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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

Exploring the influences affecting the prescribing decisions of non-medical prescribers in patients with type 2 diabetes mellitus

Submitting author: ***Viney T****, University of Plymouth, Plymouth, UK*

Background: Type 2 diabetes (T2D) is becoming more prevalent both worldwide and in the UK, with an array of licensed treatments for its management. Historically, complex T2D was managed in secondary care. Now, these patients are also being managed in primary care by nursing non-medical prescribers (NMPs) who make decisions regarding T2D medications. **Aim:** The aim of this study was to explore influences behind primary care nurses' prescribing decisions for patients requiring "first intensification" of their diabetes treatment. **Methods:** Narrative inquiry was used to investigate the views of five NMPs recruited using a purposive sampling method. A qualitative approach using semi-structured interviews enabled exploration of the influences underpinning prescribing decisions of the NMPs. Thematic analysis was used to analyse the data. **Results:** Findings from the interviews were that clinical influences (CIs), such as signs and symptoms, and non-clinical influences (NCIs), such as practitioner knowledge and experience, were equally key to decision-making. This was in line with the literature. However, NMPs with extensive clinical expertise in diabetes attached greater value to NCI. **Conclusion:** Identification that NMPs' prescribing decision-making is influenced by their clinical experience may raise debate around the need for timely access to experienced clinicians, as well as the need for clinical experience before commencing non-medical prescribing programmes. Further research needs to be conducted to ascertain if these nurses' views are representative of other NMPs in this area or in other service designs. ■

P2

Improving education of diabetes specialists using social media

Submitting authors: ***Epps A****, Medway NHS Foundation Trust, Gillingham, UK*

Background: After discussion with fellow diabetes specialist nurses (DSNs), it became apparent that communication between diabetes specialists in the UK was limited mainly to email. **Aims:** To use social media to improve communication, share best practice and provide peer support between diabetes specialists across the UK to enhance learning. **Methods:** A closed Facebook group was launched for diabetes specialists. A survey was distributed via SurveyMonkey® to understand the forum use. **Results:** 40% of respondents to the survey stated they use the forum daily, 40% use it between 3 and 4 times a week; 45% of respondents have connected with new healthcare professionals; 31% of respondents mainly use the forum for sharing guidelines, 23% for networking and peer support, 22% for updates to clinical practice and 16% for resources; 53% use the forum to read, and 33% to read and post questions. **Comments:** Great resource, reassuring, ability to connect countrywide, wider opinion, update easily, lovely way to network, quick responses, informative, supportive, inspiring, focus point, support, advice, brilliant innovation. **Limitations:** False information during application may lead to pharmaceutical representatives or patients/carers joining the group. Confidentiality risk associated with social media. **Conclusions:** The forum has improved communication, sharing of best practice and provides peer support between diabetes specialists across the UK. The forum has become a place where diabetes specialist can share safety alerts, ideas for service improvement, events, scenarios/medication reviews, updates from conferences and job vacancies. It allows national collaboration, such as the *Mind over Matter Conference* where the forum had the idea and planned the agenda using the Facebook group to communicate. ■

P3

Clinical pharmacists supporting inpatient diabetes patients

Submitting author: ***Birbeck E****, Colchester General Hospital, Colchester, UK*

Background: 19% of patients admitted to Colchester General Hospital have diabetes. The advances in therapies and best practice mean that it can be difficult for ward staff to manage, leading to clinical risks, such as maladministration of insulin, clinical inertia and episodes of hypoglycaemia. With limited time and resources, inpatient diabetes specialist nurses (DSNs) are often unable to address all of the issues. Clinical pharmacists were expertly placed to improve medication safety through performing a medication review, highlighting and identifying any clinical risks, and optimising patient therapy. **Aims:** Reducing avoidable medication errors related to diabetes through quicker identification and rectification of such errors by the clinical pharmacy team. Each designated pharmacist would need to pass The Certificate in the Advanced Management of Diabetes course that involved 6 days of structured education at the University of Essex, run by the North East Essex Diabetes Service (NEEDS). **Methods:** Focused on upskilling inpatient clinical pharmacists through completion of the advanced diabetes management course, followed by a new, collaborative-working initiative involving regular clinical supervision and support from the NEEDS inpatient DSNs, these pharmacists were assigned the role of Diabetes Champion. **Results and conclusions:** There were challenges: deciding which pharmacists to upskill, how to ensure a pharmacy service was run in their absence, and funding the cost of the course. Each pharmacist was assigned a specialist nurse "buddy" for clinical support and advice. An audit is run regularly to measure the levels of insulin errors and, since implementation, the results have shown a marked decline. ■

P4

Audit: B12 deficiency among type 2 diabetes on metformin therapy

Submitting author: ***Pathak U****, Meir Park and Weston Coyney Medical Practice, Stoke on Trent, UK*

Background: In 2015, NICE advised vitamin B12 assessment for patients on metformin. The association between biochemical B12 deficiency and metformin therapy has been documented. The process of B12–intrinsic factor complex uptake by ileal cell surface receptors is calcium dependent and is affected by metformin. Metformin accumulates in red blood cells. Macrocytosis (RBC count >100 fL) is a hallmark of B12 and folate deficiency and hypothyroidism. **Aim:** The aetiologies of biochemical B12 deficiency associated with metformin therapy and pernicious anaemia are different. Therefore, will intramuscular administration of B12 every 6 months, instead of 3 months, be appropriate? **Material:** 20 patients with type 2 diabetes on metformin and B12 were identified from the disease register. The male:female ratio was 10:10; the youngest was 27 years, the oldest was 82 years; and the duration of type 2 diabetes was between 1 and 16 years. **Method:** HbA_{1c}, lipids, LFTs, eGFR, UEs, FBC, B12, folate and TSH were checked every year. B12 serum level under 200 pg/mL (normal is 200–900 pg/mL) is a hallmark of deficiency. Those deficient in B12 received five intramuscular doses of B12 1000 µg over 5 days and subsequently every 3 months. To help the hypothesis, variation in size of RBC is used as a tool. **B12 pharmacokinetics:** The half-life of B12 stored in liver is 400 days. **Results:** MCV varied (range 89–97 fL) between initiation of metformin therapy and confirmation of B12 deficiency by 1–2.5 fL. B12 deficiency ranged from 167–192 pg/mL. Annual B12 levels were from 362–2000 pg/mL (normal 200–900 pg/mL). **Conclusion:** Biochemical B12 deficiency with metformin therapy may not need B12 every 3 months; B12 could be administered 6-monthly. B12 levels will be monitored annually. ■

P5

What is the effect of occupational therapy on diabetes self-management?

Submitting author: ***Clarke L****, Healthy Prestatyn Iach Primary Care Practice, Prestatyn, UK*

Background: The incidence of diabetes is growing, affecting 7.3% of the population in Wales, yet only 10% of diabetics attend structured diabetes education. The Welsh government plans to invest in services "upstream", supporting self-management and harnessing multidisciplinary teams in primary care. Occupational therapists have researched their potential role in supporting self-management in the USA and the evidence gathered is promising. Occupational therapists provide holistic, person-centred interventions to improve health and well-being by enabling participation in valued activities and occupations, providing practical support to improve independence and satisfaction with living daily life. **Objective:** The purpose of this study was to evaluate the effect of brief occupational therapy intervention on the diabetes self-management and occupational participation of people with type 2 diabetes within a Welsh primary care service. **Methods:** A concurrent mixed methods study was conducted with four participants, and pre and post testing was conducted using three standardised measures of self-efficacy, diabetes self-management, and occupational performance and satisfaction of participant identified goals. A post intervention semi-structured interview was conducted to triangulate results. **Results:** Improvements were seen in all three measures for all participants following occupational therapy intervention. Analysis of interviews revealed themes about: making change; managing myself; lifestyle choices; significance of supports; growing confidence; and the impact of occupational therapy. This provided insights into the processes that supported the improvements demonstrated. **Conclusion:** Occupational therapist are effective at providing diabetes self-management support and can enhance diabetes services within primary care, facilitating improved engagement with the care team, increased participation in valued occupations and hope for the future. ■

P6

Cardiovascular outcomes with dulaglutide in type 2 diabetes: the REWIND trial

Submitting author: ***Rachman J****, Eli Lilly and Company, Basingstoke, UK*

Objectives: The Researching Cardiovascular Events with a Weekly Incretin in Diabetes (REWIND) trial investigated the effects of the glucagon-like peptide-1 (GLP-1) receptor agonist dulaglutide on cardiovascular (CV) outcomes in adults with type 2 diabetes (T2D) with and without previous CV disease. **Methods:** REWIND was a global, double-blind, randomised, placebo-controlled trial (ClinicalTrials.gov NCT01394952). Participants aged 50 years with T2D, HbA_{1c} 9.5% (80 mmol/mol), and CV risk factors or previous CV disease were randomised to a weekly injection of dulaglutide 1.5 mg or placebo. The primary outcome was the first occurrence of a composite CV endpoint: non-fatal myocardial infarction, non-fatal stroke, or death from CV or unknown causes. **Results:** 9901 participants (mean age, 66.2 years; women, 46.3%; median HbA_{1c}, 7.2% [55 mmol/mol]; previous CV disease, 31.5%) were randomised to dulaglutide (n=4949) or placebo (n=4952). Median follow-up was 5.4 years. The primary outcome occurred in 594 (12.0%) dulaglutide-treated and 663 (13.4%) placebo-treated participants (incidence rates 2.4 vs 2.7 per 100 person-years [hazard ratio (HR), 0.88; 95% confidence interval (CI), 0.79–0.99; P=0.026]). Consistent effects were observed for all three components of the composite primary outcome ($P_{heterogeneity}$=0.89). The HR was similar in those with and without previous CV disease ($P_{interaction}$=0.97). Gastrointestinal adverse events were reported in 2347 (47.4%) dulaglutide-treated and 1687 (34.1%) placebo-treated participants (P<0.0001). **Conclusion:** Dulaglutide safely reduced CV events over 5 years in people aged ≥50 years with T2D, whose baseline characteristics were largely representative of the general T2D population, with similar benefits in those with and without previous CV disease. ■

P7

An ethnographic study exploring the knowledge of children and young people diagnosed with type 1 diabetes in Saudi Arabia

Submitting author: ***Aldossary L****, Swansea University, Swansea, UK*

Background: The number of Saudi children and young people (CYP) diagnosed with type 1 diabetes (T1D) has increased dramatically. Knowledge of patient regimens and strict adherence to health measures are an essential aspect of the comprehensive management of T1D. **Aims:** The study aimed to explore the extent to which children and adolescents with T1D and their parents understand the disease. Other than that, the study evaluated the health promotion strategies aimed at increasing knowledge of paediatric T1D that are utilised in Saudi Arabia. **Method:** An ethnography method was used to achieve the aim of the study. That involved semi-structured interviews (CYP, n=16; parents, n=16; and health team, n=7) from two different hospitals. The data were also produced from observation inside the physician, health educator and nutritionist clinics. **Results:** Thematic data analysis brings out three main themes. These themes are: knowledge and understanding of T1D and its management; the emotional and psychosocial effects of T1D on CYP and their families; and health promotion and education strategies in both hospitals. The study found that CYP had different responses to the same question about the meaning of T1D. It also identified the effect of culture on CYP management of their T1D and pinpointed barriers from the parents that affect health promotion for their children. **Conclusions:** Because there are limited qualitative studies to CYP knowledge about their T1D, this study addressed a significant contribution to the previous researches. The study highlighted the importance of CYP voices and views about their T1D. ■

P8

Healthcare assistants: mapping their involvement, competence and confidence in managing people living with diabetes. A service evaluation audit

Submitting author: ***Willcocks L****, Leicester Diabetes Centre, Leicester, UK*

Background: One challenge for primary care is the availability of practice nurses to effectively manage the complex needs of patients with long-term conditions, such as diabetes. Healthcare assistants (HCAs) are frequently being utilised to assist in the management of patients with diabetes to support a transient nurse and GP workforce. There is little knowledge on the duties and responsibilities undertaken by HCAs and the training they receive to provide effective diabetes care. **Methods:** All agreeable undertook a questionnaire assessing the level of involvement with the care of patients with diabetes, and a knowledge and confidence questionnaire. This audit hoped to enable understanding of where training is most required for HCAs in the future, which, in turn, will lead to better patient care for diabetes. **Results:** The audit found that the HCAs that took part in the audit were involved in many aspects of diabetes care. The analysis shows the extent to which HCAs are being utilised to care for people with diabetes. Most did not feel confident enough in their knowledge of diabetes and associated cardiovascular complications. Knowledge and confidence was low. There were few areas the HCAs felt able to undertake unsupervised: an above-target blood pressure and cholesterol. These are major cardiovascular risk factors that people with diabetes are at risk of developing. **Conclusion:** There is huge scope to translate these findings into the implementation of education at a national level. This audit has allowed us to refine our training offer, which, in turn, should enable HCAs to better care for people with diabetes. ■

P9

Back to basics with Injection Technique Matters – Best Practice in Diabetes Care initiative

Submitting author: ***Hicks D****, Diabetes, Medicus Health Partners, London, UK*

Background: Over the last 10 years the Injection Technique Matters (ITM) Board has supported healthcare professionals (HCPs) and people with diabetes who inject to achieve optimal injection technique. Injectable agents used to treat diabetes rely on correct injection technique for optimal effect. Failing to correctly rotate injection sites, using incorrect length needle and reusing needles can all increase the risk of lipohypertrophy, which leads to unpredictable absorption and glycaemic variation. **Aims:** The ITM mission is to increase awareness of the implications of poor injection technique and to develop easily accessible, free of charge, non-promotional practical resources that support best practice injection technique to ensure the best possible outcome and reduce the risk of complications associated with poor injection technique. **Method:** Between 2018 and 2019 a range of educational resources were launched by the ITM Board, including the *Best Practice Guideline to support Correct Injection Technique in Diabetes Care* (available at https://trend-uk.org/injection-technique-matters/) for HCPs and the *Best Practice ITM Toolkit*, a guide to help people with diabetes get the most out of their injectable therapy and avoid complications associated with poor injection technique. **Results:** With over 4500 copies of the resources distributed, 2529 page views on the TREND-UK website and over 30 000 clicks on the email banners of the sponsors, demand for the ITM resources is high. **Conclusion:** Poor injection technique has a major impact on the efficacy and safety of injectable diabetes medications and there is a pressing need for access to information and support to ensure best practice injection technique is achieved. ■

P10

Can lower extremity amputations be further prevented by regular foot health checks at community level?

Submitting author: ***Bhattacharyya M****, Newham GPCOOP, London, UK*

Foot lesions are amongst the commonest indication for hospitalisation amongst patients with diabetes who may risk of major amputations. We describe two cases of diabetic foot problems in different community settings. Both long-standing diabetes, were non-compliant with treatment and maintained poor glycaemic control. Both patients had regular foot health checks by medical practitioners. These patients with foot lesions included gangrene of foot and chronic indolent ulcers treated with oral antibiotics. Clinical examination noted the absence of peripheral pulses, trophic changes and no features of neuropathy such as loss of ankle jerk, reduced perception and sensory loss at the time of hospitalisation. A hand-held Doppler device was not used to calculate the ankle–brachial index and venous filling time. Radiographs of the feet were taken to see the joint degeneration, soft tissue infection and vessel calcification. Angiography was carried out. Fundoscopy was done in all cases to detect retinopathy. The patients were managed by the multidisciplinary team for lower-extremity amputations and by vascular surgeons for above-knee amputations. **Conclusion:** Macrovascular disease was the major cause of morbidity and mortality in our study cases despite the individuals having regular foot health checks. Microvascular complications were also present at the time of diagnosis. Diabetic neuropathy was not present, even after many years of hyperglycaemia. Annual foot checks in the community did not prevent non-traumatic amputation. The incidence of lower-extremity amputation in a diabetic patient can be predicted by assessing various risk factors, such as duration of diabetes, poor compliance, irregular foot wear habit/walking barefoot, absent pedal pulses, retinopathy, proteinuria and abnormal lipid profile. More sophisticated evaluation is necessary for high-risk factors. ■

P11

COMPLEMENT – Complete Mentoring and Diabetes Education for Clinical Pharmacists

Submitting author: ***Munday F****, Leicester Diabetes Centre, Leicester, UK*

Background: The initiative meets a need in primary care to rapidly upskill pharmacists to enable complete care for people living with diabetes. Surgeries are taking measures to counteract the decline in numbers of GPs and practice nurses, which is not expected to improve as more take retirement without replacements being readily available. Clinical pharmacists are valuable assets, alleviating the burden on remaining staff and providing appointments for patients to have face-to-face quality time with a healthcare professional. However, according to our training needs analysis (TNA) "Knowledge and Confidence" questionnaire (K&C), many did not feel ready to offer diabetes care without further training and mentorship. It was apparent that a new initiative for this valuable and growing group of professionals was required. Our initiative is aimed to meet the immediate educational needs of clinical pharmacists. Eden is part of Leicester Diabetes Centre and an NHS organisation. **Objective:** To increase the knowledge and confidence of the pharmacist in the area of holistic diabetes care, in order to improve patient outcomes. The programme included these elements: **1**) face-to-face education; **2**) mentorship programme; and **3**) Case study-based workshops. To demonstrate the effectiveness of this project, we obtained baseline readings (by first pharmacist to complete COMPLEMENT) and compared at 6 months. **Results:** Target component percentage change: average HbA_{1c} reduction, 18.2 %; average total cholesterol reduction, 12.9%; average systolic BP reduction, 5.9%; and average diastolic BP reduction, 7.1%. Feedback from pharmacists and people living with diabetes was fantastic. ■

P12

How effective is the At the 4-Front Academy in developing future nurse leaders?

Submitting author: ***Bannister M****, School of Nursing and Healthcare Leadership, Bradford, UK*

Background: The At the 4-Front Academy acts as a support network for "the next generation" of leaders in diabetes nursing. The At the 4-Front Academy comprises guided workshops on core skill development, along with demonstration and feedback sessions. Academy graduates can apply for At the 4-Front membership. **Aim:** To evaluate the effectiveness of the At the 4-Front Academy, a UK-based leadership training programme for future leaders in diabetes nursing that started in October 2014. **Methods:** We conducted an anonymised online survey in October 2018 among completers (graduates) of the At the 4-Front Academy. **Results:** There were 10 respondents to the survey out of 11 total completers. All respondents had authored at least one paper since graduating from the academy, with 20% having authored three or more. All but one of the respondents had also delivered at least one presentation at a meeting or conference since graduating, with 60% having delivered presentations at a regional level and 30% at a national level or international level (such meetings included the *Diabetes UK Professional Conference* and the *Annual Meeting of the European Association for the Study of Diabetes*). Finally, all respondents stated that the At the 4-Front Academy had facilitated their career development and progression. **Conclusions:** Although based on a relatively small sample, the results of the survey suggest that not only is the At the 4-Front Academy an effective means of facilitating career development and progression for future nurse leaders, but that graduates go on to make major contributions as diabetes nurse leaders. This includes authoring papers and delivering presentations at meetings and conferences. ■

P13

How effective is the *At the 4-Front* conference in educating nurse leaders?

Submitting author: ***Bannister M****, School of Nursing and Healthcare Leadership, Bradford, UK*

Background: The mission of *At the 4-Front* is to enhance the education and training of the country's leading diabetes nurses. **Aim:** To evaluate the effectiveness and clinical relevance of the *At the 4-Front* meeting, an annual UK-based educational conference for leaders in diabetes nursing. **Methods:** We conducted a retrospective analysis in October 2018 of anonymised delegate feedback surveys and attendance details that had been captured between 2010 (when At the 4-Front was established) and 2018. **Results:** Across the sample period, there had been attendees (n=172) from all regions in the UK. **Conclusions:** The data demonstrate that the *At the 4-Front* conference has been, and continues to be, of great clinical relevance and high educational value for leaders in diabetes nursing. ■

P14

A targeted approach to cardiovascular disease risk reduction in patients diagnosed with type 2 diabetes

Submitting author: ***O'Leary L****, Specialist Nurse Practitioner, Primary Care Resource Team*

Background: Patients diagnosed with type 2 diabetes are at an increased risk of developing cardiovascular disease. Consequently, this impacts on their health and is associated with premature death. **Aim:** To identify patients diagnosed with type 2 diabetes over 40 and not currently on statins. Improving care through patient-centred consultations, increasing awareness of individual risk, focusing on lifestyle advice and, if indicated, treatment with statins for the primary prevention of cardiovascular disease. **Method:** An initial audit identified patients diagnosed with type 2 diabetes over 40 and not currently taking statins. The QRISK2 assessment tool highlighted patients with a cardiovascular risk >10%. This provided baseline data to be measured against. Patients were offered a consultation to increase their awareness of individual risk, focusing on lifestyle advice, referral onto other support services and primary prevention with statin therapy. **Results:** Within the practice population, 30 (12.7%) patients diagnosed with type 2 diabetes met this criterion. Following the intervention, 16 (53%) patients commenced statins. Although 8 (27%) patients declined statins, they benefited from individualised risk awareness and support for behaviour change. Six (20%) patients did not respond. **Conclusion:** This project successfully improved care. Awareness of individual cardiovascular risk was increased. Patients who commenced statins, as evidence suggests, reduced their cardiovascular risk. Through education and support, patients modified behaviours as a way of reducing their risk. With patients who did not attend, alerts were set up on the IT system to opportunistically discuss. Staff education is ongoing, ensuring a patient-centred approach and these aspects are adopted in annual reviews. ■

P15

Effecting change from the coalface: The Manchester Cardio-Metabolic Pathway

Submitting author: ***Milne N****, Manchester University NHS Trust, Manchester, UK*

Background: Greater Manchester (GM) has the poorest outcomes in terms cardiovascular mortality in the UK. In the last year, over £10m extra has been spent on admissions for cardiovascular events in those with type 2 diabetes (T2D). This is unstainable. NICE guidelines do not reflect current cardiovascular outcomes trials (CVOTs) data. There is a lack of clear direction in terms of escalation of more suitable medications when a person has T2D and established CVD. This can result in confusion and clinical inertia amongst health care professionals (HCPs), thwarting optimal outcomes. **Aims:** To develop an easy-to-use, evidence-based T2D guideline for use across GM, specifically focusing on those with T2D and cardiovascular disease. **Methods:** Two healthcare professionals within a primary care setting devised a simplified pathway, based on CVOTs data. Sharing good practice, a need was established to promote and disseminate this across GM. It was important to have a consensus of expert opinion and thus a group of local experts were brought together and, through meetings, wider consultation phases and educational events, the pathway was formulated. **Results:** The pathway launched on 8th May 2019 and has been widely welcomed by HCPs. The Central Manchester CoDES (COmmunity Diabetes Education and Support) Team has been delivering education to increase confidence for those using the pathway and has actively identified 25% of persons in their cohort initiated onto the pathway. In a climate of limited economic resources and financial scrutiny, however, there has been a huge focus on ensuring the pathway makes a sound financial argument for usage of these therapies in the long term and economic modelling is ongoing. **Conclusion:** Change to deliver best practice can be evoked from the coalface with appropriate enthusiasm and resilience. ■

P16

DPP-4 inhibitor dose selection in UK general practice: deviations from manufacturer specifications

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

Background: Summary of product characteristics (SmPC) for all non-linagliptin dipeptidyl peptidase-4 inhibitors (DPP-4is) recommend dose adjustment in patients with type 2 diabetes (T2D) and moderate-to-severe renal impairment, assessed by creatinine clearance (CrCl) <50 mL/min, or glomerular filtration rate (GFR) <45 mL/min/1.73 m^2. Previous studies have indicated higher than recommended doses in approximately one third of patients prescribed non-linagliptin DPP-4is requiring dose adjustment, although it is unclear whether this is in part due to discordance between the SmPC-specified CrCl thresholds and use of GFR values in clinical practice. **Aims:** The aim of this cross-sectional study was to examine dose selection, guided by CrCl or GFR thresholds specified in the relevant SmPC, in a cohort of patients with T2D receiving non-linagliptin DPP-4is in UK general practice. **Methods:** Patients with T2D aged ≥18 years, treated with non-linagliptin DPP-4is from 15 July 2018 (post last SmPC change to renal criteria for any DPP-4i), were identified in the CPRD database. Renal function was estimated from patients' last serum creatinine record before/at index prescription, using CrCl (alogliptin, vildagliptin) or estimated GFR (saxagliptin, sitagliptin). **Results:** Of 1000 patients treated with a non-linagliptin DPP-4i requiring dose adjustment, 336 (33.6%) patients received a higher dose than recommended. Of 11 411 patients treated with a non-linagliptin DPP-4i who did not require dose adjustment, 1296 (11.4%) received a lower dose than specified in the appropriate SmPC. **Conclusions:** Prescription of non-linagliptin DPP-4is at doses outside those recommended in SmPCs remains common in general practice, highlighting the need for further education. ■

P17

Let's talk about the birds and bees. The Manchester Primary Care Standard for pre-conception advice in diabetes

Submitting author: ***Milne N****, Manchester University NHS Trust, Manchester, UK*

Background: One in every 250 pregnancies are affected by diabetes. Women with diabetes have an increased risk of obstetric complications and their offspring have an increased risk of congenital malformations, macrosomia and neonatal hypoglycaemia. Microvascular complications can progress during pregnancy. Manchester has no pre-conception service for women with diabetes. From 2014–16, only 32.1% of women had a first trimester HbA_{1c} <48 mmol/mol and only 43.3% of women were taking 5 mg folic acid. **Aim:** To enhance knowledge and confidence in delivering pre-conception advice for primary care healthcare professionals (HCPs) to ensure that all women with diabetes of child-bearing age in Manchester receive brief awareness advice and guidance on potential complications in diabetes-related pregnancies and how optimise outcomes. **Methods:** A collaboration between a small group representing primary care, commissioners and secondary care devised the Manchester Primary Care Standard for Pre-Conception advice and support. Launched in July 2018, each GP

practice was incentivised to: develop a register of women with diabetes (16–45 years); ensure a GP and practice nurse undertake a CPD accredited (PCDS) e-learning module; import Diabetes UK Information Prescription to discuss and offer at annual reviews and opportunistically. Educational events and additional resources were also implemented. **Results:** As of 1 August 2019, 66.87% of eligible women with diabetes received pre-conception advice in the previous 12 months compared to nil recorded the previous year. Confidence of HCPs to deliver pre-conception advice has increased from 7% to 73%. **Conclusion:** The Manchester Primary Care Standard with educational input has increased the delivery of pre-conception advice. Ongoing input is required to increase numbers and confidence further. We await the long-term results in terms of pregnancy presentations and outcomes. ■

P18

The importance of identification of rare causes of severe insulin resistance for appropriate management and reducing risk – cases of lipodystrophy in The National Severe Insulin Resistance (NSIR) Service

Submitting author: ***Jenkins Liu C****, Addenbrooke's Hospital, Cambridge, UK*

Background: Addenbrooke's NSIR service was commissioned in 2011 for diagnosis, therapeutic and educational support for people with unusual types of severe insulin resistance (SIR) unrelated to obesity. Lipodystrophy is the most common cause of SIR in our patients. **Case 1**: FPLD2 (*LMNA*). A 50-year-old Caucasian woman with a BMI of 25 kg/m² attended NSIR in 2014, having been referred by a GP who identified lipodystrophic legs. **Method:** Type 2 diabetes (T2D) treated with oral hypoglycaemic agent and long-standing metabolic problems. Triglycerides, 18.6 mmol/L; HbA_{1c}, 74 mmol/mol (8.9%); insulin, 167 pmol/L; leptin, 2.6 ug/L. Molecular genetic testing confirmed *LMNA*. Dietary advice was provided re low fat and weight loss. Commenced leptin therapy in 2017. **Results:** BMI down to 19.08 kg/m²; triglycerides, 0.9 mmol/L; HbA_{1c}, 38 mmol/mol. **Case 2**: FPLD3 (*PPARG*): A 57-year-old Caucasian woman with a BMI of 28 kg/m², first attended in 2012. Suboptimally controlled insulin treated T2D, central adiposity, lack of fat on legs and buttocks, acanthosis nigricans axilla. Triglycerides, 3.0 mmol/L; HbA_{1c}, 114 mmol/mol (12.6%); insulin, 99 pmol/L; leptin, 13.4 ug/L. Started low-fat, carbohydrate diet and liraglutide. 12 months later: HbA_{1c}, 79 mmol/mol; triglycerides, 1.3 mmol/L. Ongoing reduction in liver fat from 19.6% to 10%. **Conclusion:** Heightened awareness amongst healthcare professionals is required to identify rare SIR within non-obese individuals. This can reduce the risk of serious metabolic complications. ■

P19

More patients achieved composite reductions of ≥1% HbA_{1c}, ≥5% body weight and ≥5 mmHg systolic blood pressure with semaglutide versus comparators (SUSTAIN 1–5, 7)

Submitting author: ***Bozkurt K****, Novo Nordisk A/S, London, UK*

Background: Semaglutide is a glucagon-like peptide-1 (GLP-1) analogue for the once-weekly treatment of type 2 diabetes (T2D). **Aims:** Across the SUSTAIN clinical trial programme, patients with T2D achieved greater reductions in three cardiovascular (CV) risk factors with semaglutide versus placebo or comparators (dulaglutide, exenatide once-weekly, insulin glargine or sitagliptin): glycated haemoglobin (HbA_{1c}), body weight (BW) and systolic blood pressure (SBP). Here, we further assessed the extent of these reductions. **Methods:** Six SUSTAIN trials (SUSTAIN 1–5 and 7) were assessed *post hoc* to determine to what extent patients achieved clinically meaningful reductions in all of these risk factors (composite endpoint: ≥1% decrease in HbA_{1c}; ≥5% BW loss; and ≥5 mmHg SBP reduction). Across trials, mean baseline HbA_{1c}, BW and SBP ranges were 8.1–8.4%, 89.5–95.8 kg and 128.8–134.8 mmHg, respectively. **Results:** Significantly more patients achieved the composite endpoint with semaglutide (0.5 mg: 14–20%; 1.0 mg: 15–37%) versus comparators (1–12%; $P<0.001$ for all comparisons). Evaluation of the two trials versus GLP-1 receptor agonists showed that the composite endpoint was achieved by a significantly greater proportion of patients treated with semaglutide (0.5 mg: 19%; 1.0 mg: 22–33%) versus exenatide once-weekly 2.0 mg (6%; SUSTAIN 3) or dulaglutide (0.75 mg: 7%; 1.5 mg: 12%; SUSTAIN 7) ($P<0.001$ for all comparisons). **Conclusions:** With semaglutide, significantly more patients achieved clinically meaningful improvements in the composite of HbA_{1c}, BW and SBP reductions versus comparators, which may promote a better overall CV risk profile with semaglutide compared with comparators. ■

P20

Withdrawn

P21

Interrelationship between hypoglycaemia and cardiovascular and mortality outcomes in type 2 diabetes in the CARMELINA trial

Submitting author: ***Hanif W****, University Hospital Birmingham, Birmingham, UK*

Background: Severe hypoglycaemia is associated with high cardiovascular (CV) and mortality risk. CARMELINA (CArdiovascular and Renal Microvascular outcomE study with LINAgliptin) evaluated the CV safety and kidney outcomes of linagliptin in 6979 participants with type 2 diabetes and cardiorenal disease (mean age, 65.9 years; HbA_{1c}, 8.0% [64 mmol/mol]; eGFR, 54.6 mL/min/1.73m²) and demonstrated CV safety of linagliptin with respect to the primary composite outcome of CV death, myocardial infarction or stroke (3-point major adverse CV event; 3P-MACE) and no effect on all-cause mortality. **Aim:** To evaluate the relationship between on-treatment hypoglycaemia, 3P-MACE and all-cause mortality in CARMELINA. **Methods:** We assessed interrelationships between time to first severe hypoglycaemia or plasma glucose <3 mmol/L – which occurred in 557 (15.9%) and 572 (16.4%) patients in the linagliptin and placebo groups, respectively – and 3P-MACE or all-cause mortality, using adjusted Cox models. **Results:** Hypoglycaemia preceded 3P-MACE in 146 participants (at median 58 days in n=74 linagliptin; at 55 days in n=72 placebo), and was associated with a 43% higher risk (HR, 1.43 [95% CI, 1.23–1.66]), when adjusted for region and hypoglycaemia. Higher adjusted risk of all-cause mortality was also associated with preceding hypoglycaemia (HR, 1.31 [95% CI, 1.11–1.53]) in 129 participants who died (at median 65 days in n=65 linagliptin; at 49 days in n=64 placebo). More frequent hypoglycaemia was associated with a greater magnitude of incremental risk for 3P-MACE and all-cause mortality that attenuated with further adjustment using multivariable models. **Conclusion:** Preceding hypoglycaemia was independently associated with a higher risk for 3P-MACE and mortality. ■

P22

Withdrawn

P23

CoDES: Community Diabetes Education Support Pilot: Offering a bespoke approach to holistic diabetes care

Submitting author: ***Milne N****, Manchester University NHS Trust, Manchester, UK*

Background: CoDES (COmmunity Diabetes Education and Support) is a two-year pilot project, commissioned by Manchester Health and Care Commissioning Group (MHCC), to scope best working practices in introducing an integrated type 2 diabetes (T2D) community service within Central Manchester. Manchester has historically had a high spend and relatively poor outcomes in diabetes. It also

has the worst cardiovascular outcomes in the country. **Aims:** To deliver a holistic approach to diabetes care focusing not just on glycaemic control, but also on optimising blood pressure (BP), lipids, and promoting active cardiovascular and renal protection where required, in striving to improve outcomes and reduce cardiovascular/renal risk/burden for those living with T2D. **Methods:** The CoDES Team comprises two community DSNs working within seven GP practices. A blend of bespoke mentoring, education, pathways, resources, virtual and face-to-face consultations for those with complex T2D diabetes needs has been provided. There has been close working with wider community groups to include social prescribing initiatives. **Results:** At the end of year one: **1**) 82% improvement in BP; **2**) 86% improvement in lipids; **3**) 20% improvement in HbA_{1c} (average has lowered from 83 mmol/mol to 66 mmol/mol); **4**) Mentorship and education to over 450 healthcare professionals (HCPs); **5**) Increased confidence of HCP in managing diabetes (e.g. confidence in managing hypertension has increased from 50% to 100%); **6**) 25% of cohort have been initiated onto Manchester Cardio-Metabolic Pathway; **7**) 35% of cohort have required an intervention for renal protection; **8**) There have been 177 prevented referrals to secondary care; **9**) All persons have been seen within 4 weeks. **Conclusions:** A bespoke community approach can enhance HCP confidence in delivering improved diabetes care and achieve improved outcomes. ■

P24

Developing and evaluating a personalised, digital programme for type 2 diabetes prevention

Submitting author: ***Williams M****, Changing Health, Newcastle upon Tyne, UK*

Background: For several years, the NHS has provided face-to-face, structured education and support programmes for people at risk of type 2 diabetes. While these programmes have benefited many, those benefits are inaccessible to a proportion of those at risk for a variety of reasons: inflexible scheduling during the working week, the need to travel to attend in person, and a "one-size fits all" approach that makes it difficult to tailor content to the personal preferences, circumstances and needs of each individual. **Aims:** Changing Health has developed and evaluated an innovative personalised, digital programme for type 2 diabetes prevention, based on cutting-edge research in metabolism, diabetes and behavioural science. The programme empowers participants by combining bespoke, one-to-one lifestyle coaching (delivered over the phone) with a course of structured diabetes education (delivered via an app). People at risk of diabetes learn how they can best fit simple lifestyle changes into their lives and receive personalised support to help them make those changes. **Methods:** Health and user satisfaction outcomes were measured in a 12-month pilot. **Results:** At month 12, 79% of users were satisfied with Changing Health as a whole. 92% of users were satisfied with their coaching, while 88% identified their coach as crucial to their success. Participants lost an average of 2.5 kg at 3 months, 3.3 kg at 6 months, 3.6 kg at 9 months and 4.5 kg at 12 months. **Conclusion:** This trend of slow but continual weight loss is a reflection of the success of the programme design, which encourages individuals to make small but sustainable changes to their behaviour. ■

P25

Effective prescribing in diabetes

Submitting author: ***Russell S****, Barnet CCG, London, UK*

Barnet CCG is in the top quartile nationally for the prescribing of dipeptidyl peptidase-4 inhibitors (DPP-4is), spending approximately £1.73m annually. A recent local audit of 200 patients identified that 60% of patients who had been prescribed one of these medicines had not had the 5.5 mmol/mol reduction in HbA_{1c} in the 6 months after initiation as suggested by NICE as a guide to continue with the treatment. This means a possible £1.03m is being wasted per annum. The EASD/ADA consensus statement 2018 suggests that patients with existing CV or renal disease may benefit from a treatment that offers cardiorenal protection, such as a sodium–glucose cotransporter 2 inhibitor (SGLT2i) or glucagon-like peptide 1 receptor agonist (GLP-1 RA). As DPP-4is do not offer cardiorenal protection, a medication change may be appropriate. ■

P26

Use of digital mobile apps on exercise may change the behavioural attitude of the south Asian population to improve glycaemic control

Submitting author: ***Bhattacharyya M****, Newham GPCOOP, London, UK*

Background: The development of poor glycaemic control despite oral non-insulin therapy may be due to the behavioural attitude of the south Asian population. It has been linked to lack of physical activity and resistance to insulin over time. **Aims:** To study: whether digital apps in personal phones and regular physical activity have helped to improve glycaemic control; the effectiveness of personal interventions, alone or in combination, in improving glycaemic control in the community setting; and to evaluate the impact of these interventions on reducing the HbA_{1c}. **Method:** We studied 109 patients in primary care, with 56 patients receiving personal intervention. 56 had patient-based interventions and monitored physical activity on personal phones. Use of self-educational materials and digital apps on their phones alone resulted small changes in HbA_{1c} after 3 months of exercise prescribing. **Results:** 56 patients effectively reduced HbA_{1c}. Multi-faceted interventions combining physicians' input and patient education with digital apps were successful in reducing HbA_{1c} from 69 mmol/mol (8.5%) to 55 mmol/mol (7.2%). 53 patients who did not participate or engage had poor glycaemic control reflected in their HbA_{1c}. **Conclusions:** Interactive digital apps and step counts appeared to be more effective than physician reminders of increased physical activity. The effectiveness of using digital apps in patients' personal mobile phones and exercise prescribing depends to a large degree on the particular human behaviour and the barriers to change in the south Asian community. No single intervention can be recommended for all behaviours in any setting. Multi-faceted interventions on many levels may be successfully applied to communities after addressing local barriers to change. Patient-based interventions and physician attitude to use digital apps show promise and innovative methods, such as these, deserve further study. ■

P27

Over-treatment of type 2 diabetes in the elderly

Submitting author: ***Rahman SY****, Hockley Farm Medical Practice, Leicester, UK*

Background: Initial recommended HbA_{1c} targets for people with diabetes showed the benefits of strict control in a younger population. In older adults with multiple comorbidities, the risk of harm may outweigh benefits. Despite this, in the UK the QOF targets for diabetes still aim for HbA_{1c} levels under 58 mmol/mol (7.5%). **Aims:** To examine glycaemic control levels amongst older adults with diabetes and identify those who are at risk of overtreatment to amend their treatment to fit in with best practice. **Methods:** An audit was carried out at an inner-city English practice in 2015 to identify people with type 2 diabetes aged 70 years and above. Patients were grouped based on recent HbA_{1c} levels of >53 mmol/mol (>7.0%) or ≤53 mmol/mol (≤7.0%). These were further classified according to treatment: low-risk medication, high-risk medication and no medication. Medical record prompts were then set on all elderly people with type 2 diabetes to avoid tight control ≤53 mmol/mol (≤7.0%). This was re-audited in 2019 to measure changes, with patients on two or more antidiabetes drugs listed for medication review. **Results:** The proportion of elderly people with

type 2 diabetes with HbA_{1c} ≤53 mmol/mol (≤7.0%) has reduced from 68% to 61%. Of these, 13.5% were on dual or multiple therapy. There was a large reduction in over-treated patients using high-risk medication, from 23% to 8%. **Conclusions:** Using prompts on the electronic medical records, there has been an improvement in the proportion of elderly patients over-treated. There has been a reduction in the proportion of patients on sulfonylureas and insulin in elderly patients with HbA_{1c} ≤53 mmol/mol (≤7%). ■

P28

Efficacy, effectiveness and safety of nasal glucagon as rescue therapy for severe hypoglycaemia in children and adolescents with type 1 diabetes

Submitting author: ***Balogh E****, Eli Lilly and Company, Basingstoke, UK*

Background: One of the therapeutic options for severe hypoglycaemia is injectable glucagon, which requires prior reconstitution. Nasal glucagon (NG), containing 3 mg of glucagon dry powder absorbed through the nasal mucosa, is a ready-to-use drug-device combination. NG is under development for severe hypoglycaemia treatment in adult and paediatric populations with diabetes. **Aims:** The efficacy, effectiveness and safety of NG in children and adolescents with type 1 diabetes (T1D) are discussed here. **Methods:** The pharmacokinetic, pharmacodynamic, efficacy and safety profiles of NG 3 mg and injectable glucagon administered intramuscularly (IMG) 0.5–1 mg were studied in a randomised trial. Subsequently, real-world effectiveness and tolerability of NG 3 mg were evaluated. **Results:** NG 3 mg achieved treatment success (based upon prespecified criteria) in 100% of participants with a glucose-raising effect similar to IMG (weight-based doses) in children and adolescents with T1D. In the real-world setting, NG 3 mg resolved 100% of moderate hypoglycaemic events (≤70 mg/dL [≤3.9 mmol/L]), including clinically significant hypoglycaemia with a glucose level <54 mg/dL (3.0 mmol/L) and signs and symptoms of neuroglycopaenia. No severe hypoglycaemic events were reported. Safety profiles of NG and IMG were similar for nausea and vomiting. Headache and nasal symptoms occurred more frequently with NG compared to IMG; most of these were transient. **Conclusions:** NG appears to be an efficacious and well-tolerated ready-to-use nasal dry powder, with potential to substantially ease severe hypoglycaemia rescue treatment in children and adolescents with T1D. It may also expand the community of people who could quickly render aid in a rescue situation. ■

P29

Efficacy, effectiveness and safety of nasal glucagon as a rescue therapy for severe hypoglycaemia in adults with type 1 diabetes

Submitting author: ***Balogh E****, Eli Lilly and Company, Basingstoke, UK*

Background: Injectable glucagon is one of the therapeutic options for severe hypoglycaemia, which involves prior reconstitution. Nasal glucagon (NG), containing 3 mg of glucagon dry powder absorbed through the nasal mucosa, is a ready-to-use drug–device combination. NG is under development to treat severe hypoglycaemia in adults, children and adolescents with diabetes. **Aims:** This abstract presents the efficacy, effectiveness and safety of NG in adults with type 1 diabetes (T1D). **Methods:** The randomised non-inferiority trial compared NG with injectable glucagon administered intramuscularly (IMG) for treatment of insulin-induced hypoglycaemia. The real-world use study evaluated the effectiveness and tolerability of NG 3 mg to treat moderate/severe hypoglycaemic events (HEs). **Results:** In the randomised trial, NG 3 mg was non-inferior to IMG in treating insulin-induced hypoglycaemia (98.7% versus 100%; difference, 1.3%; upper end of 1-sided 97.5% CI, 4.0%). NG 3 mg was effective in a real-world setting in treating moderate/severe hypoglycaemia in adults with T1D, resolving 96.2% of HEs, including moderate and severe hypoglycaemia. Importantly, all 12 severe HEs resolved, and participants regained consciousness, stopped convulsions or achieved normalcy within 15 minutes of administration, as assessed by caregivers. NG and IMG showed consistent safety profiles for nausea and vomiting. Headache and nasal symptoms occurred more frequently with NG versus IMG, but most symptoms were transient. **Conclusions:** NG appears to be an efficacious and well-tolerated ready-to-use nasal dry powder with potential to substantially ease severe hypoglycaemia rescue treatment in adults with T1D. It may also expand the community of people who could quickly render aid in a rescue situation. ■

Notes