

Slowing, halting and reversing the upward trend in type 2 diabetes

I would like to think that the Afan Cluster (formerly within the Abertawe Bro Morgannwg University Health Board and now part of Swansea Bay University Health Board [SBUHB]) is having some success in addressing the rate of patients developing type 2 diabetes. In June 2015, there was a prevalence of 7.55%, while in June 2019 it was 7.4%. Is this a natural variation or the result of 3 years' work identifying those with non-diabetic hyperglycaemia (NDH; also known as pre-diabetes) or at higher risk of NDH, and then offering a fresh annual lifestyle advice session?

In June 2019, we had 50 984 registered patients in the cluster. Of these, 3737 (7.3%) had evidence of previous NDH (defined by us as having one or more of impaired fasting glycaemia [IFG], impaired glucose tolerance [IGT], HbA_{1c} >41 mmol/mol or fasting blood glucose [FBG] >6 mmol/L), but no diabetes diagnosis. 2142 (4.25%) were at high risk of NDH (defined as ≥45 years old with hypertension and obesity [BMI ≥30 kg/m² ever], but not having diabetes or any evidence of NDH).

Between 2015 and 2018, everyone in these two at-risk groups was offered an annual HbA_{1c} test and then an annual, 20-minute, face-to-face, lifestyle advice session with a trained healthcare support worker (HCSW).

It has been estimated that 5%–10% of people with NDH will go on to develop type 2 diabetes annually (NHS, 2014). However, there is evidence that healthy lifestyle, properly explained, reduces the chance of developing type 2 diabetes by more than half (Diabetes Prevention Program Research Group, 2002; Tuomilehto et al, 2001). That is why, in 2015, the Afan Cluster decided to make it a priority to identify patients in our higher deprivation cluster who had, or were at risk of developing, NDH and to offer them lifestyle advice.

One or two HCSWs from each surgery were trained, using the Community Food and Nutrition Skills (level 2) course, accredited by Agored Cymru, to deliver the advice.

A clinical audit was designed for those sites using Vision clinical software and a search for those with the EMIS patient record system to identify those with a previous HbA_{1c} result that indicated evidence of previous NDH and those at higher risk of developing NDH. These people were then offered a fresh HbA_{1c} test and from 2015–2018, regardless of the result, an annual lifestyle session. The audit and search update daily.

We created a Vision guideline and EMIS template to facilitate HCSW data viewing and entry points, and included links to leaflets, exercise courses and video education, with hot keys for speed. All HCSWs use these templates for quality purposes. Staff have refresher training on delivery every second year. Data are collected monthly and collated, with the lead GP feeding back cluster and practice performance. The cluster pays £2.50 per blood test and £20 per annual lifestyle session to cover the cost of staff time. This is about £70 000 per cluster. The scheme was extended to four clusters in 2016 and, in November 2019, was expanded across the whole SBUHB, incorporating eight clusters.

To establish whether this scheme has made a difference, we identified patients in the Afan Cluster who, by December 2018, had had at least one prior HbA_{1c}, FBG or glucose tolerance test sometime in their lives that indicated previous NDH before their first lifestyle session, and a subsequent HbA_{1c} after they had accepted and received lifestyle advice. These criteria were met by 1916 patients, their second tests often being 1–2 years after lifestyle advice had been received, not just a few months.

Analysis showed that 64.8% showed some improvement in HbA_{1c} after the intervention, versus 24.4% who worsened. Across the whole cohort, a mean drop of 1.53 mmol/mol (or 3.7% of the mean HbA_{1c} total) was recorded. A subset of 1005 patients (52.5%) was identified whose new HbA_{1c} measurement (from the start of the scheme in 2015, before lifestyle advice) indicated



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Citation: Goodwin M (2019)
Slowing, halting and reversing the
upward trend in type 2 diabetes.
Diabetes & Primary Care 21: 147–8

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Box 1. A snapshot of audit data within the cluster in June 2019.

- 84% of patients with evidence of previous non-diabetic hyperglycaemia* (NDH) have had a new HbA_{1c}, fasting blood glucose or glucose tolerance test every 24 months.
- 76% of patients with a high risk of future NDH have had a new HbA_{1c}, fasting blood glucose or glucose tolerance test every 24 months.
- 69% of patients with a last-known HbA_{1c} >41 mmol/mol have had a new test every 12 months (to establish if still in NDH range).
- 65% of patients still with a NDH HbA_{1c} have received lifestyle education/counselling about lifestyle regarding the risk of diabetes in the last 12 months.

*As defined within this article.

that they currently had NDH. Of these, 596 still had NDH by December 2018, indicating that 43% of the subset had reverted to a normal HbA_{1c} after receiving lifestyle advice. When interpreting these results, it should be noted that the analysis excludes those who have developed diabetes, but this number is relatively small and, when looked at in detail at one or two practices, would not negate much of the improvement seen. It is very difficult to extract data from national patient databases and this hampers assessment on a larger scale.

Across the whole cohort, the average weight loss was 1.2 kg and blood pressure was 5 mmHg lower. Attendance rates were high (>80% for blood tests and >65% for lifestyle sessions) and many individuals seemed to become more health aware.

Looking at a smaller group of 340 patients in early 2017 who were aged >45 years, hypertensive and obese, with normal HbA_{1c} levels on retesting, and who also had a lifestyle session between 2015 and 2017, a decrease in mean HbA_{1c} of 2.1 mmol/mol (from 37.3 mmol/mol to 35.2 mmol/mol) was noted. This decrease of 5.7% suggested that the advice given had resulted in lower blood glucose levels even in those with no evidence of NDH.

The cluster scheme changed from April 2018, to offer HbA_{1c} only once every 24 months to both groups, and lifestyle advice only to those shown to have a persisting HbA_{1c} >41 mmol/mol during the previous 12 months (as opposed to everyone from 2015–2018). *Box 1* shows the extent to which patients at high risk were receiving

additional monitoring by June 2019.

In my own practice of 2700 patients, 95% of those identified attended for annual blood tests and over 90% for annual lifestyle advice from 2015–2018. Two of my reception staff were trained in 2015 to offer robust dietary and health advice, and have thrived in their new roles. Patients who knew them from reception felt comfortable with them, and these new HCSWs have since migrated to a variety of roles: phlebotomy; diabetes foot care; home visiting for warfarin therapy, flu and other immunisations; ambulatory blood pressure monitoring and hypertension clinic assessment with 8-day home readings; electrocardiograms; and spirometry basics. We are now entering the fourth year of the NDH scheme with a much more versatile team and good morale.

Following the HbA_{1c} screening of over 10% of the practice list and the subsequent new diabetes diagnoses for many patients, prevalence of diabetes peaked at 8.25% in early 2016. Excluding subsequent inward and outward migration of people living with diabetes, the underlying prevalence in July 2019 had lowered to 7.7% in my practice.

I still see patients developing diabetes, but at a far lower rate than in previous years. Only time will tell if the trend continues, but it is looking positive for many and the improvement is not explained away by population changes or migration of people with diabetes. For anyone interested in the scheme, the Vision audit and EMIS searches are available, as are the guidelines and templates. Please ask the [publisher](#) to put you in contact with me, if you are interested.

A final thought. In my patients with persistent NDH (i.e. an HbA_{1c} >41 mmol/mol despite evidence of lifestyle modification), prescribing metformin to 31 of them, who had tolerated the drug for 12 months, resulted in a further 2.9 mmol/mol drop in HbA_{1c}, with 90.3% showing some improvement and 61% reverting to normoglycaemia. That's another project we are exploring as a route for persistent prediabetes in our cluster and it is looking very positive! ■

Diabetes Prevention Program Research Group (2002) Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* **346**: 393–403

NHS (2014) *One in three adults in England 'has prediabetes'*. Available at: <https://bit.ly/2P5X1X1> (accessed 10.12.19)

Tuomilehto J, Lindström J, Eriksson JG et al; The Finnish Diabetes Prevention Study Group (2001) Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* **344**: 1343–50