**	**19.0**
Saundersfoot Medical Centre	204	60	29.4
Argyle Surgery	350	45	12.9
TOTAL	**3328**	**1266**	**38.0**

Out of the 1266 service users who attended an initial consultation, 602 (47.6%) were referred on to additional services whereas 664 (52.4%) were not. 512 service users were referred to Foodwise for Life, 27 were referred to Weight Management Level 3, and 415 were referred to NERS. There were 29 referrals into other services including GP, gastro dietitians, smoking cessation, and walking groups (Table 3).

Table 3. Onwards referrals from initial consultations.

Accepted Referrals from Initial Consultation	
Programme of Referral	**n (%)**
Foodwise for Life	512 (40.4)
Referral to Weight Management Level 3	27 (2.1)
Referral to NERS	415 (32.8)
Referral to Other	29 (2.3)
GP	2 (0.2)
Gastro dietitian	2 (0.2)
Smoking cessation	9 (0.7)
Walking group	2 (0.2)
Social prescribing services	1 (0.1)
Education programme for patients (EPP)	11 (0.9)
Xpert	1 (0.1)
ESCAPE-pain	1 (0.1)

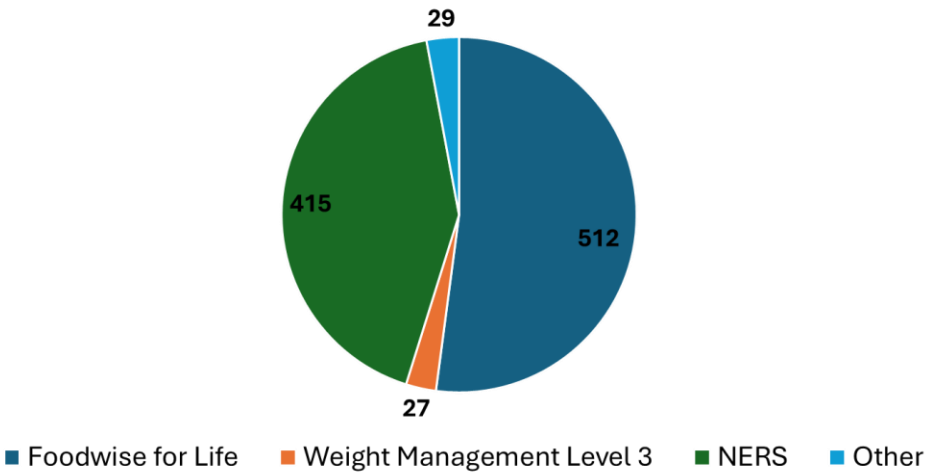

Figure 2. Referrals from initial consultations.

3.1.1 Uptake - Follow-up at 6 Months

From January 1st, 2023, to the end of April 2025, a total of 660 letters were sent inviting service users to a 6-month follow-up clinic, with 241 of these individuals attending a follow-up clinic at six months (36.5%). The percentage uptake (number of letters sent against clinics held) was highest in Carmarthenshire (41.4%) and lowest in Pembrokeshire (27.1%). Cardigan Health Centre in South Ceredigion was the surgery with the highest number of clinics held (43).

Table 4. Number of 6-month follow-up letters sent and clinics held by site.

Region	Recruitment		
	Letters Sent	Clinics Held	Uptake %
Carmarthenshire	**280**	**116**	**41.4**
Taf / Tywi Cluster	**67**	**30**	**44.8**
Furnace House	25	13	52.0
St Peters Surgery	3	0	0.0
Meddygfa Teilo	17	6	35.3
Meddygfa Tywi	0	0	N/A
Morfa	22	11	50.0
Amman Gwendraeth Cluster	**188**	**73**	**38.8**
Penygroes Surgery	86	28	32.6
Meddygfa'r Sarn	30	10	33.3
Meddygfa'r Minafon	15	6	40.0
Tumble	26	16	61.5
Brynteg Surgery	31	13	41.9
Coalbrook Surgery	0	0	N/A

Llanelli Cluster	**25**	**13**	**52.0**
Ash Grove	2	1	50.0
Llwynhendy	5	2	40.0
Fairfield	12	8	66.7
Meddygfa Tywyn Bach	3	1	33.3
Ty Elli	3	1	33.3
Ceredigion	**214**	**80**	**37.4**
North Ceredigion Cluster	**88**	**32**	**36.4**
Ystwyth Medical Group	63	27	42.9
Tanyfron	10	4	40.0
Borth Surgery	15	1	6.7
Padarn Surgery	0	0	N/A
South Ceredigion and Teifi Cluster	**126**	**48**	**38.1**
Cardigan Health Centre	108	43	39.8
The Surgery New Quay	18	5	27.8
Bro Pedr Medical Group	0	0	N/A
Meddygfa Emlyn	0	0	N/A
Pembrokeshire	**166**	**45**	**27.1**
North Pembrokeshire Cluster	**116**	**25**	**21.6**
Barlow House	37	8	21.6
The Surgery, Robert Street	14	7	50.0
St Davids	4	1	25.0
Newport Surgery	24	7	29.2
Fishguard Health Centre	0	0	N/A
Neyland Surgery	36	2	5.6
Solva Surgery	0	0	N/A
St Thomas Surgery	1	0	0.0
South Pembrokeshire	**50**	**20**	**40.0**

Saundersfoot Medical Centre	50	20	40.0
Argyle Surgery	0	0	N/A
TOTAL	**660**	**241**	**36.5**

The mean age of the 241 service users who attended a 6-month follow-up clinic was 69.7 ± 9.4 years, with a slight majority being female (52.3%).

Of the participants who attended a 6-month follow-up consultation, a total of 70 (29.0%) were referred on to additional services at this stage. 32 were referred to Foodwise for Life (13.3%) and 36 were referred to the NERS programme (14.9%).

Table 5. 6 month follow up referrals.

Referrals	**N (%)**
Foodwise for Life	32 (13.3)
Referral to Weight Management Level 3	1 (0.4)
Referral to NERS	36 (14.9)
Referral to Other	2 (0.8)
Education programme for patients (EPP)	1 (0.4)
Smoking cessation	1 (0.4)

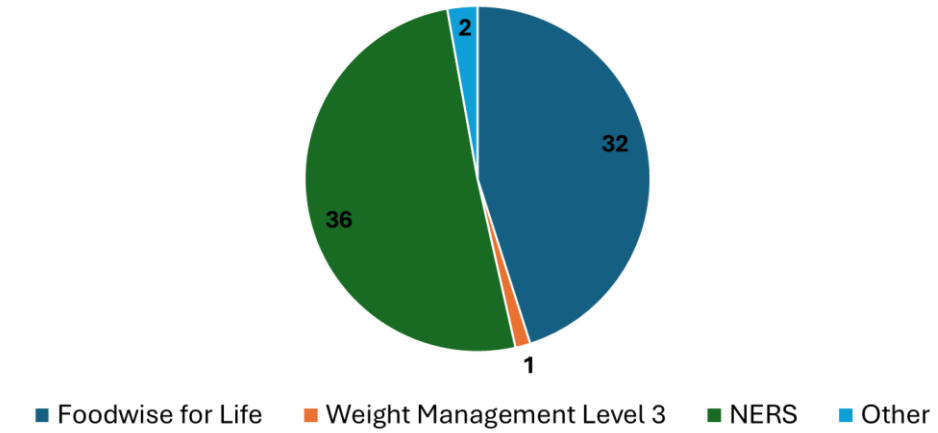

Figure 3. Referrals from 6 month follow up consultations.

3.1.2 Uptake - Follow-up at 12 Months

From January 1st, 2023, to the end of April 2025, a total of 542 letters were sent inviting service users to a 12-month follow-up clinic, with 142 of these individuals attending a follow-up clinic at six months (26.2%). The percentage uptake (number of letters sent against clinics held) was highest in Pembrokeshire (31.0%) and lowest in Ceredigion

(23.0%). Saundersfoot Medical Centre in South Pembrokeshire was the surgery with the highest number of 12-month clinics held (21).

Table 3. 12 month follow up recruitment letters, clinics and uptake.

Region	Recruitment		
	Letters Sent	Clinics Held	Uptake %
Carmarthenshire	**248**	**61**	**24.6**
Taf / Tywi Cluster	**108**	**37**	**34.3**
Furnace House	24	12	50.0
St Peters Surgery	22	7	31.8
Meddygfa Teilo	42	11	26.2
Meddygfa Tywi	0	0	N/A
Morfa	20	7	35.0
Amman Gwendraeth Cluster	**109**	**24**	**22.0**
Penygroes Surgery	69	14	20.3
Meddygfa'r Sarn	17	7	41.2
Meddygfa'r Minafon	2	1	50.0
Tumble	21	2	9.5
Brynteg Surgery	0	0	N/A
Coalbrook Surgery	0	0	N/A
Llanelli Cluster	**31**	**0**	**0.0**
Ash Grove	26	0	0.0
Llwynhendy	0	0	N/A
Fairfield	1	0	0.0
Meddygfa Tywyn Bach	4	0	0.0
Ty Elli	0	0	N/A
Ceredigion	**126**	**29**	**23.0**
North Ceredigion Cluster	**49**	**12**	**24.5**
Ystwyth Medical Group	48	12	25.0
Tanyfron	1	0	0.0
Borth Surgery	0	0	N/A
Padarn Surgery	0	0	N/A

South Ceredigion and Teifi Cluster	**77**	**17**	**22.1**
Cardigan Health Centre	75	17	22.7
The Surgery New Quay	2	0	0.0
Bro Pedr Medical Group	0	0	N/A
Meddygfa Emlyn	0	0	N/A
Pembrokeshire	**168**	**52**	**31.0**
North Pembrokeshire Cluster	**116**	**31**	**26.7**
Barlow House	62	17	27.4
The Surgery, Robert Street	13	3	23.1
St Davids	12	5	41.7
Newport Surgery	29	6	20.7
Fishguard Health Centre	0	0	N/A
Neyland Surgery	0	0	N/A
Solva Surgery	0	0	N/A
St Thomas Surgery	0	0	N/A
South Pembrokeshire	**52**	**21**	**38.9**
Saundersfoot Medical Centre	52	21	38.9
Argyle Surgery	0	0	N/A
TOTAL	**542**	**142**	**26.2**

The mean age of service users who attended a 12-month follow-up clinic was 69.2 ± 9.3, the majority of which were female (52.8%).

Of the participants who attended a 12-month follow-up consultation, a total of 23 (16.2%) were referred on to additional services at this stage. 12 were referred to Foodwise for Life (8.5%) and 17 were referred to the NERS programme (12.0%).

Table 7. 12 month follow up referrals.

Referrals	N (%)
Foodwise for Life	12 (8.5)
Referral to Weight Management Level 3	2 (1.4)
Referral to NERS	17 (12.0)
Referral to Other Education programme for patients (EPP)	1 (0.7)

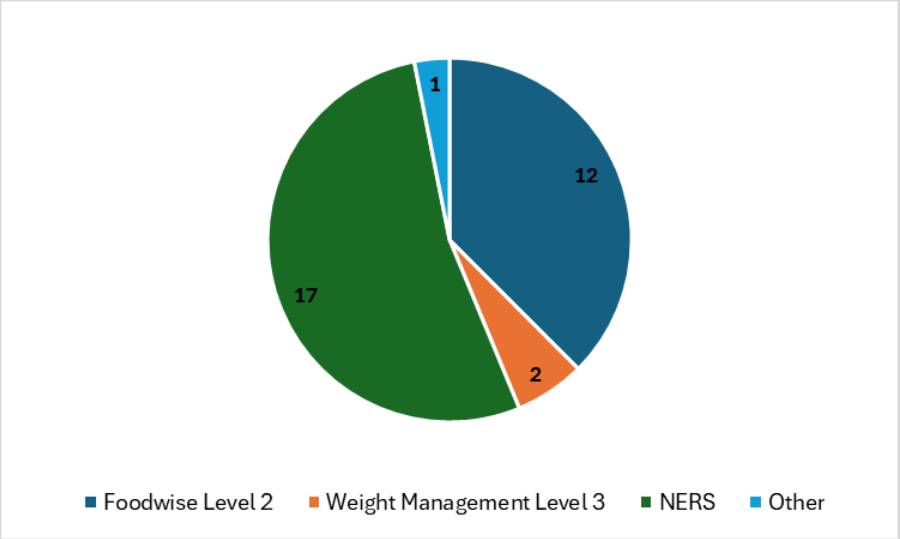

Figure 4. Referrals from 12 month follow up consultations.

3.2 Baseline Characteristics of Service Users

Those who were invited to participate in the programme had a mean age of 66.2 ± 10.3 years, were equally split in terms of gender (49.7% female) and had a mean venous HbA1C reading within the prediabetic range of 42 to 47 mmol/mol (43.6 ± 1.6 mmol/mol) (Table 8).

Table 8. Mean age, gender and venous HbA1C for participants that initial letters were sent to.

Parameter	Value
Age	
Years ± SD	66.2 ± 10.3 (n = 3328)
Not recorded (n)	0
Gender	
Male (n, %)	1674, 50.3%
Female (n, %)	1654, 49.7%
Not recorded (n, %)	0
HbA1c	
mmol/mol ± SD	43.6 ± 1.6 (n = 3217)
Not recorded (n)	111

The mean age of the service users who attended a clinic was 68.5 ± 9.1 years with slightly more females attending than males (53.2% female). The mean venous HbA1c of those who attended a clinic was within the prediabetic range of 42 to 47 mmol/mol (43.7 ± 1.5 mmol/mol) (Table 9). Additionally, the mean BMI of clinic attendees was 31.2 kg/m^2, and the mean waist to height ratio was 0.64, indicating a high level of central adiposity, which is associated with increased risk to T2DM, hypertension and cardiovascular disease (National Institute for Health and Care Excellence, 2025). However, the waist to height ratio was unavailable for 60% of participants.

Table 9. Baseline parameters for service uses who attended a clinic.

Parameter	Value	n
Age		
Years ± SD	68.5 ± 9.1	1266 (100.0%)
Not recorded (n)	N/A	0 (0.0%)
Gender		
Male (n, %)	N/A	592 (46.8%)
Female (n, %)	N/A	673 (53.2%)
Not recorded (n, %)	N/A	1 (0.1%)
HbA1c		
mmol/mol ± SD	43.7 ± 1.5	1265 (99.9%)
Not recorded (n)	N/A	1 (0.1%)
SBP/DBP		
SBP/DBP ± SD	142.4 ± 20.0 / 81.3 ± 9.7	861 (68.0%)
Not recorded (n)	N/A	405 (32.0%)
Height		
Meters ± SD	1.67 ± 0.1	1157 (91.4%)
Not recorded (n)	N/A	109 (8.6%)
Weight		
Kilograms ± SD	87.9 ± 18.3	1156 (91.3%)
Not recorded (n)	N/A	110 (8.7%)
BMI		
Kg/m^2 ± SD	31.2 ± 5.5	1146 (90.5%)
Not recorded (n)	N/A	120 (9.5%)
Waist Circumference		
Metres ± SD	1.07 ± 0.14	540 (42.7%)
Not recorded (n)	N/A	726 (57.3%)
Waist to Height Ratio		
Mean ± SD	0.64 ± 0.08	507 (40.0%)
Not recorded (n)	N/A	759 (60.0%)

The EQ-5D dimensions and level that the participants rated in their initial appointments are shown in table 10. For mobility, 595 participants (47.0%) reported no problems with mobility, but a high percentage (39.6%) did report some issues with mobility. Two

participants reported extreme problems with mobility. A high number of participants (69.7%) reported no problems with self-care. Only 25.5% of participants reported no problems with pain or discomfort in the initial appointments.

Table 10. EQ5D results from initial consultations.

	MOBILITY n (%)	SELF-CARE n (%)	USUAL ACTIVITIES n (%)	PAIN / DISCOMFORT n (%)	ANXIETY / DEPRESSION n (%)
Level 1 (No problems)	595 (47.0)	882 (69.7)	636 (50.2)	323 (25.5)	631 (49.8)
Level 2 (Slight problems)	232 (18.3)	110 (8.7)	220 (17.4)	371 (29.3)	244 (19.3)
Level 3 (Moderate problems)	176 (13.9)	90 (7.1)	161 (12.7)	272 (21.5)	166 (13.1)
Level 4 (Severe problems)	91 (7.2)	13 (1.0)	65 (5.1)	109 (8.6)	33 (2.6)
Level 5 (Extreme problems / unable to do)	2 (0.2)	2 (0.2)	17 (1.3)	25 (2.0)	20 (1.6)
Not Recorded	170 (13.4)	169 (13.3)	167 (13.2)	166 (13.1)	172 (13.6)
Total	1266 (100)	1266 (100)	1266 (100)	1266 (100)	1266 (100)

3.3 Impact of the HDUHB DPP on Service Users

3.3.1 Impact on Clinical Outcomes

Table 11 shows the clinical outcomes reported by the DPP team at the end of the programme for the service users who took part. For venous HbA1c outcomes, 89 participants (40%) had HbA1c results of <41 mmol/mol indicating normoglycaemia, 56 participants (25%) had results between 42-47 mmol/mol which was lower than their previous result, 40 (18%) had results between 42-47 mmol/mol that was higher than their previous result, and 8 participants (<1%) had readings above 48 mmol/mol indicating diabetes. 84 participants (66%) had a reduced BMI at the end of the programme, 34 (27%) had increased, and 9 participants (7%) had stayed the same. For waist to height ratio, this decreased for 32 participants (68%), increased for 11 participants (23%) and stayed the same for 4 participants (9%). The follow-up plan was also recorded for some participants: 119 (87%) were discharged from the programme, 12 (9%) were re-entered, 2 (1%) declined further interventions, and 5 (4%) had their diabetic history/onset sent to their GPs.

Table 4. Reported clinical outcomes after taking part in the programme.

Venous HbA1c Outcomes n (%)	
<41 Normoglycaemia	89 (39.9%)
>48 Diabetes	8 (0.9%)
42-47 Higher than previous	40 (17.9%)
42-47 Lower than previous	56 (25.1%)
42-47 No change	30 (13.5%)
Change in BMI n (%)	
Increased	34 (26.8%)
Reduced	84 (66.1%)
Stayed the same	9 (7.1%)
Change in waist to height ratio n (%)	
Increased	11 (23.4%)
Reduced	32 (68.1%)
Stayed the same	4 (8.5%)
Follow up plan	
Discharged	119 (86.6%)
Declined	2 (1.4%)
Re-enter Programme	12 (8.7%)
Diabetic H/O to GP	5 (3.6%)

Table 12 shows the results of the statistical analysis comparing the clinical outcomes for the participants at the initial consultations and 12-month follow up consultations. For HbA1C, 223 participants had their results recorded at the initial and 12-month follow up consultations. A highly significant reduction in venous HbA1C was observed between baseline and follow-up appointments (from 44 (43, 45) mmol/mol to 42 (41, 44) mmol/mol (median (IQR)), $p < 0.0001$). 126 participants also had their weight recorded in both the initial and 12-month follow up appointments. A significant decrease in weight between the initial and follow-up consultations was observed (from 83.87 ± 16.91kg to 82.36 ± 16.34kg (mean ± SD), $p<0.0001$). Similarly, waist to height ratio was significantly lower at 12 months than at baseline (0.64 ± 0.066 at baseline vs 0.62 ± 0.064 at 12 months (mean ± SD), $p<0.001$). No significant change in blood pressure was observed between baseline and follow-up.

Table 5. Clinical outcome comparison between the initial and 12 month follow up.

Parameter	n	Baseline	Follow-up (12 months)	p
HbA1C (mmol/mol)	223	44 (43, 45)	42 (41, 44)	1.19E-13
Weight (kg)	126	83.87 ± 16.91	82.36 ± 16.34	7.00E-05
BMI (kg/m^2)	124	30.06 ± 4.73	29.53 ± 4.57	0.00013
Waist to Height Ratio	46	0.64 ± 0.066	0.62 ± 0.064	0.00026
SBP (mmHg)	73	137.68 ± 21.62	137 ± 22.03	0.7745
DBP (mmHg)	73	80.38 ± 9.81	78.07 ± 10.43	0.06128

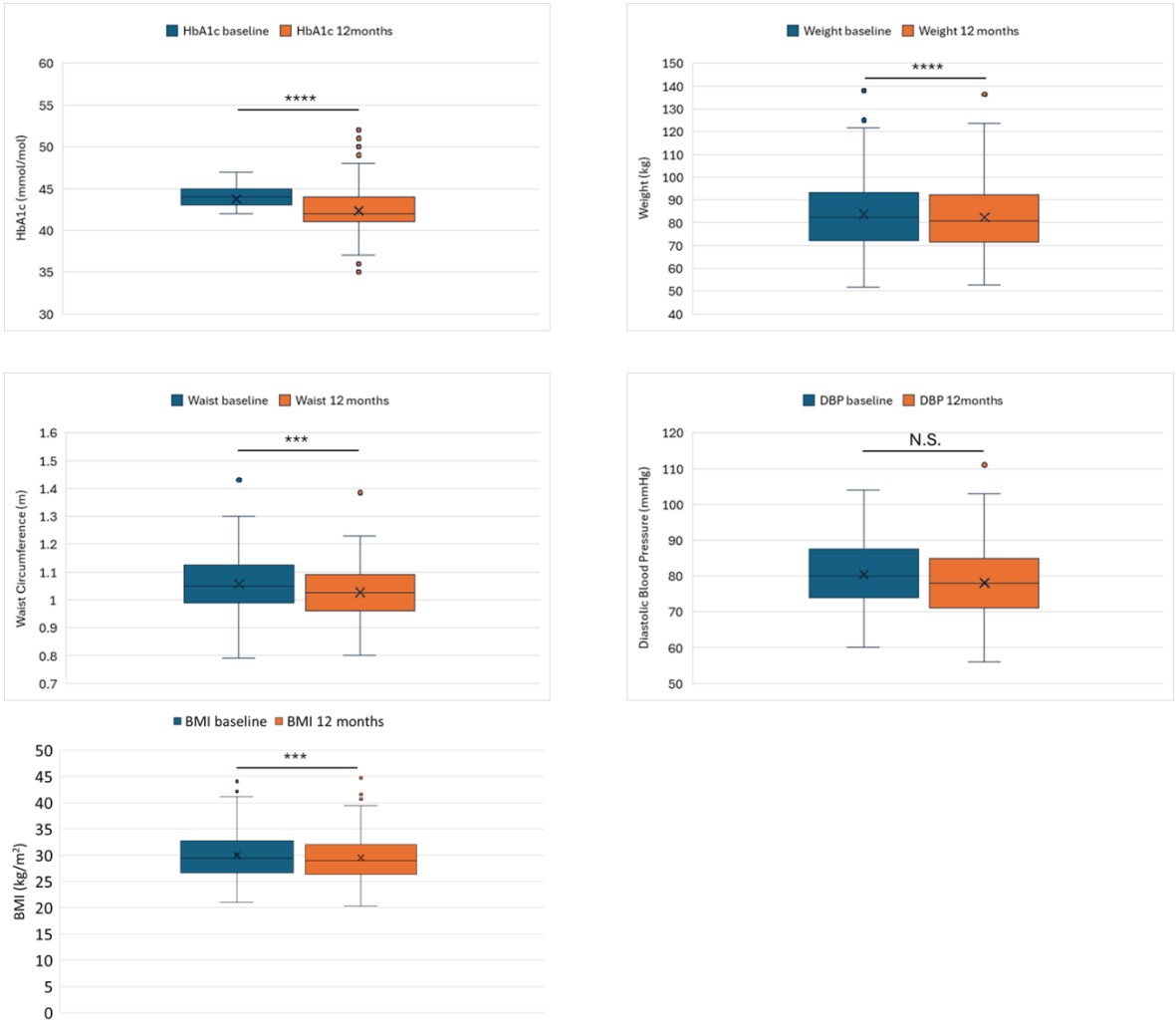

*Figure 5. HbA1c, weight, BMI, waist circumference and diastolic blood pressure at baseline and 12-month follow-up. **** $p < 0.0001$, *** $p < 0.001$.*

3.3.2 Impact on Quality of Life

Table 13 compares the data for the EQ-5D ratings for participants who completed both the initial and 12-month follow-up appointments. No significant difference between baseline and follow-up parameters were found for any of the individual dimensions, indicating no perceived change in mobility, self-care, ability to perform usual activities, pain/discomfort or anxiety/depression in the cohort.

Table 6 EQ5D comparison between the baseline and 12 month follow up

Dimension	Baseline n (%)	12 Month Follow-up n (%)	P-value
Mobility			
No problems	52 (56.5%)	52 (56.5%)	**0.9217**
Slight problems	21 (22.8%)	21 (22.8%)	
Moderate problems	12 (13.0%)	14 (15.2%)	
Severe problems	7 (7.6%)	5 (5.4%)	
Unable to walk about	0	0	
Self-care			
No problems	80 (86.0%)	79 (84.9%)	**0.8445**
Slight problems	8 (8.60%)	9 (9.7%)	
Moderate problems	3 (3.2%)	3 (3.2%)	
Severe problems	1 (1.1%)	2 (2.2%)	
Unable to wash or dress	1 (1.1%)	0	
Usual Activities			
No problems	61 (64.9%)	57 (61.3%)	**0.8119**
Slight problems	16 (17.0%)	22 (23.7%)	
Moderate problems	11 (11.7%)	11 11.7%)	
Severe problems	5 5.3%)	3 (3.2%)	
Unable to do usual activities	1 (1.1%)	1 (1.1%)	
Pain / discomfort			
No pain/discomfort	37 (39.4%)	37 (39.4%)	**0.9333**
Slight pain/discomfort	30 (31.9%)	33 (35.1%)	
Moderate pain/discomfort	18 (19.2%)	17 (18.1%)	
Severe pain/discomfort	5 (5.3%)	5 (5.3%)	
Extreme pain/discomfort	4 (4.3%)	2 (2.1%)	
Anxiety / Depression			
Not anxious/depressed	44 (46.8%)	48 (51.1%)	**0.6202**
Slightly anxious/depressed	33 (35.1%)	36 (38.3%)	
Moderately anxious/depressed	12 (12.8%)	6 (6.4%)	
Severely anxious/depressed	2 (2.1%)	1 (1.1%)	
Extremely anxious/depressed	2 (2.1%)	2 (2.1%)	

Table 14 and Figure 6 depict a comparison of the EQ-5D Visual Analogue Scale (VAS) scores between the baseline and follow up. The EQ-5D VAS score is a self-reported measure of health status that allows individuals to rate their overall health from 0 (worst imaginable state of health) to 100 (best imaginable state of health). A significant difference for the EQ-5D VAS scores between the baseline and follow-up consultations was observed (75.0 (50.8, 80.0) vs 75.0 (65.0, 90.0), p = 0.0092) indicating an improvement in self-perceived health status.

Table 7. Comparison of VAS health score at baseline and 12 months.

Health Score				
Parameter	**n**	**Baseline**	**12 Month Follow-up**	**P-value**
VAS Health Score	76	75.0 (50.8, 80.0)	75 (65.0, 90.0)	**0.0092**

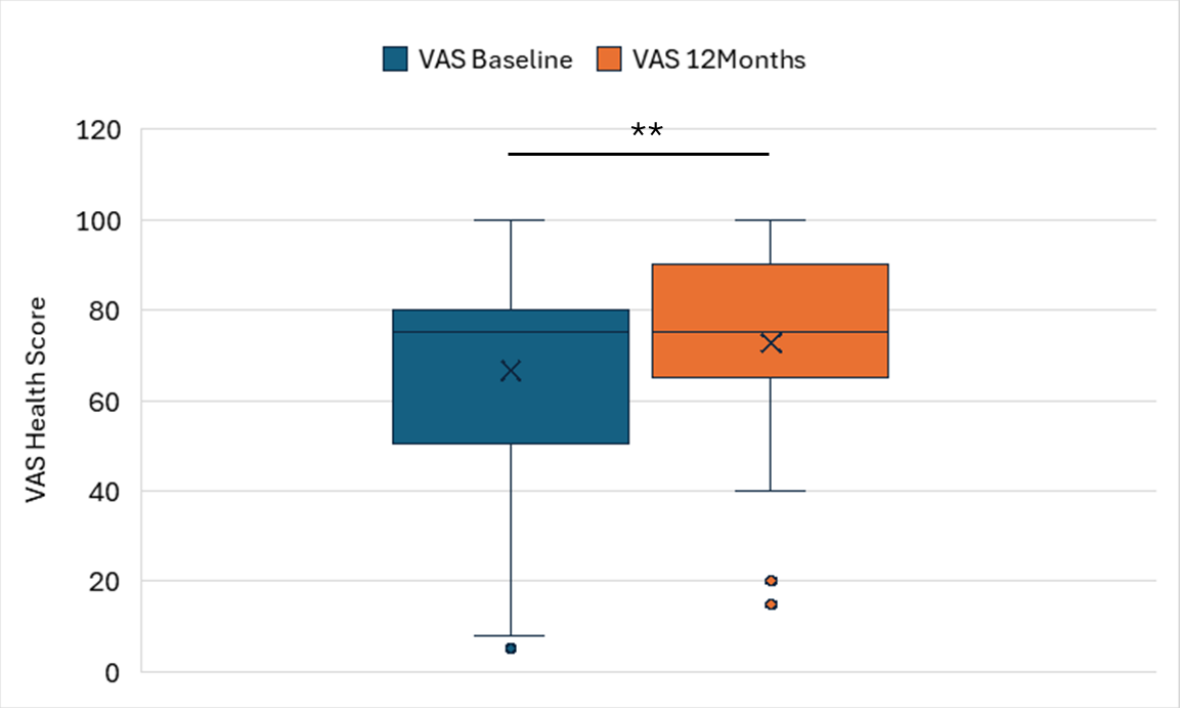

*Figure 6. Changes in mean EQ5D VAS Health Scores between the initial and12 month follow up consultations. ** p < 0.01.*

3.4 Patient Reported Experience Measure (PREM)

All service users were invited to complete the PREM (Appendix 2) at each appointment that was attended. The PREM was completed a total of 195 times from November 2023 to the end of November 2025, with the first completion on 16th November 2023.

Appointment Details

All service users who completed the PREM were located in HDUHB. The majority (118, 60.5%) had their GP practice in Ceredigion, with 64 (32.8%) in Carmarthenshire and 13 (6.7%) in Pembrokeshire (Figure 7).

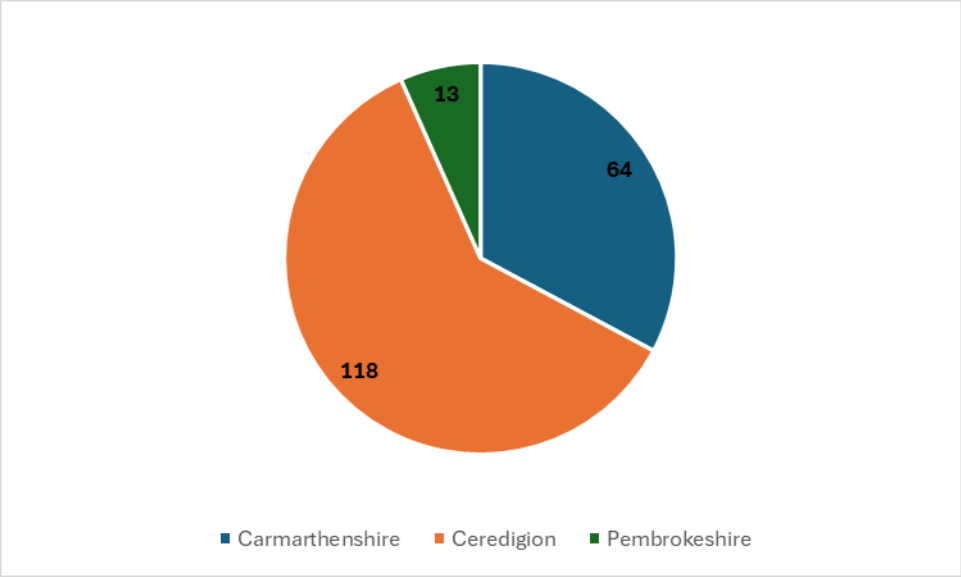

Figure 7. Location of GP practice for service users that completed a PREM questionnaire.

The majority (n = 109, 55.9%) of those who completed the PREM indicated that they did not know they were at risk of developing T2DM before being contacted about the Diabetes Prevention Programme, with 1 (0.5%) stating they had an inclination, but weren't sure and 85 (43.6%) indicating that they did know they were at risk of developing T2DM.

The majority of respondents were attending their first appointment (n = 139, 71.3%) with 56 (28.7%) attending a follow-up appointment. Additionally, the majority of appointments were attended face-to-face at a venue other than their GP surgery (n = 186, 95.3%), 8 stated they attended face-to-face at their GP surgery (4.1%) and 1 attended via telephone (0.5%).

General feedback to the appointments was positive, with almost all those who responded reporting that they felt they were always listened to during their appointment (n = 190, 97.4%), and that they felt things were explained to them in a way that they could understand (n = 189, 96.9%) (Figure 8). Additionally, almost all users felt the length of the appointment was 'Just Right' (n = 192, 98.5%), with only 2 (1%) feeling the appointment was too short, and 1 (0.5%) feeling it was too long.

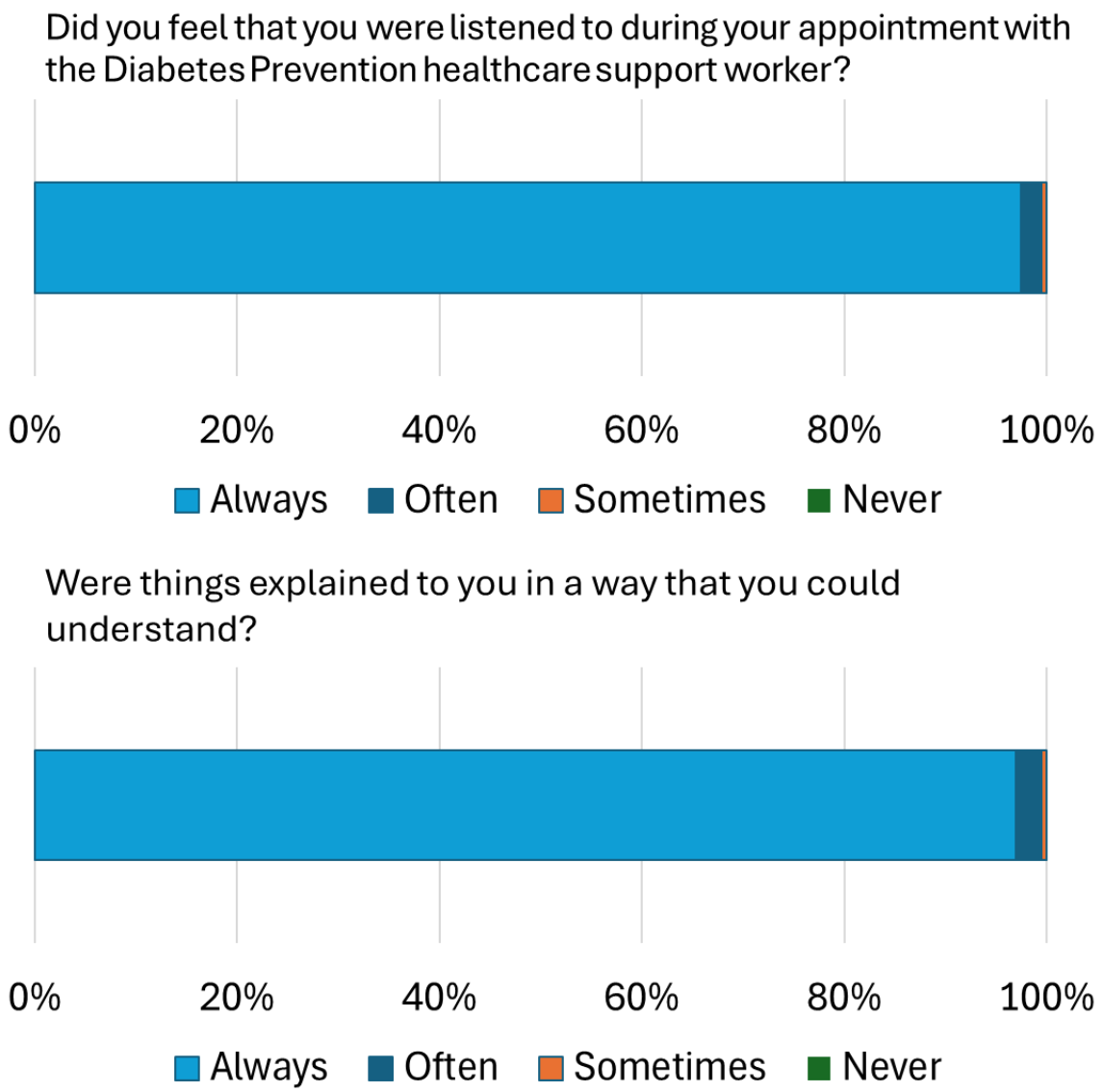

Figure 8. Service user responses when asked 'Did you feel that you were listened to during your appointment with the Diabetes Prevention healthcare support worker?' and 'Were things explained to you in a way that you could understand?'.

Awareness of T2DM Risk

Respondents rated their knowledge around the risk of developing type 2 diabetes significantly higher FOLLOWING their appointment when compared to BEFORE their appointment (scale of 1 to 10), giving a median rating of 5 (5, 7) prior to the appointment and a median of 9 (8, 10) following the appointment ($p < 0.0001$) (Figure 9).

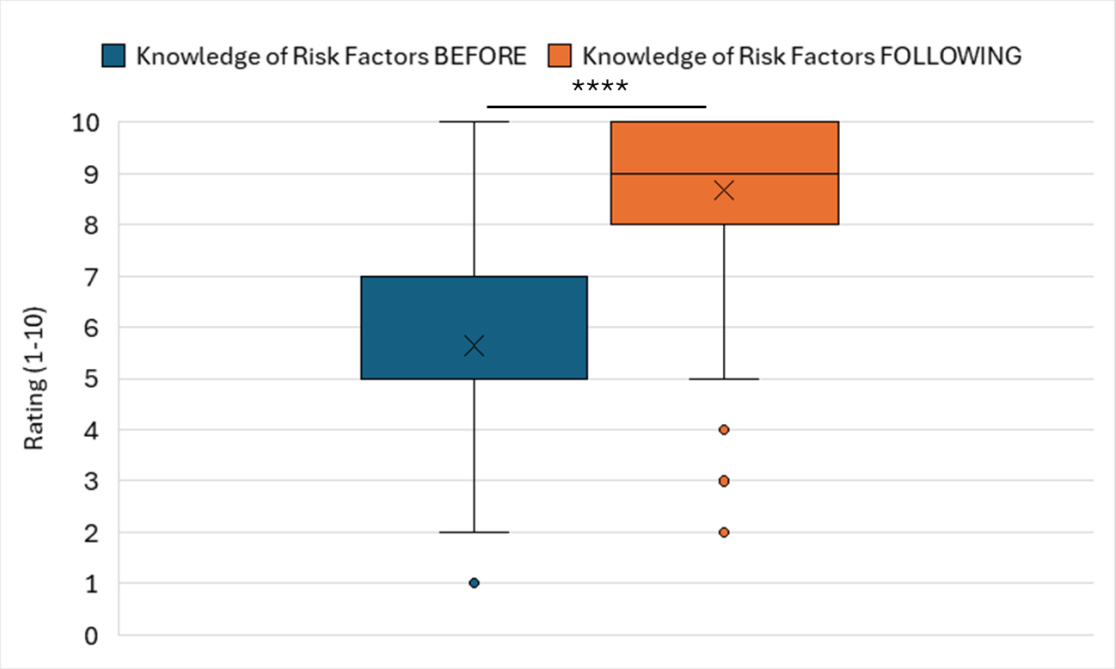

*Figure 9. PREM respondents rating their knowledge of risk factors BEFORE and FOLLOWING their appointment (rated from a scale of 1 to 10). ****p < 0.0001.*

When asked how confident they feel about making lifestyle changes to reduce their risk of developing T2DM, respondents answered positively, with the majority either 'Extremely confident' or 'Very confident' (n = 145, 74.4%). Respondents also emphasised the importance of making lifestyle changes, with the majority believing that it is either 'Extremely important' or 'Very important' (n = 190, 97.4%) (Figure 10).

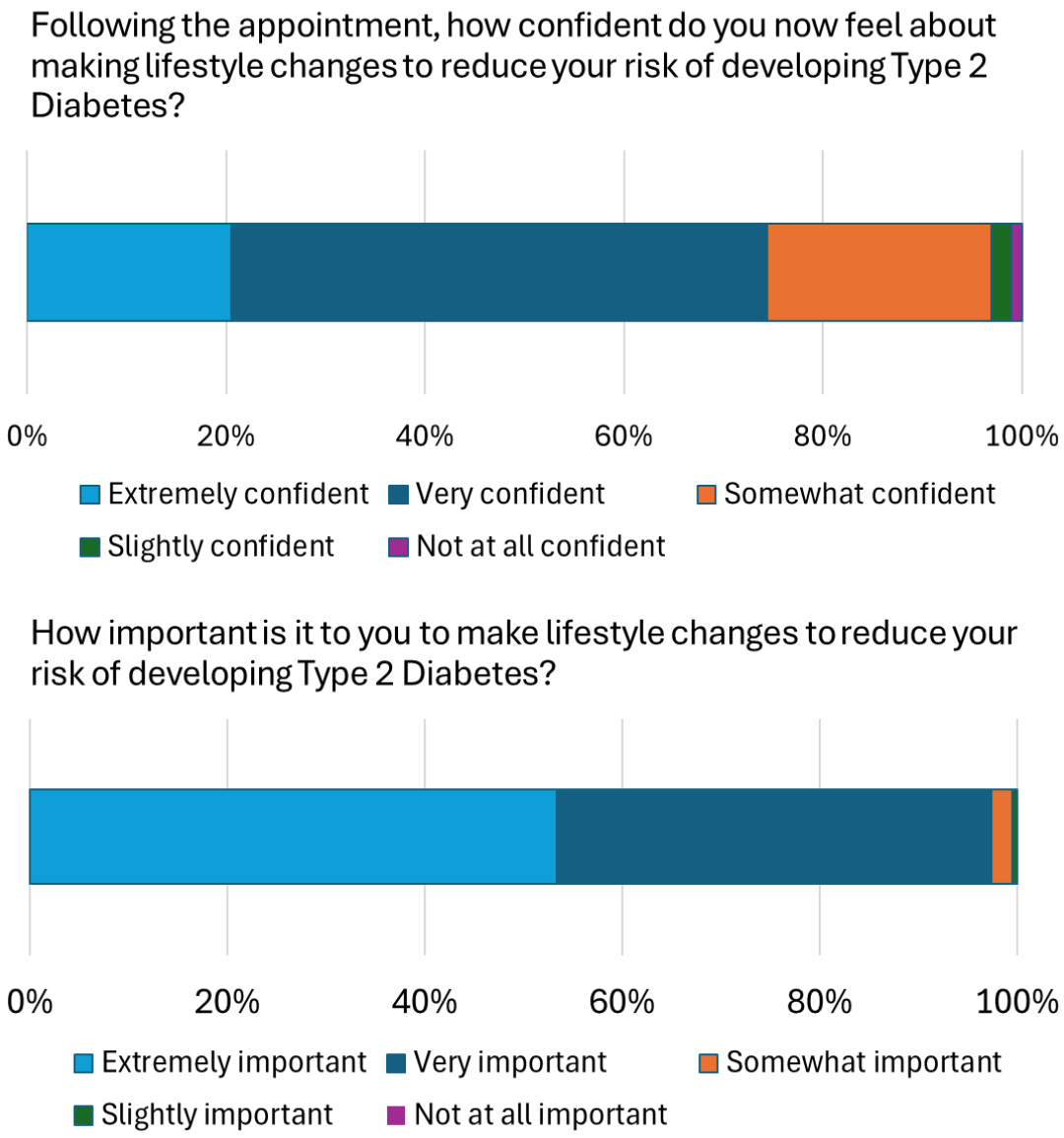

Figure 10. Service user responses when asked 'Following the appointment, how confident do you now feel about making lifestyle changes to reduce your risk of developing T2DM?' and 'How important is it to you to make lifestyle changes to reduce your risk of developing T2DM?'.

Additional Support Offered

When asked if they were offered further support at their appointment, the majority stated 'Yes' (n = 183, 93.8%), with only 10 (5.1%) responding 'No' and 2 (1.0%) responding 'Can't remember'. When asked if they intend to take up these offers of support, the majority (n = 99, 54.0%) stated 'Yes', with 55 (30.1%) stating 'Maybe' and 29 (15.8%) 'No'.

The majority of respondents (n = 171, 87.7%) were provided with written leaflets during their appointment, with 9 (4.6%) not provided written leaflets and 1 (0.5%) stating they couldn't remember (Data missing for 14 cases (7.2%)). The majority (n = 161, 94.2%) said they found the written leaflets helpful/informative, with only 3 (1.8%) stating that the leaflets were not helpful/informative, and of the remaining 7, 4 (2.3%) had missing data and 3 (1.8%) were yet to read the leaflet.

Overall Experience

When asked if there were any ways that the appointment could be improved, the majority of respondents (n = 173, 88.7%) were very positive, with no suggestions for improvement. Additionally, almost all respondents (n = 193, 99.0%) rated the service either 'Very good' or 'Good', with only 2 (1.0%) rating the service as 'Neither good nor poor', and no respondents giving the service a rating of 'Poor' or 'Very poor' (Figure 11).

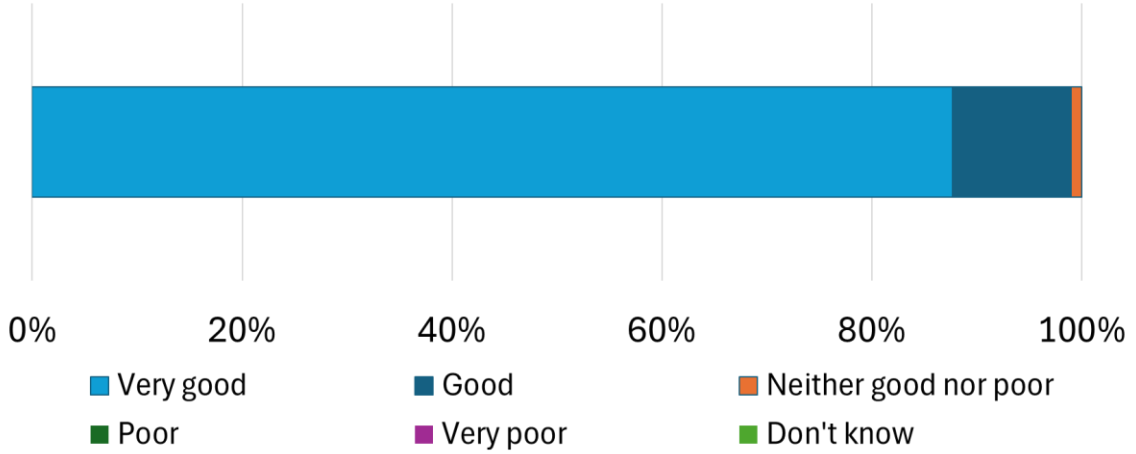

Figure 11. Service user responses when asked 'Thinking about your Diabetes Prevention appointment. Overall, how was your experience of our service?'.

3.4 Value-Based Healthcare Analysis

3.4.1 Cost of Diabetes

Approximately 5.8% of the population in the UK have been diagnosed with T2DM (Hex et al., 2012). The direct costs associated with diabetes has risen by 2024 with estimates ranging from £10.7 billion (Hex et al., 2012) to £14 billion (Quinn, 2024). With over 5.6 million people living with diabetes in the UK, this translates to a mean cost of around £1,910 per patient per year. Over 40% of this cost was related to the diagnosis and treatment of the disease, while the remaining 60% was due to the cost of the associated complications. Analyses have shown that improvements in glycaemic control shows potential to reduce the burden of diabetes and the costs associated with it (Baxter et al., 2016).

Baxter et al (2016) calculated estimations for the cost avoidance for potential improvements in glycaemic controls in adults with Type 1 and Type 2 diabetes. The costs were calculated in relation to the NHS and centred around modest and achievable improvements in glycaemic control (Baxter et al., 2016). They estimated that a potential cost avoidance of £340 million can be achieved in the first 5 years following sustained improvements in glycaemic control. After 25 years, this could rise to approximately £5.5 billion. For people with T2DM, greater control leads to costs savings through reductions in amputations, foot ulcers, and neuropathy which accounts for 57% of the cost

avoidance. They found that there was a higher level of cost reduction in people with higher baseline HbA1c values (Baxter et al., 2016).

3.4.2 Cost-effectiveness of the NHS England DPP

In England, the NHS launched the NHS DPP in 2016. The programme targets individuals with non-diabetic hyperglycaemia, with the aim of preventing these individuals from going on to develop type 2 diabetes. Similarly to the programme in Wales, this is a national programme targeting individuals who were non-diabetic in an attempt to prevent the development of type 2 diabetes. The full version of this programme includes 13 group-based behaviour change sessions ranging from education, nutrition, physical activity, and weight loss. The programme runs with individuals for 9-12 months (McManus et al., 2024).

In 2016, NHS England carried out an impact assessment to estimate the cost of the programme over a 5-year period. The assessment also looked at the potential outcomes of the service, both in the short and long-term. They estimated that over the period, 18,000 cases of diabetes would have been delayed or prevented where 390,000 individuals are enrolled into the programme. They estimated that the programme would be cost effective with cost savings materialising by 2034. The cost of the programme was estimated at £270 per participant (NHS England, 2017).

McManus (2024) evaluated the long-term effectiveness of the NHS DPP by developing a Markov cohort state transition model with a 35-year time horizon. The results of the analysis showed that over a 3-year period the NHS DPP could generate an average of 40.8 incremental QALY with a cohort of 1,000 individuals. This could result in a cost saving of £135,755 for 1,000 participants (McManus et al., 2024).

3.4.3 Impact of the HDUHB DPP on Long-term Outcomes

T2DM is associated with an increased risk of numerous complications. Cardiovascular disease is one of the most common and severe outcomes, with individuals with type 2 diabetes being more than twice as likely to experience heart attacks or strokes compared to those without diabetes (NHS, 2025). Kidney disease is another major concern, with chronic kidney disease (CKD) affecting approximately 20–40% of people with diabetes over time (NHS Digital, 2024).

Foot complications, including ulcers and infections, are also prevalent in diabetes, and in severe cases can lead to lower limb amputations. The National Diabetes Audit reports that people with T2DM are at a significantly higher risk of amputation, with rates several times higher than in the non-diabetic population. Vision loss due to diabetic retinopathy is another long-term complication, affecting more than 30% of people with diabetes at some stage and is a leading cause of blindness in working-age adults in the UK (NHS Digital, 2024).

Based on the estimated annual incidence rates for people with T2DM, as the HDUHB DPP successfully reduced risk in 89 individuals, it has the potential to prevent a substantial number of serious health complications. Specifically, assuming these participants were

to develop diabetes without the programme, it may have averted approximately 19.6 cardiovascular events, 13.4 cases of chronic kidney disease, 0.27 lower limb amputations, and 1.34 cases of vision loss due to diabetic retinopathy annually. These figures are derived from published incidence rates: cardiovascular events occur in roughly 22% of people with T2DM per year, kidney disease in 15%, amputations in 0.3%, and vision loss in 1.5% annually (NHS Digital 2024).

3.4.4 Cost Utility Analysis

A Quality-Adjusted Life Year (QALY) is a standard measure used in health economics to assess the value of medical interventions by combining both the quantity and quality of life gained. QALYs are commonly used in cost-utility analyses to inform decisions about resource allocation in healthcare (Office for Health Improvement and Disparities, 2020).

91 participants had EQ-5D 5L data from the initial consultation and 12-month follow up consultation. EQ-5D 3L utility scores were then calculated using the Excel based model developed by the University of Sheffield's DSU (Alava et al., 2023). The QALYs gained could then be calculated using the area under the curve method, assuming linear change between time points. This resulted in a mean QALY gain of 0.01 per service user, and the total QALYs gained across the 91 participants was 0.90. In total, there were 1266 participants who enrolled to the programme over the first 28 months (mean of 543 participants per year). Assuming a linear model across the 543 participants this would result in 5.26 QALYs gained. If we assume that the cost of the HDUHB DPP is the same as the NHS England DPP (£270 per participant from (NHS England, 2017), then the cost of the programme for the 543 participants would be £146,610 (assuming a linear model). This would mean the cost per QALY gained would be £27,873. Assuming the QALY gain is maintained at a discount of 3.5% annually as recommended by NICE (National Institute for Health and Care Excellence, 2022), and using a life expectancy of 81, the lifetime QALY gain for each individual would be around 0.1, giving a total of around 54.35 QALYs gained for the 543 service users and a cost per QALY gained of around £2,698. NICE recommends the cost per QALY to be below £20,000 - £30,000 (Office for Health Improvement and Disparities, 2020) meaning with the assumptions the programme could be considered cost effective as it falls comfortably within this threshold.

3.5 Conclusions

The HDUHB DPP has been successful in recruiting service users from all seven health board clusters since its inception in January 2023 until the end of April 2025, with 1,266 individuals recruited to the programme during this period. Data shows the programme has had an overall positive and highly significant impact on service users, with significant reductions in HbA1C, weight, BMI and waist circumference, indicating significantly reduced diabetes risk and improved metabolic health.

Although the individual dimensions of the EQ-5D did not significantly change in individuals attending the programme, a significant increase in the overall VAS scores was observed at 12 months, indicating an improvement in self-perceived health status.

The intervention has demonstrated that it has the potential to reduce the development of diabetes in West Wales, with almost 40% of the individuals that attended baseline and 12-month follow-up appointments achieving normoglycaemia. The data suggests that the programme is highly cost effective, with an estimated cost per QALY of £2,698, however, this is based on limited follow-up and cost data.

3.5.1 Limitations

As true costing data were not available, estimates were used for cost based on a 'per patient' figure taken from similar programmes in the literature which is a potential limitation of the cost analysis. Additionally, a relatively small number of service users had complete datasets, and thus in future greater emphasis on follow-up would be recommended to ensure accuracy of any analysis or conclusions from future evaluations or monitoring. It must also be noted that this is an evaluation with no control group, it is assumed that individuals would have remained prediabetic if the intervention were not in place.

3.6 Recommendations

Recommendation 1: Investigate Poor Attendance of Follow-up

Consistent with the interim report, follow-up engagement remains limited, with only 11.2% of service users who attended an initial clinic returning for a follow-up. Improving follow-up rates is essential to maximise programme effectiveness and sustain health outcomes.

Recommendation 2: Investigate the Reasons for Low Uptake of Secondary Referrals

Fewer than 50% of service users attending an initial clinic were referred to additional services. A review of referral processes and inclusivity is recommended to ensure that individuals are offered appropriate services aligned with their personal needs.

Recommendation 3: Improve Data Collection Infrastructure

Current data management relies on Microsoft Excel spreadsheets, which present limitations that may compromise data integrity and service evaluation. Adoption of more robust data collection platforms, such as REDCap, is advised to enhance accuracy and efficiency.

Recommendation 4: Continue and Expand Evaluation Activities

Given the small proportion of follow-up data available at the time of this assessment and the absence of actual cost data, further evaluation is required. This should aim to provide a more comprehensive analysis of programme outcomes and cost-utility.

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Appendices

Appendix 1 – EQ-5D

Under each heading, please tick the ONE box that best describes your health TODAY.

MOBILITY

I have no problems in walking about ❑
I have slight problems in walking about ❑
I have moderate problems in walking about ❑
I have severe problems in walking about ❑
I am unable to walk about ❑

SELF-CARE

I have no problems washing or dressing myself ❑
I have slight problems washing or dressing myself ❑
I have moderate problems washing or dressing myself ❑
I have severe problems washing or dressing myself ❑
I am unable to wash or dress myself ❑

USUAL ACTIVITIES *(e.g. work, study, housework, family or leisure activities)*

I have no problems doing my usual activities ❑
I have slight problems doing my usual activities ❑
I have moderate problems doing my usual activities ❑
I have severe problems doing my usual activities ❑
I am unable to do my usual activities ❑

PAIN / DISCOMFORT

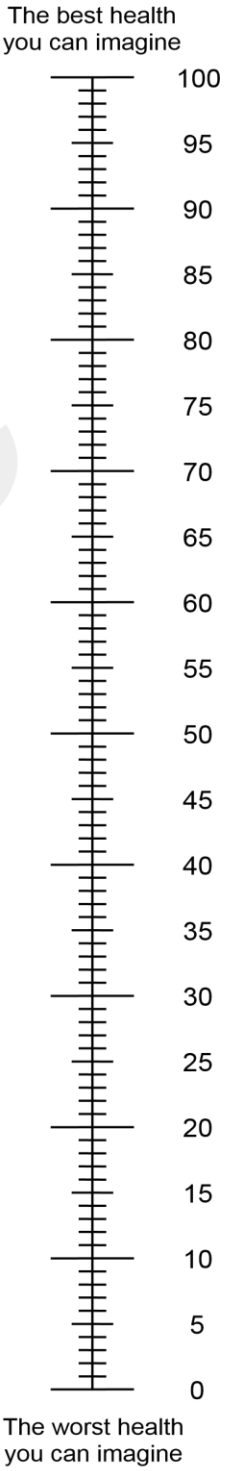
I have no pain or discomfort ❑
I have slight pain or discomfort ❑
I have moderate pain or discomfort ❑
I have severe pain or discomfort ❑
I have extreme pain or discomfort ❑

ANXIETY / DEPRESSION

I am not anxious or depressed ❑
I am slightly anxious or depressed ❑
I am moderately anxious or depressed ❑
I am severely anxious or depressed ❑
I am extremely anxious or depressed ❑

- We would like to know how good or bad your health is TODAY.
- This scale is numbered from 0 to 100.
- 100 means the best health you can imagine.
  0 means the worst health you can imagine.
- Mark an X on the scale to indicate how your health is TODAY.
- Now, please write the number you marked on the scale in the box below.

YOUR HEALTH TODAY = ☐



Appendix 2 – PREM Questionnaire

Diabetes Prevention Programme
Patient Questionnaire

The All Wales Diabetes Prevention Programme (AWDPP) team and Public Health Wales would really like to hear about your experience of attending the All Wales Diabetes Prevention Programme. This programme has been developed to help people make changes which might prevent or delay the onset of Type 2 Diabetes. The programme is new, and we want to know how well it works and how it can be improved to help other people at risk. Your views will help health professionals design more effective programmes in the future.

Before you complete the questionnaire, it is important for you to understand what is involved, and why it is being done. Please take time to read and understand this information.

What is the purpose of the patient questionnaire?
To provide you with the opportunity to share you experience of the programme. Please be assured that there are no right or wrong answers to the questions. Every answer is invaluable!

Why have you been asked to complete this questionnaire?
You have attended a Diabetes Prevention appointment with a Health care support worker. We would really like to understand your experience of attending this appointment.

Do you have to take part?
No, everyone has the right to pot out.

What are the benefits of your participation?
The information you submit will be used to help improved services and help to gain a better understanding of what works well and where things can be improved.
We may from time to time share statistical information with external organisations for the purpose of enabling research, development and improving health and health care.

Will your taking part be kept confidential?
Yes, all data obtained is kept confidential. The information you provide will be saved in a secure NHS Wales file, where responses from other service users from other areas will also be collected.

Is it anonymous?
Yes, completely. We collect no personally-identifying data at all, and we ask you not to identify yourself or anyone else in your written responses.

The questionnaire will take approximately 5 minutes to completed.

We thank you for your time.

1) Please select your Health Board:			
Hywel Dda Health Board			
2) Please enter your GP Surgery:			
3) Before you were contacted about the Diabetes Prevention Programme, did you know you were at risk of developing type 2 Diabetes?			
Yes ☐	No ☐	Other _____	
Your All Wales Diabetes Prevention appointment			
4) Month your appointment took place:			
5) Which diabetes prevention appointment are you attending?			
First Appointment ☐	Follow Up Appointment ☐	Not Sure ☐	
6) What type of appointment did you attend?			
Face to face at GP surgery ☐	Face to face another venue ☐	Video via computer / tablet / smartphone ☐	Telephone ☐
7) Did you feel that you were listened to during your appointment with the Diabetes Prevention Health and Wellbeing Facilitator?			
Always ☐	Often ☐	Sometimes ☐	Never ☐
8) Were things explained to you in a way that you could understand?			
Always ☐	Often ☐	Sometimes ☐	Never ☐
9) Did you feel the lengths of the appointment was:			
Too Short ☐	Just Right ☐	Too Long ☐	
Your awareness of the risks of type 2 diabetes			
10) BEFORE the appointment, how would you have rated your knowledge around the risk of developing Type 2 Diabetes? (On a scale of 1 = very little knowledge, 5 = some knowledge, 10 = very good knowledge)			

1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐	8 ☐	9 ☐	10 ☐

11) FOLLOWING the appointment, how would you have rate your knowledge around the risk of developing Type 2 Diabetes? (On a scale of 1 = very little knowledge, 5 = some knowledge, 10 = very good knowledge)

1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐	8 ☐	9 ☐	10 ☐

12) FOLLOWING the appointment, how confident do you now feel about making lifestyle changes to reduce your risk of developing Type 2 Diabetes?

Extremely confident ☐	Very confident ☐	Somewhat confident ☐	Slightly confident ☐	Not at all confident ☐

13) How important is it to you to make lifestyle changes to reduce your risk of developing Type 2 Diabetes?

Extremely important ☐	Very important ☐	Somewhat important ☐	Slightly important ☐	Not at all important ☐

Additional support to help you reduce your risk of developing type 2 diabetes

14) Were you offered further support at the appointment? (e.g. referral to another service such as a weight management programme, physical activity programme or signposting to internet links?)

Yes ☐	No ☐	Can't remember ☐

15) If you were offered further support, please can you give details of which ones:

16) Do you plan to take up any of these offers of further support?

Yes ☐	Maybe ☐	No ☐

17) Were you provided with any written leaflets during your Diabetes Prevention appointment?

Yes ☐	No ☐	Can't remember ☐

18) If you were provided with written leaflets, did you find these helpful/informative?

Yes ☐	No ☐	Other _____

19) Are there any ways in which you feel the appointment can be improved?

20) Thinking about your Diabetes Prevention appointment. Overall, how was your experience of our service?

Very good ☐	Good ☐	Neither good nor poor ☐	Poor ☐	Very poor ☐	Don't know ☐

21) Is there anything else you would like to tell us about your experience of the Diabetes Prevention Programme?

Equality Monitoring

Finally some questions about you to help us ensure that we treat everyone fairly and with equal respect.

22) What is your age?

18-24 ☐	25-34 ☐	35-44 ☐	45-54 ☐	55-64 ☐	65-74 ☐	75+ ☐	Prefer not to say ☐

23) What is your gender?

Male ☐	Female ☐	Prefer not to say ☐

24) At birth, were you described as:

Male ☐	Female ☐	Other ☐	Prefer not to say ☐

25) Which of the following options best describe how you think of yourself?

Heterosexual or straight ☐	Bisexual ☐	Gay or Lesbian ☐	Other ☐	Prefer not to say ☐

26) What is your ethnic group?

White – British/English/Northern Irish/Scottish/Welsh ☐	White - Gypsy or Irish Traveller ☐	White – Irish ☐	White – Other ☐
Mixed/multiple ethnic group – White and Black Caribbean ☐	Mixed/multiple ethnic group – White and Black African ☐	Mixed/multiple ethnic group – White and Asian ☐	Mixed/multiple ethnic group – Other ☐
Asian/Asian British – Indian ☐	Asian/Asian British – Pakistani ☐	Asian/Asian British – Bangladeshi ☐	Asian/Asian British – Chinese ☐
Asian / Asian British – Other ☐	Black/African/Caribbean/Black British - African ☐	Black/African/Caribbean/Black British - Caribbean ☐	Black/African/Caribbean/Black British – Black British ☐
Black/African/Caribbean/Black - Other ☐	Other Ethnic Group - Arab ☐	Prefer not to say ☐	

27) Have you completed this questionnaire:

Digitally on your phone/mobile device ☐	On paper ☐

TRITECH
Sefydliad | Institute

TriTech Institute
Unit 2 Dura Park
Bynea
SA14 9TD

0300-303-6115
Tritech.HDD@wales.nhs.uk

TriTech Institute @tritech_hd tritech.nhs.wales