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POSTER ABSTRACT BOOK

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- The abstracts in this supplement have been edited minimally from the submitted versions, primarily for house style on units.
- For full authorship details, please refer to the posters.
- Funding declarations are presented only where explicitly supplied with the abstracts. For full details, please refer to the posters.

P1

Effectiveness of virtual diabetes group consultation and education to improve patients' self-efficacy, glycaemia and metabolic control in primary care

Submitting author: ***Badat A****, Alastair Ross Medical Practice*

Aim: The aim of this study was to measure the effectiveness of a primary care, virtual group consultation and diabetes self-management education program (VGC-DSME) to improve glycaemia, metabolic control and patients' self-efficacy in the management of diabetes. **Methods:** A quantitative study was conducted on a small group of patients with uncontrolled diabetes as part of a quality improvement project. All patients >18 years with type 1 or type 2 diabetes were eligible for the study. Four patients completed a 4-week VGC-DSME program, 2 hours/week, via Microsoft Teams. Data measuring HbA_{1c}, lipids, blood pressure (BP) and BMI were obtained, prior to the workshops and at 3 months' follow-up. Patients' self-efficacy was evaluated by means of a mixed-methods strategy, using a semi-structured survey. **Results:** HbA_{1c} significantly reduced by 21 mmol/mol (16%), with an average systolic BP reduction of 8 mmHg (10%). Average diastolic BP increased by 5 mmHg (4%), as did the lipid profile by 0.7 mmol/L (0.03%) due to an adverse health event with a participant. There was a rise of 22.5% in motivation level, 25% in confidence levels with self-management skills boosted by 31%, rating VGC-DSME at 96% with a likelihood of recommending to others. The change impact of the QI project revealed that patients are 7 times less likely to see the GP and with patient activation level increasing by 1.8 (scale of 1–5), correlates to primary and secondary care demand savings of £1002/patient/year. **Conclusion:** The results confirm the significant benefits of VGC-DSME in improving glycaemia, metabolic control and patients' self-efficacy, as well as the notable impact on saving GP appointments and monetary gains. Results were considered valid and reliable. However, evidence needs to be further assessed in larger cohorts of patients for generalisability. ■

P2

Manchester Intermittent Diet in Gestational Diabetes Acceptability Study (MIDDAS-GDM): A randomised feasibility trial of an intermittent low-energy diet (ILED)

Submitting authors: ***Dapre E****, GPST2*

Background: Gestational diabetes mellitus (GDM) is rising in and is associated with maternal and neonatal complications. First-line NHS care advises healthy eating and physical activity – only moderately effective for achieving glycaemic targets. ~30% of women require medication with metformin and/or insulin. There is no strong evidence base for any particular dietary regimen to improve outcomes in GDM. Intermittent low-energy diets (ILEDs) are associated with improved hyperglycaemia and insulin resistance in type 2 diabetes and could be a viable option in the management of GDM. **Objective:** To test the safety and feasibility of an ILED amongst women with GDM compared to usual, best NHS care. **Methods:** Randomised controlled feasibility trial of ILED vs best NHS care. We aim to recruit 48 women with GDM from antenatal clinics at Manchester Foundation Trust (MFT) over 9 months, starting in September 2022. Participants will be randomised to ILED (2 days of restricted calories of 1000 kcal/week, and 5 days of best NHS care healthy diet and physical activity advice), or NHS care until delivery of their baby. **Results and conclusion:** Primary outcomes: uptake, recruitment and retention to the study, and adherence to dietary interventions. Safety outcomes include birth weight, gestational age, neonatal hypoglycaemic episodes, hyperbilirubinaemia, admission to Special Care Baby Unit/Neonatal Intensive Care Unit, stillbirths, percentage of women with hypoglycaemic episodes, and significant maternal ketonaemia. Secondary outcomes will assess the fidelity of delivery of interventions, and qualitative analysis of participant and healthcare professionals' experiences. Exploratory outcomes include the number of women requiring metformin and/or insulin. ■

P3

Use of CGM to reverse pre-diabetes and metabolic syndrome

Submitting author: ***Phillips G****, Manor Pharmacy/ProLongevity*

Clients are provided with a continual blood glucose monitor and are coached on a one-to-one basis by a health professional. The glycaemic index/load is based on a population average. However, at the n=1 level, glycaemic responses are frequently equal and opposite, driven primarily by the microbiome NOT the human genome. At any one time, the entire bloodstream should contain no more than 5 g of glucose (=1×5 mL teaspoon). The typical Western diet, high in sugar, carbs and processed foods, drives up blood sugar. Since hyperglycaemia is toxic, the body responds by secreting ever more insulin. Eventually the body becomes insulin resistant, leading first to pre-diabetes and ultimately to type 2 diabetes. The hyperinsulinaemic/hyperglycaemic environment is pro-inflammatory and toxic to the metabolism (at the level of the mitochondria) via numerous well-elucidated mechanisms. This is the root cause which explains the causal relationship between type 2 diabetes/cardiovascular disease/cancer/dementia. By use of CGM and patient counselling, the ProLongevity "precision nutrition" approach seeks to reverse these metabolic syndrome-related diseases. Not only does this produce significant health gain, it allows for consistent **deprescribing** of expensive medication. NB. The medication generally addresses the symptoms (hyperglycaemia, hypertension, etc.) of metabolic diseases, but completely fails to address root causes. As such, the ProLongevity service would pay for itself just in terms of savings on the £20bn NHS drugs bill. ■

P4

Addressing the primary care workforce crisis as per the NHS Long Term Plan: Utilising, equipping and supporting clinical pharmacists to care for people living with diabetes. COMPLEMENT PLUS

Submitting author: ***Munday F****, Leicester General Hospital*

Background: Numbers of GPs and practice nurses are declining, diabetes diagnoses are increasing and we are in a pandemic that can severely affect people living with multimorbidities and obesity. Aim: Boost and enhance the workforce in primary care to provide excellent care and support for people living with diabetes by utilising pharmacists to their full potential. **Method:** EDEN adapted their current multi-award-winning pharmacist training programme (COMPLEMENT) into a 4–6-month virtual complete diabetes training package, with mentoring support (COMPLEMENT PLUS). **The course:** Four recorded lessons, four e-learning modules and four virtual mentoring sessions to develop confidence and apply learning, using case study discussions. 48 delegates were asked to rate their knowledge and confidence in 25 areas pre- and post-training: 100% of delegates reported an increase in knowledge and confidence in all 25 areas. **Results:** Delegate feedback was collected: 66% of delegates rated the training "Excellent"; 34% rated the training "Very Good"; 100% of the delegates would recommend this training to peers. Feedback example from patients seen by the pharmacists: "He listened to me, I felt safe in his hands and now feel in control of my diabetes." **Conclusion:** Patients living with diabetes have a range

of healthcare needs, including regular monitoring, management of complex dosing regimens, ensuring appropriate use of medications and lifestyle education. With training/mentoring, pharmacists have the potential to meet these needs and reduce workload pressures in primary care. The COMPLEMENT PLUS model is cost-effective and sustainable, and proven to give pharmacists the increased knowledge and confidence that they require to practise independently. ■

P5

Reduction in the prevalence of methicillin-resistant *Staphylococcus aureus* in tissue and wound swab samples taken from outpatients attending a specialist diabetes foot clinic, 2005–2021

Submitting author: ***Moore J****, Internal Medical Trainee 1*

Aim: To assess annual change in prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) from tissue and wound swab samples from foot ulcers (DFU) in people with diabetes from 2005 to 2021. **Methods:** A retrospective analysis of everyone with MRSA-positive wound or tissue swabs taken from our specialist multidisciplinary foot clinic over a seventeen-year period, between July 2005 and July 2021. **Results:** From 2005 to 2021, a total of 406 MRSA-positive isolates from DFU swabs were identified from 185 individuals attending the foot clinic. The total number of swabs sent was 6312 from 1916 individuals living with diabetes. Annual MRSA DFU prevalence peaked in 2008 at 14.6% (n=38), decreased in 2013 to 5.2% (n=20) and did not exceed 4% (n=6) from 2015–2021. Incidence of MRSA in DFUs followed similar reductions that were observed in incidence of hospital MRSA and hospital MRSA bacteraemia. Hospital MRSA reached a low in 2021 (n=211), a 76% fall from 2007 figures (n=880). Hospital bacteraemia reduced by two thirds from 2006/7 to 2011/12 (from n=48 to n=16), and in 2021/22 a solitary case was reported. **Conclusions:** Prevalence of MRSA in DFU infections treated as outpatients is decreasing in line with falls in hospital-acquired blood-borne infections and with overall hospital MRSA incidence. This is likely a reflection of the combination of strategies which have led to a fall in community MRSA. Reduction in prevalence should have positive impacts on outcomes in people living with diabetes, reducing the complication of osteomyelitis and necessity for long-term antibiotic administration. ■

P6

Holistic care

Submitting author: ***Jetten S****, Brockwood Medical Practice, Tanners Meadow*

Aims and objectives: To treat the patient holistically, not only considering HbA_{1c} control but also reducing cardiovascular disease risk by controlling blood pressure (BP), reducing cholesterol, weight management and, furthermore, protecting the kidneys, while also not over-medicating, especially in those that are frail. **Methods:** To carefully consider the class of medication being prescribed, taking into consideration proteinuria, weight, BP and not only HbA_{1c}. Therefore, potentially being able to minimise the amount of medication that a patient may have to take, as some antidiabetes medications have more than one use, such as SGLT2 inhibitors and dapagliflozin in particular, as proven by the DAPA-HF and the DAPA-CKD studies. Therefore, if someone has a raised HbA_{1c}, elevated BMI, elevated BP and proteinuria, then dapagliflozin would be the best medication to add in, but also if any of these factors where present independently, it could also be added. **Results:** By adding an SGLT2 inhibitor, such as dapagliflozin, this could reduce the medication load of a patient who has multiple factors occurring. Therefore, this one medication can help with HbA_{1c} control and weight loss, as well as offering good heart and kidney protection, and reducing proteinuria. It also reduces the risk of polypharmacy occurring. **Conclusion:** In looking at a patient holistically, it can benefit not only the patient but also be a great saving to the NHS as multiple medications will not necessarily be required and, furthermore, compliance is more likely. ■

P7

Non-diabetic hyperglycaemia and prevalence of B12 deficiency

Submitting author: ***Patel A****, Medical Student, Tilbury*

Aims: A review of records of patients with impaired fasting glycaemia (IFG) has shown an association between IFG, low levels of vitamin B12 and hyperuricaemia. **Method:** The electronic records of patients with non-diabetic hyperglycaemia (n=582) were examined to verify the association of low vitamin B12, hyperuricaemia, smoking, dyslipidaemia and progression to diabetes. **Results:** Patients with IFG (41%) had begun to show signs of vitamin B12 deficiency also had a pre-existing high BMI. This is within 2 years of diagnosis of IFG levels (r=1.6459; P<0.000 01); 43% had increased uric acid levels (P<0.000 01). Smokers and ex-smokers (60%) went on to develop dyslipidaemia with increased QRISK scores and became diabetic within an average of 2.5 years (P<0.02). **Conclusions:** Non-diabetic hyperglycaemia has been recognised on the disease register as part of the Primary Care Quality and Outcome Framework for long-term conditions management. Our data analysis showed an association between B12 deficiency, smoking, dyslipidaemia, statins and progression of IFG to diabetes. B12 deficiency is associated with increased LDL levels and insulin resistance and increased cardiovascular risk. The implication of high prevalence of B12 deficiency in a pre-diabetic state needs to be understood. Studies show a beneficial effect of B12 replacement on reduction of cardiovascular risk. However, the presence of B12 deficiency and hyperuricaemia in IFG is poorly understood. We advocate that screening for B12 should be implemented in the ongoing care of patients with non-diabetic hyperglycaemia. ■

P8

Metabolic risks of obesity progression to impaired fasting glycaemia and diabetes – a retrospective study in primary care

Submitting author: ***Patel A****, Medical Student, Tilbury*

Aims: Electronic medical records of patients on the obesity register were analysed to assess the risk of progression towards hypertension and impaired fasting glycaemia (IFG) and diabetes. **Methods:** A retrospective analysis of the electronic clinical system database obesity register of 371 patients was conducted to see the prevalence of IFG and diabetes in this register. **Results:** An increase in body mass index (BMI) exponentially increased risk of developing IFG and diabetes and hypertension. Intervention of healthy lifestyle and exercise leads to reduced BMI with concurrent reduced risk of diabetes. 371 participants with type 2 diabetes were auto-enrolled to the obesity register based on their BMIs. Patients who had IFG (77%) went to develop type 2 diabetes (r=0.884; P<0.000 01); these patients also developed high blood pressure (r=0.2823; P=0.000465). We found that hypertension often preceded the development of prediabetes and diabetes. **Conclusion:** A raised BMI and obesity increase the risk of developing hypertension that precedes the development of IFG, and increases this risk leading to diabetes. Early referral and aggressive intervention would enable mitigation of disease progression of IFG to diabetes. We also advocate a national screening programme starting early in life to screen patients at risk, such as those with a family history of diabetes and a high BMI. ■

P9

Metformin-related B12 deficiency in patients with diabetes

Submitting author: ***Khanom S****, Medical Student, Tilbury*

Aims: Department of Health guidelines (June 2022) recommend screening for B12 deficiency in patients

on metformin. The practice implemented a quality improvement (QI) programme to ensure patients are screened for B12 deficiency. **Method:** By employing QI methodology undertaking process mapping and two PDSA (plan, do, study, act) cycles, *n*=692 patients were issued blood test forms to check for B12 levels. Both clinicians and patients were educated about the potential of developing B12 deficiency from metformin. **Results:** Prior to instituting regular blood tests, patients were receiving blood tests in an *ad hoc* manner. QI methodology enabled implementation of a quarterly blood test schedule to improve the detection rates from 3% to 10% (67 patients of 692). We found a temporal relationship between initiation of prescribing and deficiency, which was of an average length of 24 months. We also found that the risk was higher with doses above 2 g and with the sustained release formulation. All patients had a follow-up intrinsic factor antibody screen to rule out pernicious anaemia but none screened positive, confirming this was an adverse drug-related effect due to metformin prescribing. Clinicians and patients were educated as to the side-effects and iatrogenic risk of developing metformin-related B12 deficiency. **Conclusion:** The process is now embedded in practice, and patients are advised of the need for regular blood tests. These resulted in the practice developing guidelines for regular blood tests and monitoring and screening for B12 deficiency. It also enabled us to educate clinicians and staff. ■

P10

Effectiveness of the National Diabetes Prevention Programme; an evaluation in primary care

Submitting author: ***Khanom S****, Medical Student, Tilbury*

Aims: The latest NDA report showed 251 000 people with newly diagnosed type 2 diabetes in England in 2020–21. Of these, 28% were on the register for non-diabetic hyperglycaemia (NDH) in the previous year, while 167 000 had no recorded diagnosis. Data to March 2021 also revealed 13% of the 1.3 m people on the NDH register in 2018 had progressed to diabetes and 8% had died. The evidence base exists for lifestyle intervention to prevent progression of impaired fasting glycaemia (IFG). This was a mixed methods study to evaluate the effectiveness and acceptability of the National Diabetes Prevention Programme in a rural population in Essex. **Methods:** A mixed methods study was undertaken to evaluate the NDPP. Patients who were referred were asked about their views of effectiveness of the programme and if their participation did affect their diet and lifestyle behaviours. **Results:** We found that of the population of 671 with the NDPP, 208 patients were offered referral, 81 patients completed the programme and 50 patients found the programme was good. Of these, 14 were happy to be to re-referred, but 18 did not wish to be re-referred; 40 patients declined for various reasons; 36 found the programme not useful; and 4 were not contactable. **Conclusion:** It was important to understand why the uptake rates of the NDPP patients were were low and why some were not taking this condition seriously. Following this study, patients were provided with more education about the risk of progression to diabetes and the opportunity of reversal of their condition. ■

P11

Using lifestyle as medicine: a pilot in West Wales

Submitting author: ***Frater N****, Ammanford*

Background: If current trends continue, 1 in 10 of the population of the UK will have type 2 diabetes by 2034; this is more than the population of Wales. Research shows that lifestyle change provides the biggest impact on glycaemic control, as well as preventing microvascular and macrovascular complications. **Aims:** We set out to demonstrate the impact of a holistic programme based on the principles of lifestyle medicine, delivered by a GP and a DSN, and its effect on glycaemic control in patients with type 2 diabetes. **Methods:** 52 patients with type 2 diabetes in the Amman-Gwendraeth Valley were encouraged to self-refer to the clinic. Six weeks of education sessions were designed to improve eating habits, educate on impact of sleep and stress reduction, and improve social support, with an offer of an exercise prescription. Support was given for one year, with an emphasis on long-term change. **Results:** Six months after the programme had started, 56% of participants had an HbA_{1c} less than 48 mmol/mol. 40% either decreased or stopped their medication. 93% achieved a lowering of their HbA_{1c}. 98% retention rates were maintained during the intensive phase. **Conclusion:** Improvements in lifestyle bring about improvements in a vast array of physical and mental health problems, and not just diabetes. The cost savings and time savings for the NHS are significant. Many current education programmes deliver over six weeks without ongoing support. Patients need both professional and peer support to make meaningful change; once they receive this, everything is possible. ■

P12

A service evaluation on the information booklets given to pregnant patients with type 1, 2 or gestational diabetes

Submitting author: ***Tank N****, Medical Student*

Background: Information booklets for pregnant patients with gestational and type 1/2 diabetes were handed out at an antenatal clinic. **Aim:** The booklets were given as a pilot to ensure material contains appropriate detail and to assess patients' feelings for future distribution. **Method:** 19 patients were asked to complete a primary survey after talking through information booklets. Patients ranked 14 statements from "strongly agree" to "strongly disagree". A follow-up survey was conducted asking patients to choose the correct answer out of three options – 15 patients completed this. **Results:** 86.5% of responses were "strongly agree" or "agree" in the primary survey. 76.2% of the secondary survey answered correctly. All participants stated that the information booklets were helpful. Some patients would prefer to have a map of the clinic and faces of the healthcare team in the booklets. **Conclusion:** Overall, the response was positive, and constructive criticism can be acted on. ■

P13

Deep Dive Sessions delivered across PCNs in Dorset show definite improvement in achieving the 8 care processes

Submitting author: ***Smith O****, Dorset*

The Diabetes Deep Dive Sessions have been established by the Dorset CCG Diabetes Target Working Group to encourage collaboration at the PCN level in order to improve the achievement of the NICE recommended treatment targets and drive down variation between PCNs. The Deep Dive Sessions across 8 out of 18 Dorset PCNs that agreed to participate resulted in an increase in the proportion of people with diabetes completing all 8 care processes and showing definite improvements in the 8 care processes when compared to PCNs that have not participated. Data have also shown a reduction in variation of those achieving all three treatment targets. Impact data results on the 8 care processes: Before Deep Dives system-wide, 3–6/12 after Deep Dives. PCN 1: 34.5%, 35.1%, 39.9%; PCN 2: 34.4%, 35.1%, 35.2%; PCN 3: 28.8%, 35.1%, 38.4%; PCN 4: 28.0%, 35.1%, 32.1%; PCN 5: 36.8%, 35.1%, 38.6%; PCN 6: 41.5%, 35.1%, 41.2%; PCN 7: 25.6%, 35.1%, 30.2%; PCN 8: 43.1%, 35.1%, 46.2%. Examples of action plan agreed at the first Diabetes Deep Dive Session and progress at 3-month follow-up session: Develop the HCAs diabetes competencies at the PCN level; consider the role of Diabetes Co-Ordinator. Most of the Diabetes Deep Dive participants agreed on the information shared being useful, that it presented easy-to-understand data and on improvement in diabetes care in their practice. Example of feedback: "It was so good to discuss ideas and identify areas of improvement and realistic outcomes to progress with." The plan for the Diabetes Deep Dive Sessions is to continue to work across the 18 PCNs in Dorset. ■

P14

Accessible diabetes education for care homes

Submitting author: ***Stubbs M****, Community Diabetes Nurse Specialist*

Aims: To equip care home staff to provide effective diabetes care to residents living with diabetes. To provide accessible training, which staff could attend with minimal negative impact on colleagues or residents. To empower care home staff in diabetes care provision and reduce reliance on primary care health professionals. **Methods:** Met with CCG care quality manager to plan how to involve the majority of care homes. Optimum time for provision of education was early afternoon during the overlap of daytime shifts for staff. Appropriate technology utilised, so that maximum staff could participate. Education provided for 1-hour sessions. Care home staff invited by email to managers; Zoom link included with invitation. **Results:** Care home staff eager to be part of this "free" training. Good attendance online for initial sessions in 2020, varying from 8–10 participants to around 30 online. Variable levels of interaction. Early feedback suggested a programme of four different sessions on key aspects of basic diabetes knowledge and management skills were needed. Staff felt they could better recognise hypoglycaemia and high blood glucose and know how to treat appropriately and effectively. Know when to call 999. **Conclusion:** Far greater attendance when education provided online than face to face. Ability to reach far greater number of care homes and staff by offering online education. Education needs to be provided on a "rolling programme" of four series of key subjects. Level of engagement from individual participants varies during online education sessions. ■

P15

The interface between type 2 diabetes and established dyadic relationships

Submitting author: ***Turner A****, GP and PhD Research Student*

Background: Type 2 diabetes is an increasing global concern, with poor health outcomes if management is ineffective. Living with type 2 diabetes is associated with anxiety, depression or diabetes distress from the burden of day-to-day self-management. This is also true for close family members acting as informal (unpaid) carers, although the knowledge base around their lived experience is under-developed. **Aim:** The aim of the research was to explore carers' lived experience and to develop a rich understanding of their psychosocial needs. **Methods:** Working within a constructionist paradigm, qualitative research was undertaken using semi-structured interviews and analysed using interpretative phenomenological analysis. **Results:** The interface between type 2 diabetes and established dyadic relationships revealed three themes. Parent–child dynamics (between the carer and person with type 2 diabetes) were found with female carers and men undertaking substantial caring duties. Controlling behaviours around lifestyle change were associated with carers who adopted the role of parent, and *laissez-faire* behaviours found when carers adopted the role of child. **Conclusions:** Dyadic conflict was evident when there was disunity over acceptance or avoidance of the diagnosis. The interplay between these three themes gave rise to either harmonious or conflicted relationships that influenced the degree of lifestyle change, especially dietary change. These findings may have implications for future health outcomes for both people living with type 2 diabetes and their carers. They also pose questions about how dyads can effectively implement lifestyle change and how they can be supported to do so. ■

P16

Sustainability of HbA_{1c} control of tirzepatide vs. insulin glargine in people with type 2 diabetes and increased cardiovascular risk (SURPASS-4)

Submitting author: ***Patel N****, Eli Lilly and Company*

Background: Tirzepatide (TZP) is a novel GIP/GLP-1 receptor agonist approved in the US for glucose-lowering in type 2 diabetes (T2D). The open-label SURPASS-4 trial examined TZP vs. insulin glargine (iGlar) in adults with T2D inadequately controlled on oral medications. **Methods:** Participants (n=1989) with baseline HbA_{1c} 58–91 mmol/mol (7.5–10.5%) and BMI ≥25 kg/m^2 were randomised 1:1:1:3 to once-weekly TZP (5, 10, 15 mg) or iGlar (100 U/mL) titrated to <5.6 mmol/L (100 mg/dL) fasting glucose. This *post hoc* analysis evaluated the sustainability of glycaemic control after the 52-week (wk) primary endpoint (last on-treatment visit post-52 wks, up to 1 wk), (median=85 wks). **Results:** After achieving the 52-wk HbA_{1c} targets of <53 mmol/mol (7%), ≤48 mmol/mol (6.5%), or <39 mmol/mol (5.7%), a participant was considered to have sustained long-term HbA_{1c} control if the final, post-52 wk, on-treatment HbA_{1c} measurement increased ≤2.0 mmol/mol from the 52-wk HbA_{1c} target. More participants in all 3 TZP dose groups maintained each of the 3 HbA_{1c} targets beyond 52 wks vs. iGlar (all TZP, P<0.05). Even for the lowest TZP dose (5 mg), 67% of participants achieved an HbA_{1c} ≤6.5% at 52 wks, with 75% of these having ≤2 mmol/mol increase at their last visit. In contrast, for iGlar, 33% achieved an HbA_{1c} ≤6.5%, with 66% of these having ≤0.2% increase. **Conclusion:** TZP treatment results in improved long-term HbA_{1c} control for a significantly greater percentage of adults with T2D compared to iGlar. ■

P17

Low-calorie diets the novel treatment for type 2 diabetes: how have these been working in the real world?

Submitting author: ***Morais M****, Xyla Health & Wellbeing*

Aims: Introduction to low-calorie diets. Our programme covers the design of our 12-week programme and the areas it is active in. **Results:** We have had 1273 referrals, and had 185 completers at time of writing. Average weight loss has been 10.2% at 12 months. Average HbA_{1c} and blood glucose at the start of the programme was 60 mmol/mol and 9.5 mmol/L, and at the end 41 mmol/mol and 6.9 mmol/L, respectively. Satisfaction was 91% and retention to complete was 74%. ■

P18

Glycaemic effect of tirzepatide by duration of diabetes

Submitting author: ***Iwobi J****, Eli Lilly and Company*

Background and aim: Results of SURPASS-1 through -5 phase 3 clinical trials have demonstrated significant glucose-lowering efficacy of the novel GIP/GLP-1 receptor agonist tirzepatide (TZP) in adults with type 2 diabetes (T2D). To understand whether the glucose-lowering effect of TZP depends on the duration of diabetes, we conducted a subgroup analysis within each of the five trials. **Materials and methods:** The primary endpoint of the five SURPASS trials was mean change from baseline in HbA_{1c} for 5, 10 and 15 mg at 40 or 52 weeks against various comparators (placebo, semaglutide 1 mg, titrated insulin degludec and titrated insulin glargine) in adults with T2D. This subgroup analysis of the five trials assessed whether mean change of HbA_{1c} from baseline in the overall population were consistent when assessed by baseline duration of diabetes category (≤5 years, 5 to 10 years, >10 years) in patients while they were on-treatment and without rescue medication (efficacy estimand). **Results:** For all five trials, analysis of change from baseline in HbA_{1c} at 40 or 52 weeks for all three duration of diabetes subgroups were consistent with primary study results, with the treatment differences favouring all three doses of TZP compared with placebo or active comparator. The most frequent adverse events were generally mild-to-moderate in severity, gastrointestinal-related and mainly occurred during the dose-escalation period. **Conclusion:** These results suggest that TZP treatment provided effective HbA_{1c} reduction assessed by mean change from baseline regardless of baseline duration of diabetes consistent with the overall SURPASS 1–5 patient population. ■

P19

Higher weight loss is associated with improved quality of life in patients with type 2 diabetes: SURPASS program

Submitting author: ***Webb J****, Eli Lilly and Company*

Background and aims: In addition to glycaemic control, the ADA recommends weight management for patients with type 2 diabetes (T2D) with overweight or obesity. This analysis explored the association between weight loss and patients' quality of life using pooled data from the SURPASS clinical trials, regardless of treatment and dosing. **Materials and methods:** SURPASS 1 to 5 participants achieving ≥5%, ≥10% or ≥15% weight loss were assessed for patient-reported outcomes (PRO) at baseline and endpoint. Weight-related PROs investigated were Ability to Perform Physical Activities of Daily Living (APPADL), Impact of Weight on Quality of Life-Lite Clinical Trials (IWQOL-Lite-CT), Impact of Weight on Self-Perceptions (IW-SP), and other measures were the EQ-5D-5L and Diabetes Treatment Satisfaction Questionnaire change (DTSQc). Higher PRO scores indicate better outcomes. **Results:** At endpoint, improvements were observed from baseline in all assessed PRO measures across weight loss categories. In the analysis of the patient groups with higher weight loss percentages, greater improvements in APPADL, IWQOL-Lite-CT, IW-SP and EQ VAS scores were observed. EQ-5D-5L index score changes and the DTSQc scores also increased but to a lesser extent. **Conclusions:** Weight loss was associated with improved quality of life with greater improvement seen in higher percentages of weight loss in patients with T2D, regardless of therapy. ■

P20

Achievement of HbA_{1c} <6.5% with ≥5% weight loss and without hypoglycaemia in people with type 2 diabetes treatment with tirzepatide: a post hoc analysis of the SURPASS-1 to -5 studies

Submitting author: ***Shipton J****, Eli Lilly and Company*

Background: The SURPASS-1 to -5 trials showed that 66%–95% of participants receiving tirzepatide (TZP) achieved HbA_{1c} ≤48 mmol/mol and 54%–88% achieved ≥5% weight loss at the end of trials. TZP was not associated with an increase in hypoglycaemia vs comparators. **Objective and methods:** We evaluated participants achieving a triple composite of HbA_{1c} with ≥5% weight loss and without severe hypoglycaemia (blood glucose <54 mg/dL or severe) with TZP (5, 10, 15 mg) and respective comparators or placebo while on treatment without rescue medication. End-of-treatment HbA_{1c} and weight were evaluated at week 40 for SURPASS-1, -2, -5 and week-52 for SURPASS-3, -4. **Results:** Significantly more participants receiving TZP (any dose) achieved the triple endpoint vs placebo/active comparators. TZP monotherapy (5, 10, 15 mg) led to 55%, 64%, 67% of participants achieving the triple endpoint vs 2% with placebo (SURPASS-1). As add-on to metformin, TZP (5, 10, 15 mg) led to 56%, 71%, 77% achieving a triple composite vs 44% with semaglutide 1 mg (SURPASS-2). Compared to basal insulin, TZP (5, 10, 15 mg) led to 51%, 70%, 77% achieving the triple endpoint vs 4% with degludec (SURPASS-3; add-on to metformin). Added to 1–3 oral antihyperglycaemics, TZP (5, 10, 15 mg) led to 44%, 61%, 69% achieving the triple endpoint vs 3% with glargine U100 (SURPASS-4). As add-on to basal insulin, TZP (5, 10, 15 mg) led to 39%, 55%, 71% achieving the triple endpoint, vs 3% with placebo (SURPASS-5). **Conclusion:** Significantly more participants receiving TZP achieved HbA_{1c} 50% of patients achieved this triple endpoint with TZP at 10 and 15 mg doses. ■

P21

Glycaemic control with tirzepatide in people with type 2 diabetes by baseline HbA_{1c} ≤69.4 mmol/mol or >69.4 mmol/mol

Submitting author: ***Gulati K****, Eli Lilly and Company*

Background: Tirzepatide, a once-weekly GIP/GLP-1 receptor agonist recently approved in the United States for the treatment of type 2 diabetes in adults, has demonstrated superior glycaemic control over all trial comparators in the Phase 3 SURPASS clinical trials. **Aims:** This *post-hoc* analysis assessed glycaemic control with tirzepatide in participants stratified by baseline (BL) HbA_{1c} (≤69.4 mmol/mol [8.5%], >69.4 mmol/mol [8.5%]). **Methods:** Mean change from BL in HbA_{1c} was assessed in tirzepatide-treated participants (5, 10, or 15 mg) from SURPASS-1 (monotherapy), SURPASS-2 [add-on to metformin (MET)], SURPASS-3 (add on to MET±SGLT2i), SURPASS-4 (add-on to MET, SGLT2i, or sulfonylurea) and SURPASS-5 (add-on to insulin glargine±MET) at trial endpoints (40 or 52 weeks). Safety was also assessed. Treatment comparisons were estimated using data while participants were on treatment and without rescue medications (efficacy estimand). **Results:** Across each SURPASS trial, ranges in mean BL HbA_{1c} were 63.3–69.6 mmol/mol (7.94–8.52%), mean BMI were 31.9–34.2 kg/m^2 and mean diabetes duration were 4.7–13.3 years. At trial endpoints, HbA_{1c} reductions from BL ranged from 16.9–23.4 mmol/mol (1.55–2.14%) in the BL HbA_{1c} ≤69.4 mmol/mol (≤8.5%) subgroup and 29.5–37.8 mmol/mol (2.70–3.46%) in the BL HbA_{1c} >69.4 mmol/mol (>8.5%) subgroup. Gastrointestinal side effects were consistent with those reported in the incretin class and hypoglycaemic events (blood glucose <3.00 mmol/L [<54 mg/dL] or severe) were low. **Conclusion:** Significant and clinically meaningful HbA_{1c} reductions were observed with tirzepatide, irrespective of BL HbA_{1c}. ■

P22

Tirzepatide induces weight loss in participants with type 2 diabetes regardless of baseline BMI: a *post hoc* analysis of SURPASS-1 through -5 studies

Submitting author: ***Ebere I****, Eli Lilly and Company*

Background: Tirzepatide (TZP) is a novel once-weekly GIP and GLP-1 receptor agonist evaluated in patients with type 2 diabetes (T2D) in the SURPASS-1 through -5 phase 3 studies. TZP (5, 10, 15 mg) monotherapy or in combination with oral antihyperglycaemic medications or insulin glargine were compared to placebo, semaglutide 1 mg, insulin degludec and insulin glargine with primary endpoint at 40 weeks or 52 weeks. These five studies demonstrated safety and efficacy of TZP in improvement of glycaemic control and body weight. **Aims:** To understand whether the weight-lowering effects of TZP are dependent on baseline body mass index (BMI), we conducted subgroup analyses of SURPASS-1 through -5. **Methods:** Body weight change in the BMI subgroups (Subgroup 1 [<27 or ≥27 kg/m^2] and Subgroup 2 [<30; ≥30 to <35; ≥35 kg/m^2]) at primary endpoint was assessed in patients while on treatment without rescue medication (efficacy estimand) in the modified intention-to-treat population, defined as all randomised patients who received at least one dose of study drug. **Results:** All TZP doses (5, 10, 15 mg) lowered body weight in patients with T2D irrespective of baseline BMI in both subgroups. The weight reductions were generally dose-dependent and absolute weight change was generally greater in higher BMI categories. The most frequent adverse events were gastrointestinal-related events that were generally mild to moderate in severity and occurred mostly during the dose-escalation period. **Conclusions:** TZP-treated patients with T2D experienced weight loss across a spectrum of mean baseline BMI values in SURPASS-1 through -5 studies. ■

P23

Relationship between body weight change and glycaemic control with tirzepatide treatment in people with type 2 diabetes

Submitting author: ***Lynch A****, Eli Lilly and Company*

Background: Tirzepatide (TZP) is a novel, once-weekly GIP/GLP-1 receptor agonist used for the treatment of type 2 diabetes (T2D). In the SURPASS clinical trial program, TZP demonstrated significant HbA_{1c} and body weight reductions vs placebo, semaglutide, insulin degludec and insulin glargine. **Aims:** This *post-hoc* analysis assessed the relationship between HbA_{1c} and body weight reductions with TZP treatment (5, 10 or 15 mg). **Methods:** HbA_{1c} and body weight data at 40 weeks (SURPASS-1, -2 and -5) and 52 weeks (SURPASS-3 and -4) were analysed by trial, due to differences in design, background therapy and baseline characteristics of participants. **Results:** Across the trials, HbA_{1c} reductions from baseline were observed in 96–99%, 98–99% and 94–99% of participants treated with TZP 5, 10 and 15 mg, respectively. Moreover, 87–94%, 88–95% and 88–97%, respectively, also experienced weight loss. Significant correlations between HbA_{1c} and body weight changes were observed with TZP in SURPASS-2, -3, -4 (all doses) and -5 (TZP 5 mg only) (statistically significant correlation coefficients ranged from 0.1438 to 0.3130 across studies; $P \leq 0.038$, for all doses). **Conclusion:** Consistent reductions in HbA_{1c} and body weight, even when used with medications associated with weight gain, were observed in the vast majority of participants treated with TZP at doses of 5, 10 or 15 mg. This study was previously presented at ADA 2022. ■

P24

Changes in abdominal fat and clinical/analytical parameters in tirzepatide- or insulin degludec-treated patients with type 2 diabetes (SURPASS-3 MRI)

Submitting author: ***Ahmed E****, Eli Lilly and Company*

Background and aims: Tirzepatide (TZP), a GIP/GLP-1 receptor agonist, significantly reduced liver fat content and volumes of visceral and abdominal subcutaneous adipose tissue (VAT and ASAT) vs insulin degludec (IDeg) in patients with type 2 diabetes (T2D) in SURPASS-3. Changes in several biomarkers associated with adipose tissue metabolism and clinical parameters and correlations with changes in abdominal fat were assessed herein. **Materials and methods:** Insulin-naïve patients with T2D inadequately controlled on metformin with/without SGLT2 inhibitor and fatty liver index ≥60 at baseline had an MRI scan performed prior to randomisation (1:1:1:1) to once-weekly TZP (5, 10, 15 mg) or once-daily IDeg. VAT and ASAT volumes were assessed via MRI. TZP was compared to IDeg at Week-52 for VAT and ASAT, weight, HbA_{1c}, lipids and biomarkers of adipose tissue dysfunction. **Results:** All TZP doses reduced VAT and ASAT from baseline at Week-52, and weight, while IDeg increased these. All TZP doses significantly ($P<0.001$) reduced HbA_{1c}, increased adiponectin and decreased leptin levels vs IDeg. There were significant correlations ($P<0.05$) between changes in VAT or ASAT, respectively, and changes in weight ($\rho=0.76/0.85$), HbA_{1c} ($\rho=0.29/0.31$), HDL cholesterol ($\rho=-0.21/-0.25$) and adiponectin ($\rho=-0.38/-0.28$) with TZP. Changes in ASAT were also significantly correlated ($P<0.05$) with changes in leptin ($\rho=0.40$), insulin ($\rho=0.30$) and HOMA-IR ($\rho=0.22$) with TZP. Changes in VAT were also significantly correlated ($P<0.05$) with changes in triglycerides ($\rho=0.18$) with TZP. **Conclusion:** TZP demonstrated significant reductions in VAT and ASAT vs IDeg, correlating with improvements in several biomarkers of adipose tissue dysfunction, weight and HbA_{1c}. ■

P25

Can smartphone-based home urinalysis improve annual albuminuria screening rates in diabetic patients: a retrospective analysis of the National Diabetes Audit

Submitting author: ***Noor S****, Healthy.io*

Background: Failure to test diabetic patients for annual urine albuminuria risks accelerated progression to chronic kidney disease (CKD), development of end-stage renal failure and excess cardiovascular events. However, adherence to annual testing is suboptimal, likely influenced by a combination of complex factors. **Aims:** Healthy.io, a medical technology company, developed Minuteful Kidney (MK), an *in-vitro* diagnostic, smartphone-enabled, home-based, CE-marked class IIa and FDA-approved ACR testing solution. This is a case study analysing the potential of the MK ACR test to improve adherence. **Methods:** We retrospectively analysed the National Diabetes Audit for uptake of the albumin-to-creatinine ratio (ACR) test in the primary care setting across the Kent and Medway region in the United Kingdom between 2017 and 2021. GP centres offering standard-of-care alongside Healthy.io's Minuteful Kidney (MK) home ACR test were compared to GP centres offering standard-of-care only. **Results:** In the first year of MK deployment, we found a significant improvement in ACR testing rates in GP centres offering the MK home ACR test ($P<0.0001$), with patients with type 1 diabetes reaching the lowest level of untested patients recorded to date ($P=0.0001$). **Conclusions:** Healthy.io's MK home ACR test reflects an essential CKD screening component during a pandemic. Screening engagement strategies in primary care should aim to provide both home-based and in-clinic tests to address differential patient needs. ■

P26

Pilot health outcomes of an online self-management programme for people with type 2 diabetes following a Low ENergy Approach (LENA) in primary care

Submitting author: ***Arsenyadis F****, Leicester General Hospital*

Background: Low-energy diets (LED) of 800–900 kcal/day can help people lose weight and achieve type 2 diabetes (T2D) remission. We piloted a 3-phase (12 weeks of LED, 6 weeks of food re-introduction and 8-month maintenance), interactive, online self-management programme to support. Medicines management and health monitoring were provided by existing primary care teams. Meal replacement products were provided by LighterLife. **Method:** Participants were recruited via brief interventions in primary care. Weight (kg), HbA_{1c} (mmol/mol) and systolic blood pressure (mmHg) were collected at baseline, month 4, month 6 and 12 months. **Results:** Fifteen (*x* male) participants aged 35–74 years (mean weight=106.7 kg [SD, 23.1], mean BMI=40 kg/m^2 [SD, 6.8]) were enrolled on to LENA. Thirteen completed the programme. Showed sustained significant differences at month 4 (–21.1 kg [95% CI, –15.4 to –26.8; $P<0.001$]), month 6 (–18.9 kg [95% CI, –12 to –25.7; $P<0.001$]) and 12 months (–16.5 kg [95% CI, –8.3 to –24.6; $P<0.001$]). HbA_{1c} reduction remained statistically significant at 12 months (–13.71 mmol/mol [95% CI, –0.69 to –26.74]). Three (23.1%) achieved T2D remission at month 6 and one (7.6%) sustained remission at 12 months. **Conclusion:** It is feasible to embed LENA in primary care and safely support significant sustained weight loss and T2D remission at 12 months. ■

P27

Providing accessible diabetes care for people experiencing homelessness or suffering from drug or alcohol addiction and living with diabetes

Submitting author: ***Palmer J****, Diabetes Nurse Specialist*

Background: Diabetes is common in socially excluded groups. However, people experiencing homelessness or suffering addictions find traditional healthcare models difficult to access. Excluded populations struggle to manage their diabetes due to poor diets, difficulty monitoring glucose, accessing and storing medications. **Aims:** To identify people diagnosed with diabetes and suffering exclusion. To offer personalised provision through accessible appointments and assertive outreach. To provide education to healthcare staff and homelessness/addiction workers. **Methods:** A collaboration was formed between a Diabetes Specialist Nurse and a GP practice caring for homeless individuals. 26 individuals have diabetes and suffer exclusion: 25 (96%) are homeless or transitioning into housing; 1 (4%) is housed but suffers from addictions; 19 (73%) suffer drug or alcohol addiction; 6 (23%) have cognitive impairment. The team designed and provided

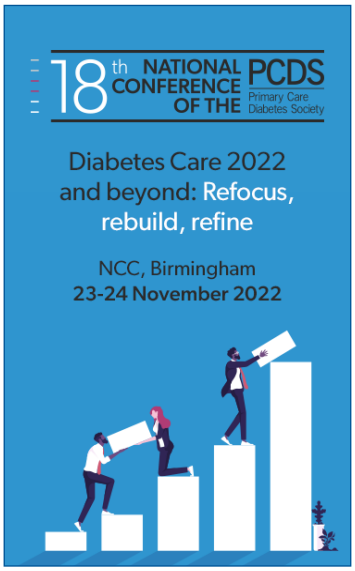
joint care using specialist diabetes, homelessness and addictions knowledge. **Results:** Improved uptake of annual reviews and self-care by establishing fortnightly clinics and assertive outreach. Flash glucose monitoring offered where indicated. Improved screening uptake by co-locating homeless and screening services. Improved diabetes knowledge within the homeless team through joint working. Improved diabetes knowledge for homelessness/drug workers through bespoke education programmes. Establishing holistic management by attending integrated care MDTs and establishing collaboration between diabetes services, GP practice and allied health professionals. **Conclusion:** Reaching out beyond traditional clinic environments has a positive impact on engagement for excluded groups. Working within a wider team allows personalised, holistic approaches to improve acceptability of management, increasing likelihood of engagement. ■

P28

Aneurin Bevan University Health Board – Primary Care Division commissioned Primary Care Diabetes Specialist Nurses (PCDSN) to provide National Enhanced Service (NES) reviews for diabetes patients prescribed injectable therapies

Submitting author: ***Rees F****, Aneurin Bevan University Health Board*

Aim: The specification of this service is designed to cover enhanced aspects of clinical care of the patient, that go beyond the scope of essential services. **Methods:** Supporting development and maintenance of high-quality care for people with diabetes in primary care. Increasing the proportion of people with diabetes being cared for outside of hospital and enabling the referral and discharge of patients from secondary care in accordance with appropriate clinical guidance. Supporting all patients being cared for in primary care to receive a holistic annual review. Using prudent healthcare principles, to provide the necessary supportive monitoring reviews according to clinical guidance. Ensuring that all newly diagnosed patients with diabetes receive an enhanced review promoting awareness of the condition, self-care, on-going education and monitoring. Providing data to clusters, Local Health Boards and Welsh Government to inform the design and development of services for patients with type 2 diabetes. **Results:** Of 73 general practices within Health Board: 61 service is operational; 7 are considering the logistics; 5 have opted out (reason currently delivering service in-house). Patients report seeing PCDSN for glycaemic review as a valuable opportunity to discuss issues and concerns in person particularly post pandemic. **Conclusions:** An innovative initiative to provide an equitable service across GP practices of a comprehensive glycaemic review of patients with type 2 diabetes using injectable therapies. ■



Notes