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Abstract ID: 338

The impact of empagliflozin dose on HbA1c and weight outcomes at 6 and 12 months: updated analysis from the ABCD empagliflozin audit programme

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Introduction: Previously, phase IIb trials demonstrated dose-dependent reductions in HbA1c. Changes in weight were significant across all doses assessed but not dose-dependent. The aim of this analysis is to establish how exposure to the 25 mg empagliflozin dose impacts HbA1c and weight outcomes.
Methods: Datasets were extracted from the ABCD audit if they included a minimum of baseline and relevant follow-up data and stratified by exposure to high-dose empagliflozin: Group 1 (10 mg throughout); Group 2 (25 mg from commencement); Group 3 (increased from 10 mg to 25 mg at 6 months). Changes were assessed using paired t-tests (within groups) and ANOVA with Bonferroni corrections (between groups) in Stata 16 SE.
Results: 9,371 datasets were included (Group 1, n=5,765; Group 2, n=1,887; Group 3, n=1,719) with mean±SD baseline age 60.3±10.3 years, HbA1c 75.7±16.8 mmol/mol and weight 96.9±22.1 kg. 61.5% were male. Median diabetes duration was 8.3 years (IQR 4.5–12.6), which was broadly similar across all groups. At 6 months and 12 months, HbA1c decreased by –11.1 mmol/mol (p<0.001, 95% CI –10.8 to –11.5) and –11.4 mmol/mol (p<0.001, 95% CI –11.1 to –11.8), respectively and weight by –3.6 kg (p<0.001, 95% CI –3.4 to –3.7) and –3.8 kg (p<0.001, 95% CI –3.6 to –3.9), respectively. No significant difference was found between groups at 6 months for weight or HbA1c change. At 12 months, groups 2 and 3 had greater HbA1c reductions compared with group 1 (p=0.01 and p<0.001, respectively) but no difference between each other (p=0.51). At 12 months there was no significant difference in weight changes between group 1 and groups 2 or 3; group 3 lost more weight (–4.4 kg, 95% CI –4.1 to –4.7) than group 2 (–3.4 kg, 95% CI –3.1 to –3.7) (p=0.02).
Conclusions: HbA1c reductions appear to be greatest among those taking higher doses of empagliflozin by 12 months. Weight reductions were greater in group 3 than in those who were started immediately on high dose (group 2). Reasons for this are unclear and further work should explore how high-dose empagliflozin impacts other important parameters.

Abstract ID: 394

Glycaemic outcomes associated with do-it-yourself artificial pancreas systems (DIYAPS): initial insights from the Association of British Clinical Diabetologists' (ABCD) DIYAPS audit programme

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Introduction: Use of DIYAPS is increasing internationally with several thousand users worldwide. Given their unapproved and unlicensed status, objective glycaemic and safety data are needed. The ABCD DIYAPS audit programme launched in 2020 with the aim of providing clinically validated data. We report preliminary findings.
Methods: Clinicians were asked to enter user data as captured in routine clinical encounters into a bespoke online audit tool for this data analysis. Changes from baseline for HbA1c and weight were assessed using paired t-tests. Where baseline data were not available due to the retrospective nature of the audit (eg, time in range), we have reported outcomes at follow-up only. Analyses were conducted in Stata 16 SE, expressed in mean ±SD unless stated otherwise.
Results: One hundred and five users were included, 83.8% white British or Irish, 66.4% female, median duration of diabetes 26 years (IQR 17–33.3), mean±SD baseline HbA1c 55.9±10.3 mmol/mol, weight 82.2±24.3 kg and BMI 28.6±9.5 kg/m2. Over a median follow-up of 0.7 years (IQR 0.4–1.8) HbA1c reduced by –7.7 mmol/mol (95% CI 5.4 to 10.0, p<0.001) and weight increased by 1.2 kg (95% CI 0.2 to 2.2, p=0.02). At follow-up, mean time in range (TIR, glucose 3.9–10 mmol/L) was 74.2±19.6% with a mean time below range (TBR, glucose <3.9 mmol/L) of 3.1±2.3%. 69.4% achieved the recommended TIR >70% and 77.6% achieved TBR <5%. Three episodes of severe hypoglycaemia were reported, two of which required admission. There was one admission for hyperglycaemia. No other admissions or paramedic callouts were recorded. Four user-reported adverse events were noted including insulin over-delivery due to interference from another application (n=1), excessive weight gain (n=1) and hypoglycaemia due to exercise (n=2).
Conclusion: Our initial analysis suggests that DIYAPS use is associated with improvements in HbA1c at follow-up, with achievement of TIR similar to commercial closed loop systems. Most users achieved the recommended % TIR and TBR target ranges. Current safety outcomes are reassuring but continued surveillance for potential adverse outcomes is required, with ongoing healthcare professional understanding and oversight.

Abstract ID: 370

Screening for gestational diabetes:comparing NICE criteria versus RCOG criteria recommended during the COVID pandemic – the role of HbA1c in GDM screening

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Aims: To examine the disparity in identification of gestational diabetes (GDM) using the RCOG criteria (HbA1c ≥39 mmol/mol or FBG ≥5.6 mmol/L) during the COVID-19 pandemic from the conventional NICE guidelines.
Methods: Of 40,740 deliveries at our University Hospital from year 2009 (pre-COVID pandemic) in women without pre-existing diabetes, 8,542 were deemed 'high-risk' based on NICE risk stratifica-

tion and had an oral gluose tolerance test (OGTT) for GDM screening. Locally, HbA1c is routinely undertaken along with an OGTT. Data were analysed retrospectively to explore variation in GDM diagnosis using the two criteria.

Results: Using NICE criteria and RCOG criteria, 11.3% and 15.3% respectively of 'high-risk' women were diagnosed with GDM. HbA1c ≥39 mmol/mol was observed in 13.5%. When RCOG criteria were used, the diagnosis would have been missed in 43.5% of GDM diagnosed with an OGTT (4.9% of the 'high-risk' cohort; $\chi 2=1423$, $p<0.001$). 8.9% with a normal OGTT would have been diagnosed with GDM with the RCOG criteria. The proportion of Asians was higher in the cohort with HbA1c ≥39 mmol/mol compared with those diagnosed with OGTT alone (26% vs 18%, $p<0.001$). HbA1c ≥39 mmol/mol was associated with significantly higher fetal macrosomia (birthweight ≥4500 g) compared with GDM diagnosed with OGTT (3.5% vs 0.9%; $\chi 2=47.7$, $p<0.001$), although the women with GDM received intensive antenatal management.

Conclusions: The RCOG and NICE criteria, when used in isolation for GDM screening, identify different populations with a risk of missing a GDM diagnosis in a proportion of women when RCOG criteria are solely applied. HbA1c could have a supplementary role when used in addition to OGTT in 'high-risk' women to identify and to potentially reduce maternal-fetal complications through intensive antenatal management.

Abstract ID: 347

Outcomes in patients with lipodystrophy receiving treatment with metreleptin via the National Severe Insulin Resistance Service at Addenbrookes Hospital, Cambridge

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Introduction: Lipodystrophy is a rare condition characterised by complete or partial loss of subcutaneous adipose tissue. It is associated with severe insulin resistance, diabetes, hypertriglyceridaemia, pancreatitis and non-alcoholic fatty liver disease. The mainstay of treatment is a low-fat, energy-restricted diet.[1] Deficiency of the appetite-regulating hormone leptin causes difficulty in adherence to dietary restrictions. Metreleptin replacement therapy has been available for several years to lipodystrophy patients attending the National Severe Insulin Resistance (NSIR) Service via a compassionate use programme. NICE have recently approved NHS funding.[2] We describe outcomes in 25 lipodystrophy patients treated with metreleptin in addition to diet and standard medical therapies.

Patients: 25 patients (21 female, median age 31 years (range 1–54)) were followed up for a median of 8.3 years (range 2.5–9.3). Seven patients have congenital generalised lipodystrophy, 3 acquired generalised lipodystrophy, 14 familial partial lipodystrophy (12 LMNA and 2 PPARG mutation) and 1 acquired partial lipodystrophy.

Results: Median baseline HbA1c was 71.5 mmol/mol (IQR 50.2–83.8) and fasting triglycerides were 3.4 mmol/L (1.4–4.4) compared with HbA1c 64.0 mmol/mol (44.0–69.0) and fasting triglycerides 3.1 mmol/L (1.7–6.1) at the most recent visit. Most patients reported a significant reduction in hyperphagia. Three patients have died, one had a liver transplant and one a renal transplant.

Conclusion: Patients with lipodystrophy and leptin deficiency attending the NSIR service, treated with metreleptin, reported a reduction in hyperphagia. There was also an improvement in metabolic status. Morbidity and mortality rates in this patient group remain high. The availability of NHS funding will enable earlier access to metreleptin therapy which may improve outcomes.

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Abstract ID: 389

Mental health case-management significantly reduces hospital admissions and bed days in adults with type 1 diabetes mellitus

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Background: Mental health problems are associated with recurrent hyperglycaemia and diabetic ketoacidosis in type 1 diabetes mellitus (T1DM).[1–3] A recent systematic review showed limited evidence for the use of mental health interventions to reduce acute diabetes presentations, with no studies in the T1DM population.[4]

Aims: To describe the effect of a case-management mental health approach to reduce readmissions, hospital bed days and HbA1c for T1DM patients.

Methods: T1DM patients readmitted to three acute hospitals in East London for diabetes-related issues with one previous hospital presentation in the prior year were offered a pilot intervention with case-management by a consultant psychiatrist specialised in diabetes. Case-management includes: (a) treatment of underlying mental health problems and (b) a psychotherapeutic approach to understand the causes of admissions and, where necessary, increase self-management of diabetes. Outcome measures were hospital attendance rates, hospital bed days and glycaemic control (HbA1c).

Patients: 20 patients (15 females, median age 27 years (IQR 22–38)) agreed to mental health intervention. All participants had ≥1 mental health diagnosis. The mean duration of diabetes was 10.7 years and the mean treatment length was 15±6 months.

Outcomes: Hospital attendance rates: In two years prior to intervention, the mean number of hospital admissions was 9.5±8.4 episodes. Following intervention this significantly reduced to 3.9±5.3 episodes ($p<0.05$). Approximately 75% of attendances were diabetes-related with considerable overlap with non-diabetes attendances. Hospital bed days: There was a significant reduction following intervention. The pre-treatment median bed days was 0.69 days/month (IQR 0.30–0.96) and post-treatment was 0.17 days/month (IQR 0.00–0.98) ($p=0.029$). An estimated 125 bed days were saved over 12 months and the total cost saved from this was £159,875. HbA1c levels: The mean pre- and post-treatment HbA1c was 102±24 and 94±19 mmol/mol ($p=0.250$).

Conclusions: Specialist mental health case-management can significantly reduce all hospital attendances, hospital bed days and recurrent admissions in T1DM population.

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Abstract ID: 364

Cortisol measurement post steroids (dexamethasone) treatment for COVID-19

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Introduction: The RECOVERY trial 2 reported patients with COVID-19 receiving/requiring invasive mechanical ventilation or oxygen in whom the use of dexamethasone (6 mg for 10 days) resulted in lower 28-day mortality. Adrenal insufficiency from hypothalamic-pituitary-adrenal axis suppression is a serious, potentially life-threatening side effect of glucocorticoid treatment.
Objective: To investigate the effect of COVID-dexamethasone protocols on adrenal function.
Methods: Data were collected from patients admitted with a diagnosis of COVID-19 treated with dexamethasone/hydrocortisone between November 2020 and March 2021. Adrenal function was assessed using 09:00am cortisol, at least 48 hours off steroids. Cortisol levels >300 nmol/L excluded adrenal insufficiency. Patients with levels of 100–300 nmol/L underwent further assessment and those with levels <100 nmol/L were started on hydrocortisone replacement.
Results: 79 patients were alive at initial data collection. 51/79 had 7–10 days of 6 mg dexamethasone whilst 28/79 had an additional ARDS regimen of dexamethasone. Eight of the group died, and data are available for 60 patients. 18/60 had suboptimal cortisol <300 nmol/L and 5/60 had cortisol <100 nmol/L (4 of these having had ARDS regimen of prolonged dexamethasone). 10 patients recovered their axis prior to confirmatory testing within 1–4 weeks. Confirmatory testing was undertaken SST on 6/18 patients; 5 had satisfactory results and 1 has been unable to attend yet.
Conclusions: These data demonstrate a minimal risk of adrenal insufficiency after treating with RECOVERY doses of dexamethasone 6 mg. Almost 50% of patients on ARDS regimen had early evidence of adrenal insufficiency; the rate of recovery is unclear because of deaths in this cohort. Steroid cover may be needed for invasive procures such as tracheostomy in this group. These data also suggest that COVID-19 itself does not cause adrenal insufficiency, which is reassuring.

Abstract ID: 356

The absence of diabetic autoantibodies when routinely tested in adult-onset type 1 diabetes is associated with a high prevalence of treatment change and successful insulin cessation

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Background and aims: Recent ADA/EASD guidelines recommend islet-autoantibody (AA) testing in all adults with suspected type 1 diabetes (T1D). We aimed to assess the impact of routine AA testing in adults with newly diagnosed T1D.
Methods: We assessed the clinical, biomarker and genetic characteristics associated with positive and negative AA status (GAD, IA-2 and ZNT8) in 713 adults with recently diagnosed T1D (clinical diagnosis T1D and insulin from diagnosis and duration <12 months) in the prospective StartRight study. We then evaluated changes in treatment and glycaemic control over 2 years after informing participants and their clinicians of AA results.
Results: 25.0% (178/713) of participants were AA negative. This group had genetic and C-peptide characteristics suggestive of a high prevalence of type 2 diabetes (T2D): mean T1D genetic risk score (T1DGRS), AA negative vs positive, 0.244 vs 0.267 (p<0.001) (T2D mean 0.231), C-peptide (median duration 4 months) 998 vs 555 pmol/L, rate of decline in C-peptide (urine C-peptide creatinine ratio measured annually) 0.19 nmol/mmol/year vs 0.35 (p=0.001), (T2D 0.22 nmol/mmol/year). After a median follow-up of 22 months, 21.1% (31/147) of AA negative participants had stopped insulin with maintained glycaemic control (recruitment HbA1c 67.7 mmol/mol, final HbA1c 60.7 mmol/mol) and 15.6% (23/147) added oral agents to continued insulin. Treatment change was rare in AA positive participants and none stopped insulin.
Conclusions: In adult onset clinically diagnosed T1D, negative islet AAs should raise a high suspicion of underlying T2D and is associated with successful insulin cessation. These findings support recent recommendations for routine islet AA assessment in adult-onset T1D.

Abstract ID: 323

The rare occurence of type B insulin resistance syndrome (TBRIS) in a T1DM patient: could an insulin pump be the solution?

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Introduction: Type B insulin resistance syndrome (TBRIS) is a rare phenomenon of abnormal glucose homeostasis. This condition can manifest with severe hypoglycaemia to extreme insulin-resistant hyperglycaemia and is caused by the presence of insulin receptor autoantibodies.
Case report: A 27-year-old female diagnosed with type 1 diabetes mellitus (T1DM) at 12 years of age presented with an episode of diabetic ketoacidosis. Her glutamic acid decarboxylase antibody was found to be positive and she was commenced on an insulin basal bolus regime. Her initial diabetes control for the first 5 years as reflected by her HbA1c was suboptimal. Five years after her initial diagnosis she presented with multiple episodes of hypoglycaemia despite reductions in her insulin doses. A battery of tests which included a short Synacthen test and coeliac screen was found to be normal. Her insulin levels, on the other hand, were found to be elevated at 34500 pmol/L and she had positive insulin antibodies. She was commenced on an insulin pump due to severe recurrent hypoglycaemic episodes. Whilst being on the pump, her insulin levels reduced and her hypoglycaemic episodes resolved. She was thereafter taken off the pump but her hypoglycaemic episodes recurred and her insulin levels rose to >500 pmol/L. She was recommenced on the insulin pump and her hypoglycaemic episodes resolved, her insulin levels normalised and eventually her insulin antibodies became undetectable.
Conclusion: This case highlights the rare occurrence of TBRIS in a

T1DM patient and the unusual phenomenon of insulin antibody clearance and normalisation of blood glucose with the use of an insulin pump.

Abstract ID: 316

Replacing all but essential face-to-face visits with virtual support for gestational diabetes care during the COVID pandemic maintains outcomes

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Background: Gestational diabetes mellitus (GDM) is associated with increased perinatal complications. Our service historically saw patients with GDM monthly. Self-monitoring blood glucose (SMBG) levels were reviewed weekly via email.
During COVID lockdown (23 March 2020–14 September 2020) we limited face-to-face contact and started using an App-based communication platform (GDm-HealthTM). Patients recorded SMBG on the App. Face-to-face contact was reduced to monthly scans or if insulin start was needed. Otherwise, contact was made via the app or telephone. We wanted to establish whether reduced face-to-face contact had impacted glucose control or postnatal outcomes.
Methods: A retrospective analysis was performed comparing fasting glucose data and postnatal outcomes for women with the App (1 June 2020–31 December 2020) and standard care (1 June 2019–31 December 2019).
Results: There were 62 women in the before App group (BA) and 61 in the with App group (WA). There was no significant difference in baseline characteristics. Results are shown as mean (SD). Treatment at 36 weeks gestation: diet only BA 22 vs WA 26 (p=0.40); metformin only BA 16 vs WA 22 (p=0.28); insulin (+metformin) 24 vs 13 (p=0.06). Fasting glucose at 36 weeks: BA 5.0 (1.1) vs WA 4.7 (0.3) mmol/L (p=0.12). Birth weight: BA 3.4 (0.6) vs WA 3.3 (0.5) kg (p=0.43) and Z score 0.3 (1.1) vs 0.4 (0.9) (p=0.77). Mode of delivery: vaginal BA 27 vs WA 14; instrumental BA 5 vs WA 7; caesarean section BA 30 vs WA 27 (p=0.78). Gestation at birth: BA 40 vs WA 38 weeks (p=0.16).
Conclusion: App-based communication is effective with outcomes matching standard face-to-face GDM care.

Abstract ID: 353

Managing hyperglycaemia and reducing glycaemic variability in critically ill COVID-19 patients

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Background: There are limited data on interventions to improve glycaemic control in critically ill COVID-19 patients, who often have high intravenous insulin requirements and challenging hyperglycaemia.
Aims: To evaluate if a safe reduction in carbohydrate content received from enteral feeding improved time in range (TIR) in critically ill patients with COVID-19.
Methods: We studied 21 critically ill patients (14 male, median age 57 years) with blood glucose levels >10 mmol/L despite high intravenous insulin requirements of >5 units/hour for >24 hours. All patients were on continuous enteral feeding and on >6 mg/day dexamethasone. Our intervention was a 30% reduction in the amount of carbohydrate delivered hourly via individualised enteral feed rate adjustments while still keeping within the recommended 20–30 kcal/kg ideal body weight/day. TIR was defined as the percentage of time blood glucose values were 6–10 mmol/L. TIR, time above range, mean blood glucose levels (using hourly venous blood glucose readings) and intravenous insulin requirements were evaluated 48 hours before and after the intervention.
Results: TIR more than doubled post intervention from median (interquartile range) 20.0% (7.64–40.4%) to 47.1% (24.3–56.3%), p=0.001. Significant reductions in time above range, mean blood glucose levels and intravenous insulin requirements (median (interquartile range) 8.96 (6.97–10.4) units/hour to 5.22 (4.25–7.59) units/hour) were also observed (p<0.05 for all).
Conclusions: In a cohort of critically ill COVID-19 patients, a safe reduction in the carbohydrate content from enteral feeding reduced glycaemic variability, more than doubling TIR, with concomitant reductions in intravenous insulin requirements.

Abstract ID: 380

Empagliflozin reduced the total burden of events leading to or prolonging hospitalisation in EMPA-REG OUTCOME

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Background: In EMPA-REG OUTCOME, empagliflozin (EMPA) reduced the risk of all-cause mortality (ACM) and total (first plus recurrent) events leading to all-cause hospitalisation in patients with type 2 diabetes (T2D) and established atherosclerotic cardiovascular disease (ASCVD). We assessed the effect of EMPA on the total burden of events leading to or prolonging all-cause hospitalisation (ACPH) as well as the composite of ACPH and ACM.
Methods: Patients were randomised to EMPA 10 mg, 25 mg or placebo. Post hoc, we assessed the effect of pooled EMPA versus placebo on total events of ACPH, as reported by investigators, and an ACPH/ACM composite, using a negative binomial model.
Results: Among 7,020 patients there were 5,256 ACPH events (5,031 leading to and 225 prolonging hospitalisation) and 5,617 ACPH/ACM events. EMPA reduced the risk of total events of ACPH by 22% versus placebo (rate ratio 0.78 (95% CI 0.70 to 0.87)) and ACPH/ACM by 24% versus placebo (0.76 (95% CI 0.69 to 0.85)). The number of ACPH/ACM events prevented with EMPA versus placebo was 67.7 per 1000 patient years; the number needed to treat (NNT) over the three years of the trial to prevent one event was 4.9 (95% CI 3.5 to 8.4).
Conclusions: EMPA showed a sizeable reduction in the total burden of mortality and events leading to or prolonging hospitalisation in patients with T2D and ASCVD, with a clinically relevant number of events prevented and a low NNT.

Abstract ID: 393

Socioeconomic deprivation is associated with reduced efficacy of an insulin adjustment education programme for patients with type 1 diabetes

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Background: The Dose Adjustment For Normal Eating (DAFNE) course teaches insulin adjustment to enable normal diet and improve glycaemic control. We investigated the association between socioeconomic deprivation and reduction in HbA1c after attending DAFNE education.

Methods: In this retrospective observational study we identified adults with type 1 diabetes mellitus (T1DM) who had previously attended DAFNE in NHS Lothian, East Scotland. We extracted age, sex, postcode-based Scottish Index of Multiple Deprivation (SIMD) quintiles and annual HbA1c measurements available four years before and after course attendance. We calculated mean HbA1c before (baseline) and after attendance at the DAFNE course across four annual measurements. Change in mean HbA1c (mmol/mol) was categorised into three groups: decrease (>–2.5), no change (<±2.5), increase (>+2.5). We used multivariable ordinal logistic regression, with baseline mean HbA1c as a covariate, to investigate the association of SIMD quintile with reduction in mean HbA1c.

Results: 335 patients were included. Age and sex distribution were similar across SIMD quintiles (mean age 45.5 years) and 58.5% were female. Lower SIMD quintiles (greater deprivation) had higher baseline mean HbA1c (SIMD 1: 76.0, SIMD 5: 69.0). Lower SIMD quintiles were associated with less reduction in mean HbA1c (SIMD 1: 2.5 increase, SIMD 5: 5.0 decrease, odds ratio 4.7 (95% CI 2.0 to 11.1); p<0.001, multivariable analysis).

Conclusion: Socioeconomic deprivation was associated with less reduction in HbA1c after DAFNE. Future research could use qualitative methods to explore causes of this differential benefit, identify barriers and determine how best to support patients with T1DM from areas of greater deprivation.

A much earlier abstract including provisional results was presented at the Royal College of Physicians of Edinburgh Conference 2018 as a poster presentation. Note the present abstract contains an updated analysis that has not been presented at another meeting/event.

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Abstract ID: 351

Service evaluation of diabetes structured education in Kent and Medway

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Introduction: Patient uptake of diabetes structured education (DSE) programmes has been historically low in the UK. Digitally-enabled programmes have the potential to improve accessibility to such education.

Aim: To assess weight loss, uptake and retention of a digital structured education programme for adults living with type 2 diabetes.

Methods: Data from adults with type 2 diabetes following a digitally-enabled DSE programme were collected and analysed to determine weight loss and engagement over a 12-week programme. All patients had access to a smartphone app to monitor their food and fluid intake, activity levels and clinical changes such as weight loss, and had access to digital learning materials, supported through the programme coach.

Results: 73% of referrals (n=598) started the programme and 73% of those who started completed the programme. Average weight loss at 12 weeks was 3.62 kg (3.68%) (n=188). There was an average increase in confidence score (related to diabetes self-management) from 6/10 at baseline to 8/10 at 12 weeks. 528 participants were of working age, demonstrating greater access in those who are usually under-represented at structured education.

Conclusion: A fully remote digitally-enabled type 2 DSE and behaviour change programme is clinically effective, accessible and engaging and is able to increase confidence in self-management of type 2 diabetes.

Abstract ID: 350

Uptake and retention in a digital low-calorie diet programme delivered to a geographically remote population living with type 2 diabetes (interim analysis)

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Introduction: Research shows that low calorie diets, delivered through face-to-face appointments, can achieve significant weight loss and 46% remission rates at one year.[1]

Aim: To assess the retention and clinical effectiveness of a digital low calorie diet programme for adults living with type 2 diabetes requiring no face-to-face appointments.

Methods: Preliminary data from adults with type 2 diabetes following a digitally-enabled low-calorie diet programme (12-week total diet replacement (TDR) approximately 800 calories; 4 weeks food reintroduction; 8 months behaviour change support; supported by a Diabetes Specialist Dietitian) were collected and analysed to determine initial retention and engagement for the first 6 months of the programme. Patients had access to a smartphone app for self-monitoring and dietitian support.

Results: 29 patients started the programme; 26 (90%) completed the 12-week TDR phase and 24 (83%) completed 6 months. Average weight loss was 13.8 kg (n=26) at week 12 and 14.2 kg (n=24) at 6 months. The programme is still live but, for those who have reached 12 months, average weight loss is 12.4 kg (n=7). 39 prescriptions were stopped with an average of 3.5 prescriptions stopped per patient. The average reduction in HbA1c at 6 months was 15.8 mmol/mol (14.8% reduction) (n=13).

Conclusion: Preliminary data show that a digital low calorie diet programme results in significant weight loss, glycaemic improvement and medication reductions at 6 months in adults living with type 2 diabetes. Engagement levels and retention rates remain high.

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Abstract ID: 355

Factors associated with disparity between HbA1c and FreeStyle Libre glucose management indicator (GMI) in patients with type 1 diabetes

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Objective: To identify factors related to glucose management indicator (GMI) and HbA1c disparity.
Methods: Patients with type 1 diabetes (T1DM) on FreeStyle Libre from a diabetes centre whose sensor was active >70% of the time were included. Patient characteristics and laboratory data were collected from medical records. Ambulatory glucose profile data for 28-, 60- and 90-day periods ending at the date of last available HbA1c were collected from LibreView. A difference of <5% between HbA1c and GMI was considered non-significant. Characteristics of patients with HbA1c higher and lower than the 60-day GMI by ≥5% were compared.
Results: 267 patients with T1DM (53.6% females, 45±15 years) were studied. Median (IQR) HbA1c, body mass index (BMI) and haemoglobin were 61 (53–70) mmol/mol, 26.7 (23.7–29.6) kg/m2 and 140 (130–148) g/L, respectively. HbA1c correlated (p<0.001) with 28-day (ρ=0.822), 60-day (ρ=0.835) and 90-day (ρ=0.817) GMI. Compared to patients with HbA1c ≥5% higher than GMI (n=121, 45.3%), those with HbA1c ≥5% lower than GMI (n=43, 16.1%) were older, had higher HbA1c and lower eGFR, haemoglobin and mean corpuscular haemoglobin (MCH) (p<0.01 for each). There were no significant differences in gender, ethnicity, BMI, red cell count, mean red cell volume, % time sensor was active, 60-day GMI, glucose variability or time above, below or within target.
Conclusions: Advanced age, poorer glycaemic control and low MCH are associated with an HbA1c higher than GMI whereas reduced renal function and relatively low haemoglobin are associated with an HbA1c lower than GMI.

Abstract ID: 307

Management of hyperglycaemia in patients treated with dexamethasone for COVID-19

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Background: The use of dexamethasone has resulted in lower mortality for patients receiving oxygen or invasive mechanical ventilation. It is a first-line treatment for coronavirus disease 2019 (COVID-19). However, COVID-19 and dexamethasone both increase the risk of hyperglycaemia (shown to increase COVID-19 morbidity and mortality) and increase the risk of hyperglycaemic emergencies.
Aim: To improve management of hyperglycaemia secondary to COVID-19 and dexamethasone use in patients with and without pre-existing diabetes by implementing the Concise Advice on Inpatient Diabetes guidelines at a tertiary centre.
Methods: 111 patients from respiratory wards were included in a quality improvement project (QIP) over a period of 10 weeks. Outcome measures included frequency of blood glucose monitoring, appropriate ketone assessment and guideline-concordant management of hyperglycaemia. Plan-Do-Study-Act methodology was used, and interventions included posters, education of nursing staff and junior doctors, and discussion at the departmental meeting.
Results: By the end of the QIP there was a 33% increase from baseline in individuals having 6-hourly capillary blood glucose monitoring in the first 48 hours. Management of hyperglycaemia also improved with a 40% increase from baseline in individuals receiving acute correction with insulin and a 12% increase from baseline in individuals having regular insulin started or adjusted.
Conclusion: Both COVID-19 and its treatment increase the risk of hyperglycaemia with consequent morbidity and mortality implications. This QIP improved hyperglycaemia management through guideline implementation. This shows that guideline compliance can enable better patient care. Further system-wide work is required for sustainability.

Abstract ID: 371

Neonatal hyperinsulinaemic hypoglycaemia and early onset diabetes secondary to biallelic ABCC8 (MODY 12) mutatio

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Case history: A 21-year-old woman presented to our young adult diabetes clinic with a several year history of persistent fasting and postprandial hyperglycaemia, weight gain, raised HbA1c of 51 mmol/mol and new onset osmotic symptoms.
She had a history of macrosomia and neonatal hyperinsulinaemic hypoglycaemia with normal pancreatic imaging. She had been medically managed with diazoxide, chlorothiazide and somatostatin. These medications were weaned off in teen age without any consequences. She started to gain weight and was diagnosed with type 2 diabetes in early adulthood with good insulin reserve and negative autoantibodies for type 1 diabetes. MODY was suspected and genetic testing was performed which confirmed the presence of ABCC8 MODY. She had biallelic ABCC8 mutations: c.1672-20a>G (likely pathogenic) and c.3992-9G>a (pathogenic). Both parents are clinically unaffected. After a trial of lifestyle modification, she has been started on SGLT2 inhibitors and GLP1 agonists to improve glycaemic control and help in weight loss.
Discussion: We present a case of neonatal hyperinsulinaemic hypoglycaemia and early onset diabetes secondary to the rare subtype of MODY (ABCC8; MODY12). This could be a case of autosomal dominant inheritance, meaning that one of the identified mutations is not pathogenic, or a case of compound heterozygosity.
ABCC8 MODY can lead to phenotypically diverse presentations ranging from largely inconsequential GCK type MODY to a significant neonatal hypoglycaemia and early onset diabetes. Insulin is reported to cause significant hypoglycaemia and weight gain, and SGLT2 and Gliclazide have shown better results.[1]

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Abstract ID: 314

Flash blood glucose monitoring (FreeStyle Libre) improves glycaemic control and reduces hospital admissions for diabetic ketoacidosis and severe hypoglycaemia in community dwelling people with type 1 diabetes receiving limited specialist care

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Introduction: Flash blood glucose monitoring (FreeStyle Libre) is an established method of interstitial glucose monitoring to improve glycaemic control in diabetes.
Aim: We performed a retrospective analysis to determine the hospital admission rates for 2019 due to diabetic ketoacidosis (DKA) and hypoglycaemia in a group of patients with type 1 diabetes (T1DM) who had been using the FreeStyle Libre glucose monitoring system.
Method: Case records of 346 patients (94% with T1DM), users of FreeStyle Libre and registered to GP practices in South Wales were evaluated.
Results: The mean HbA1c improved significantly for this group over the 12-month period from 74 mmol/mol at commencement of Freestyle Libre to 68 mmol/mol after 12 months ($p<0.001$). The mean hospital admission rate for DKA was 4.61/100 patient-years and severe hypoglycaemia 0.13/100 patient years. These figures are significantly lower than figures reported in T1DM patient groups not using FreeStyle Libre.[1]
Conclusion: Flash blood glucose monitoring (FreeStyle Libre) significantly improves glycaemic control and is associated with lower hospital admission rates for DKA and severe hypoglycaemia in adult patients with T1DM.

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Abstract ID: 390

Characteristics of patients with SGLT2 inhibitors associated DKA between 2008 and 2020: a case series from King's College Hospital

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Introduction: Euglycaemic diabetic ketoacidosis (DKA) is a rare though critical complication in patients with type 2 diabetes (T2DM) using sodium glucose co-transporter 2 inhibitors (SGLT2i).[1] This case series aims to describe and define characteristics of patients treated for DKA associated with SGLT2i at King's College Hospital, London between 2018 and 2020.
Methods: All DKA cases in patients with T2DM using SGLT2i between 2018 and 2020 were retrieved from inpatient diabetes referrals and case notes were reviewed. Patients' personal, diabetes and DKA-related variables were retrospectively summarised as mean±SD values for continuous variables and frequencies and percentages for categorical variables.
Results: 15 patients of mean age 57.3±12.43 years were identified. Seven (46.6%) patients were females. The mean duration of diabetes was 14.4±2.24 years and mean HbA1c was 9.4±1.98% (79.8±21.58 mmol/mol). The mean duration of SGLT2i use was 1.38±1.49 years, with mean HbA1c within 3 months of starting SGLT2i of 9.6±1.73%. Seven (46.7%) of the DKA episodes occurred during hospitalisation, with a mean diagnosis delay of 14.17±3.7 hours. SGLT2i were taken on the same day of DKA in 8 (53.3%) patients. Mean glucose at DKA diagnosis was 15.3±6.1 mmol/L, with 6 (40%) patients having glucose ≤10 mmol/L. DKA was precipitated by acute illness or surgery (80%), reduction in oral intake (71.4%), fasting more than 24 hours (38.5%, inpatients only) and missed insulin dose (20%, inpatients only).
Discussion: In this case series of T2DM patients with SGLT2i-induced DKA, patients tend to have longer duration and poor control of diabetes, with intercurrent illness or surgery as the precipitating factor. Patients and healthcare professionals should be aware of sick day rules and have clear guidance on when to check for ketones and to stop SGLT2i, when they are unwell or in preparation for procedures requiring fasting, to prevent this life-threatening complication.[2]

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Abstract ID: 377

Investigating the impact of a dedicated stroke-diabetes multidisciplinary team on patient outcomes, referrals and staff satisfaction

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Background: Around 30% of stroke patients have diabetes mellitus (DM) and are more likely to experience worse outcomes following their stroke.[1] Current guidelines recommend keeping glucose levels between 4 and 11 mmol/L in stroke patients, which can be challenging.[2] At Charing Cross Hospital (CXH), a pharmacist-led, consultant-supported diabetes-stroke multidisciplinary team (MDT) was created in December 2019 to address these challenges. This study aims to assess the impact of the MDT on patient outcomes, referrals to the diabetes team and staff satisfaction.
Methods: Stroke patients with DM admitted to CXH in January and February of 2019 and 2020 were analysed. Patients admitted in 2019 were the 'control' group (n=73) and patients admitted in 2020 were the 'MDT' group (n=75). Patient baseline characteristics, in-hospital and post-discharge outcomes were obtained from hospital records. Referrals to the diabetes team and MDT were quantified. A questionnaire was produced to gauge the attitudes of the stroke ward staff (n=19) towards the MDT.
Results: There were no significant differences in patient outcomes between groups. Referrals to the diabetes team decreased 4-fold from the control to the MDT group and responses to the questionnaire were overwhelmingly positive.
Discussion: MDT involvement did not affect patient outcomes. However, the addition of the MDT significantly reduced the burden of referrals to the diabetes team and most staff were satisfied with the MDT. This study suggests that the MDT is a positive addition to CXH.

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Abstract ID: 358

An audit on the use of variable rate intravenous insulin infusions (VRIII) in patients diagnosed with SARS-CoV-2

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Aims: To assess VRIII utilisation in SARS-CoV-2 positive patients with diabetes mellitus at Queen Elizabeth Hospital, Birmingham, and adherence to Joint British Diabetes Society (JDBS) standards.
Methods: This was a retrospective data-based study. All patients admitted to Queen Elizabeth Hospital Birmingham who tested positive for SARS-CoV-2 requiring VRIII between March and June 2020 were included in the study. Data were extracted using our electronic database Prescribing Information and Communication System (PICS). Data were collected on demographics, diabetic history and VRIII use. Primary outcome measures were substrate use, diabetes medication management, glycaemic control, adverse events as analysed by rate of hypoglycaemia, hyponatraemia and hypokalaemia and monitoring of renal function and capillary blood glucose, in accordance with the JDBS guidelines. Pre-planned subset analysis was performed based on the patient location (ward or intensive care unit (ICU)). All results are shown as median±SD.
Results: A total of 85 patients were included in the study, with 55 patients treated in the ICU and 28 patients treated on the wards. The median age of ICU patients was lower than those on the wards (57±10.23 years vs 71.5±16.81 years) and BMI was higher (29.7±6.56 kg/m² vs 27.8±6.43 kg/m²). The percentage of male patients in ICU was higher compared with those on the wards (76.4% (42/55) vs 53.6% (15/28)). The substrate was used appropriately in 53.3% of VRIII episodes on the ward compared with only 5.4% on ICU. This was due to the concomitant use of NG feeds in 90%. Daily monitoring of electrolytes whilst on a VRIII was higher in the ICU (94.5%, 52/55) than on the ward (71.42%, 21/28). Long-acting insulin was continued in 100% of all type 1 diabetes in both wards and ICU. Median VRIII duration was higher in ICU, given prolonged stay and patients being more unwell, than on the ward (233±184.32 hours vs 14.5±52.26 hours). Target glycaemic control whilst on VRIII was better achieved in the ICU than on the wards.
Conclusion: Intensive care with close monitoring has demonstrated better adherence to VRIII as outlined by JBDS for management of hyperglycaemia in patients with diabetes and COVID-19. The longer use of VRIII in unwell ICU patients may reflect higher insulin insensitivity. A further interventional multicentre study is required to gain further insight.

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Abstract ID: 333

One-third of diabetes patients with hyperkalaemia during acute admission have renin-aldosterone angiotensin system (RAAS) antagonists discontinued by hospital discharge

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Introduction: Antagonists of the renin-angiotensin aldosterone system (RAAS) and beta-blockers provide cardiorenal and vascular protection but are associated with hyperkalaemia, as is diabetes. We evaluated the proportion of RAAS and beta-blocker discontinuation with and without hyperkalaemia in people with diabetes acutely admitted to hospital.
Methods: Unscheduled admissions between 1 January 2017 and 31 January 2020 of patients aged >16 years with electronic record of admission and discharge medications were analysed. Prescriptions of angiotensin converting enzyme inhibitors (ACEi), angiotensin-II receptor blockers (ARBs), beta-blockers and mineralocorticoid receptor antagonists (MRAs) were determined per patient at admission and discharge. The presence of diabetes was identified from the clinical notes using MedCAT, a self-supervised machine learning algorithm. Peak potassium >5 mmol/L was considered hyperkalaemia. Multivariable logistic regression evaluated the independent effects of peak potassium, admission estimated glomerular filtration rate (eGFR), age and gender on RAAS and beta-blocker cessation. A Cox proportional hazard model considered the same covariates as above, as well as cessation of RAAS antagonists on deaths following discharge of patients admitted on RAAS antagonists.
Results: Over 37 months there were 434,244 visits to A&E by 250,307 unique patients; 37,682 were admitted and had confirmed admission and discharge medications and 11,668 (31%) had diabetes. 5,227 were on RAAS or beta-blockers on admission. Of those with normokalaemia, 22% had at least one of these medications ceased compared with 36% of those with hyperkalaemia. Admission eGFR was associated with cessation of each medication ($p<0.005$). Peak potassium was associated with cessation of ACEi, ARBs and MRAs ($p<0.005$). Patients who had RAAS antagonists ceased had an increased risk of death (HR 1.87 (95% CI 1.76 to 1.98), $p<0.001$).
Conclusion: Hyperkalaemia was independently associated with discontinuation to discharge of RAAS antagonists in acutely hospitalised patients with diabetes. Patients who have RAAS antagnoists ceased on discharge have an increased risk of death, even when controlling for potential confounders.

Abstract ID: 369

Improving health outcomes in COVID19: use of flash glucose monitoring in diabetic ketoacidosis

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Introduction: COVID-19 has been linked to an increased risk of new-onset diabetes mellitus and increased incidence of diabetic ketoacidosis (DKA) either as a new presentation or with pre-existing diabetes.[1] Various mechanisms such as impaired insulin secretion, impaired glucose disposal or increased counter regulatory responses are proposed.[2]
Case report: A 57-year-old man diagnosed with COVID-19 one month prior presented with epigastric pain, shortness of breath and weight loss. Investigations confirmed DKA (pH 7.22, bicarbonate 12.6 mmol/L, blood glucose 11.6 mmol/L, blood ketones 5.8 mmol/L) with HbA1c of 95 mmol/mol. Initial treatment was started as per national DKA guidelines. Upon discharge, the patient was prescribed a basal-bolus regime (total 30 units of insulin) and a

FreeStyle Libre flash glucose monitoring (FGM) device. Rapid improvement in blood glucose levels was observed, with regular down titration of insulin and complete discontinuation after 24 days. HbA1c was 37 mmol/mol 96 days later. C-peptide normalised at 3 months for paired glucose at 837 pmol/L.

Discussion: The use of diabetes technology (FGM device) with remote monitoring of blood glucose was instrumental in the safe and effective management of this patient. Given that the available literature suggests transient beta-cell dysfunction in the majority of COVID-19 patients resulting in DKA,[3] we propose that patients who have been diagnosed with COVID-19 presenting with DKA should be discharged with insulin and FGM from secondary care. This enables remote insulin titration with ease, de-escalation of treatment with confidence and avoiding hypoglycaemia in the recovery phase of the illness in those with transient beta-cell dysfunction due to COVID-19.

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Abstract ID: 327

Use of a simplified local guideline to optimise 'front door' management of diabetes and hyperglycaemia in patients with COVID-19

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Introduction: The National Diabetes Inpatient COVID response team have published guidance regarding initial and ongoing management of patients admitted with suspected COVID-19 with diabetes, or any patients experiencing elevated blood glucose levels as a consequence of COVID-19 or sequelae of dexamethasone administered as treatment. However, there was limited awareness and implementation of this guidance within our Trust. To improve patient care, we devised a local simplified guideline, highlighting key points from national guidance.

Method: Audits were carried out prior to and following implementation of the local guideline.

Results: Frequency of blood glucose recording on admission improved from 72% to 79% and review of metformin prescribing improved from 61% to 67% post-guideline, while HbA1c measurement in patients with diabetes and COVID-19 improved significantly (from 36.1% to 76.5%, p=0.006).

Discussion: This is the most comprehensive audit conducted to our knowledge to gauge compliance with the ABCD Covid: Diabetes Front Door Guidance, involving 97 patients across both cycles. This project also brought about greater accessibility to ketone meters and heightened awareness regarding euglycaemic/sodium-glucose co-transporter 2 (SGLT-2) inhibitor-related diabetic ketoacidosis, which we feel will also improve clinical care for patients with diabetes within our service.

Abstract ID: 368

Hyperglycaemic emergencies during the COVID-19 pandemic in East London, one of the worst affected areas in the UK

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Introduction: Diabetes is an established risk factor for poor outcome in COVID-19. Additionally, the pandemic has resulted in patients delaying hospital attendance with emergencies such as diabetic ketoacidosis (DKA) and hyperosmolar hyperglycaemic state (HHS). We examined adult admissions for hyperglycaemic emergencies to Newham University Hospital during the first and second COVID-19 waves.

Results: 38 adults presented in wave 1 (1 March to 31 May 2020): 11 DKA, 14 HHS, 13 mixed DKA/HHS. Median age was 62 years and 58% were male. 63% were Afro-Caribbean, 13% Caucasian, 11% Asian. 68% had known T2DM, 16% known T1DM and 16% newly diagnosed diabetes. Mean BMI was 27.3 kg/m2, mean HbA1c (within one year) was 90.6 mmol/mol. 16 patients (42%) had PCR-confirmed COVID-19 on admission. In wave 2 (1 November 2020 to 28 February 2021) 59 adults presented: 34 DKA, 12 HHS, 13 mixed DKA/HHS. Median age was 55 years and 61% were male. 39% were Afro-Caribbean, 27% Caucasian, 17% Asian. 61% had known T2DM, 29% known T1DM and 10% newly diagnosed diabetes. Mean BMI was 27.9 kg/m2, mean HbA1c was 96 mmol/mol. 18 patients (31%) had PCR-confirmed COVID-19 on admission. In both waves most patients were male, had T2DM with poor pre-admission glycaemic control and most were overweight/obese. Mixed DKA/HHS was unusually prevalent. During wave 2, patients were younger, COVID-19 was less frequent, more patients with T1DM were admitted, when DKA predominated and only two patients with T1DM had COVID-19. Hyperglycaemic emergency admissions differed between the two waves, with wave 2 seeing increased T1DM admissions and more presentations independent of COVID-19.

Discussion: Better understanding of factors underlying these presentations could help to improve patient support during this time.

Abstract ID: 379

Introducing a local HHS protocol at the beginning of the COVID-19 pandemic: a review of HHS management against national standards before and after

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Introduction: The outbreak of COVID-19 raised concerns that there would be an increased number of patients presenting to GG&C hospitals with hyperosmolar hyperglycaemic state (HHS). This fast-tracked the introduction of a local HHS protocol based on national standards in April 2020. We aimed to review the management of HHS before and after introducing the protocol and to compare patient outcomes.

Methods: Patients were identified by biochemistry data and diagnosis coding at discharge. Data were extracted from clinical systems between January 2019 and January 2021. Data collected included COVID-19 status, morbidity and mortality, length of stay and protocol adherence.

Results: 132 patients were included (83 pre protocol and 49 post). Patients were excluded if they died within 24 hours, were incorrectly

labelled as HHS or if notes were unavailable. 3 patients had COVID-19. 85% had pre-existing diabetes. Mortality rate fell from 22% to 20% post protocol. Rate of complications (AKI, UTI, pneumonia, stroke) fell. Average length of stay fell from 25 to 19 days. Rate of HDU admissions fell from 33% to 23%. The percentage of patients treated with a HHS protocol increased from 30% to 84%. The percentage of patients receiving DVT prophylaxis, IVF within 1 hour and a diabetes review increased following introduction of the protocol. Fluid balance assessment was poorer.
Discussion: An increased number of patients were treated based on national standards following introduction of a local HHS protocol. Only 3 patients had COVID-19 infection, limiting our ability to review outcomes in this cohort. Reassuringly, morbidity and mortality remained stable despite the pandemic and average length of stay fell. The rate of HDU admissions may have fallen secondary to reduced HDU capacity or increased emphasis on advanced care planning. Adherence to the protocol was difficult to assess but there were overall positive trends in adherence.

Abstract ID: 382

Development of a binomial logistic regression model for non-invasive prediction of type 2 diabetes

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Background: Scientific evidence for dietary risk predictors in the case of type 2 diabetes (T2DM) is lacking.
Objective: To develop predictive models to identify T2DM using binomial logistic regression.
Methods: This cross-sectional multi-cited study developed a culturally sensitive questionnaire based on an amended version of the EPIC-Norfolk Food Frequency Questionnaire. Data analysis was carried out on 392 participants (with and without T2DM) aged 18–80 years within Leicester city, UK. Questionnaires collected information on demographics, anthropometric measurements, hypertension, awareness about T2DM along with dietary intake. Descriptive statistics were carried out using Microsoft Excel (Version 10). X2 test and odds ratios were calculated to find statistical significance at p=0.05 and probability of T2DM using IBM SPSS (Version 26).
Results: 14 of 30 variables were statistically significant at the univariate level, which were used as input to develop five predictive models of T2DM. The base model (using gender, ethnicity, hypertension and family history) predicted T2DM with AUROC 0.687(0.635 to 0.740) and AUPRC (0.63). The macronutrient model (AUROC 0.716 (0.665 to 0.766) and AUPRC (0.66)) had a higher predictive power for estimating the incidence of T2DM than the carbohydrate model (AUROC 0.702 (0.651 to 0.754) and AUPRC (0.65)), all nutrient model (AUROC 0.714 (0.664 to 0.765) and AUPRC (0.66)) and the micronutrient model (AUROC 0.711 (0.660 to 0.763) and AUPRC (0.66)).
Conclusion: Dietary-based risk factors, in conjunction with already known risk predictors, can be useful as a non-invasive screening tool in clinical settings to identify T2DM before applying more costly invasive methods.

Abstract ID: 388

Diabetic foot care before and during the COVID-19 epidemic: can we deliver?

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Background: The COVID-19 pandemic produced extreme challenges for the delivery of safe and effective diabetes foot services at every level. This retrospective study (April 2020 to March 2021) at Ipswich Hospital shows that, despite the challenges, adoption of innovative measures including change of referral pathways and templates, clinical triaging and liaisons with primary care services can still be effective in the delivery of safe and effective diabetic foot care.
Results and outcomes: The total number of patients reviewed in secondary care during COVID-19 was 505 compared with 622 in the previous year (2019–2020); the number of individual appointments attended was 2,754 (2,950). Similarly, hospital inpatient referrals were 380 with 736 reviews compared with 506 with 1,028 reviews in the preceding year. During COVID-19, average HbA1c for diabetes foot patients was 8.12±1.75% (7.67±2.12%), uACR was 24.13±68.83 (24.32±72.38) and total cholesterol 4.19±1.63 (3.97±1.95). The total number of angioplasty procedures performed during COVID-19 was 44 (45), lower limb bypasses 5 (4) and lower limb endarterectomies 8 (6). During COVID-19 major amputations were 9 (15) and minor amputations 35 (43). Mortality in diabetic foot subjects was 52 (47) equating to 10.3% (7.5%) of the outpatient caseload.
Conclusion: Compared with the pre-COVID-19 data, the outcomes obtained during COVID-19 demonstrate the importance of access to diabetic foot services in mitigating the risk of complications during a pandemic. Our data suggest appropriate early planning, close liaisons with care providers and timely interventions were key in reducing morbidity and mortality due to diabetic foot complications.

Abstract ID: 375

Implementation of Joint Society Guidance on Diabetes (COVID: Diabetes): dexamethasone/glucocorticosteroid therapy in COVID-19 patients during the COVID-19 pandemic in a district general hospital

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Background/aims: High-dose corticosteroids reduce mortality in COVID-19 patients requiring oxygen therapy. Yet, a triple insult of corticosteroid impaired glucose metabolism, COVID-19 impaired insulin production and increased insulin resistance could cause significant hyperglycaemia increasing morbidity and mortality. Diabetes UK, ABCD and JBDS produced guidance on corticosteroid therapy in COVID-19 patients (June 2020). We assessed implementation of this guidance.
Methods: We audited patients who received dexamethasone for hypoxia-inducing COVID-19 during two admission peaks – October/November 2020 and January/February 2021 (sample n=30). Education was provided, plus diabetes team ward rounds and a guidance summary using the Microguide smartphone app introduced between peaks.

Results: In October/November 2020, 15 had known diabetes versus 15 patients not known to have diabetes compared with 11 and 19, respectively, in January/February 2021. Capillary blood glucose (CBG) checks were carried out as per guidance on at least one of the first five admission days in 27% of patients in October/November 2020 compared with 64% of patients in January/February 2021. 60% experienced hyperglycaemia at least once (CBG >12 mmol/L) in October/November 2020 compared with 70% in January/February 2021. Of the insulin naïve population who had a CBG >12mmol/L (n=15 both), 27% were commenced on intermediate acting insulin in October/November 2020 compared with 60% in January/February 2021. Insulin dose titration as per guidance in 8/9 (89%) in October/November 2020 versus 13/14 (93%) in January/February 2021.
Conclusion: Hyperglycaemia is linked to increased mortality in COVID-19 patients. Most audit patients experienced hyperglycaemia during admission. CBG guidance adherence improved in January/February 2021 in our audit population. Commencing insulin if CBG >12 mmol/L, as recommended, also improved. Whilst adherence improved post-interventions, further staff updates will be needed to ensure adherence before future peaks.

Abstract ID: 384

Establishing a pathway for remote glucose data upload for virtual diabetes consultations

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Background: Historically, patients attend diabetes clinics with their glucose meters or glucose diaries. With the move to virtual consultations during Covid-19 pandemic, there is a need to enable timely transfer of glucose data from patients to clinicians.
Aims: To identify barriers to glucose data upload, to establish a pathway for remote glucose data transfer from home to clinic, and ultimately to improve the quality of diabetes virtual consultations.
Methods: We initially conducted a baseline patient survey to identify barriers to glucose data upload. Then we asked the administrative team to inform patients (via telephone calls or emails) that they will receive Diasend invites to upload their glucose data before the appointment. We sent out Diasend invites and following consultation we collected data of the number of patients who did/did not upload their glucose data and explored with individual patients the reasons for not uploading data. A total of 99 patients were included over four cycles.
Results: The first baseline survey showed that 43.5% of patients were not educated on how to upload data. The sum of four cycles of data showed that 71.7% of patients did not upload their data because they were not familiar with the process, technical issues, short notice or for unknown reason. The majority of patients who uploaded their data are using FreeStyle Libre.
Conclusion: Further Diasend familiarisation is required to achieve better engagement of patients with glucose data upload. This can be included in appointment letters and clinicians need to encourage patients during consultations.

Abstract ID: 365

Improving the management of adult inpatient hypoglycaemia in a large district general hospital: a quality improvement project

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Introduction: 7% of all hospital inpatients in England and Wales have known diabetes, with 20% of those patients still experiencing one or more hypoglycaemic episodes <4 mmol/L and 8.4% <3 mmol/L during their hospital stay. Studies have shown these are most likely to occur overnight or early morning.1 These data show that hypoglycaemia is a common and dangerous but also easily treatable adverse event that occurs mostly out of hours, meaning correct and rapid treatment is crucial. Coinciding with the recent update of the guidance of hypoglycaemia management in adults of our Trust, we took the opportunity to assess our Trustwide compliance and develop an action plan to target the areas requiring improvement
Methods: We completed a retrospective data analysis of patients found to have a capillary blood glucose <4 mmol/L during their inpatient stay. A hypoglycaemic episode ended when a patient's capillary blood glucose normalised at >4 mmol/L. Paediatric patients and those actively dying were excluded from the analysis. A total of 150 hypoglycaemic events across three samples were analysed, assessing compliance with key points of Trust guidance.
Results: Overall compliance with the guideline increased from 6% to 22% between January and June 2021 after our interventions. Pre-emptive hypoglycaemia prescriptions increased from 56% to 72%, whilst the signing of those prescriptions
decreased. Visual and electronic cues proved effective, particularly for junior doctors, but these impacted less on the nursing staff, leading to the relative reduction in prescriptions signed for.
Discussion: These findings show that a multi-modal approach must be taken in quality improvement projects that involve multiple staff roles.

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1. NHS Digital. National Diabetes Inpatient Audit (NaDIA) – 2016.

Abstract ID: 381

A step towards precision nutrition in participants with type 2 diabetes: a self-completed questionnaire-based study

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Background: Currently, there is little or no provision available in NHS primary care to obtain dietary information from the general population and T2DM patients, when even modest attention could be beneficial for reversing T2DM. This study investigates the relationship between dietary nutrients and the development of T2DM among varied ethnic groups living in Leicester city, UK.
Methods: A culturally sensitive online dietary questionnaire was developed (using SoGoSurvey) based on the EPIC-Norfolk Food Frequency Questionnaire. Participants were recruited from community services and NHS primary care GP sites within Leicester. Data analysis was carried out in 392 participants (184 with and 208 without T2DM). The study questionnaire assessed demographics, body measurements, health and lifestyle information along with daily dietary intake of 22 nutrients specific to T2DM at participant and ethnicity

level using Feta software (v2.46) and Microsoft Excel (version 10).
Results: Average daily lower consumption of carbohydrate (p=0.048), MUFA (p=0.006), selenium (p=0.022), zinc (0.000), vitamin A (p=0.325) and vitamin D (p=0.182) was observed among T2DM participants, while a higher consumption of carbohydrate, selenium, zinc, recommended levels of vitamin A and lower consumption of MUFA and vitamin D was prominent in those without T2DM. Average higher intake of non-alcoholic beverages was identified among white British, African, Pakistani and Bangladeshi participants with T2DM compared with those without T2DM.
Conclusion: A study questionnaire could be adopted as a non-invasive screening tool to set personalised dietary goals for the management and also the prevention of T2DM.

Abstract ID: 300

A case of MODY difficult to diagnose

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Introduction: Maturity onset diabetes of the young (MODY) is an inherited form of non-autoimmune diabetes that usually presents before the age of 25 years.[1] It is monogenic diabetes that is inherited in an autosomal dominant fashion.[2] Several causative mutations have been identified, the commonest of which are HNF1A, HNF4A, HNF1B and GCK.[3]
Case report: A 17-year-old female attended the diabetes clinic after initially presenting in primary care with dizziness and HbA1c of 75. She had no phenotypic features of type 2 diabetes. At this time, a possible diagnosis of latent autoimmune diabetes in adults (LADA) was considered and anti-GAD antibodies were requested which were later found to be negative. The patient was initiated on metformin which was titrated up to the maximum dose. Despite this, the patient's glucose level remained high and she was later switched to modified release due to gastrointestinal side effects. The dipeptidyl peptidase-4 (DPP-4) inhibitor linagliptin 5 mg once daily was also added to optimise blood glucose control. Despite the above measures, blood glucose levels remained poorly controlled and the patient began reporting recurrent episodes of thrush, so the sulfonylurea gliclazide was added as a third agent. The patient was provided with health and lifestyle advice throughout her time attending the diabetes clinic and was reviewed by a dietician. As a result, the patient lost a reasonable amount of weight. At her subsequent appointments in the 9 months after diagnosis, her HbA1c was found to be 35 so it was decided to stop both the sulfonylurea and DPP-4 inhibitor. It was thought possible that the weight loss had precipitated a return to euglycemia or probably due to the honeymoon period of diabetes. After almost 1 year from diagnosis, the patient's blood glucose levels had risen again on metformin alone and her HbA1c had drifted up as a consequence. She was re-started on gliclazide 80 mg twice daily. After a few months, the patient's HbA1c reflected optimised glycaemic control on a combination of metformin and gliclazide. During this period a referral was made to the Genetic Diabetes Specialist for Wales and the report is as follows: 'Sequencing of RFX6/14 shows a heterozygous disease-causing variant and this is causing a frameshift mutation,' showing that the patient has a genetic predisposition to diabetes. It was also noted at this time that the patient appeared to be very sensitive from the diabetes perspective to gliclazide. With regard to family history, her father has diabetes which was diagnosed in his forties. She reports he is overweight and currently on insulin therapy. Following further genetic analysis of family members, it was found that her mother, who does not have diabetes, has the same genetic abnormality. Her father who does have diabetes does not have the same genetic abnormality. These genetic reports resulted in a diagnosis of MODY. Eventually, the patient was put on insulin due to poor blood glucose control with oral glycemic agents.
Discussion: The RFX6 gene encodes for a transcription factor that directs islet cell differentiation in the pancreas. Studies have shown that mice without RFX6 are unable to generate any of the normal islet cell types apart from pancreatic-polypeptide-producing cells.4 This tells us that RFX6 likely has an important role in the normal development of the pancreas. Mutations in RFX6 have previously been associated with Mitchell–Riley syndrome, the common features of which are neonatal diabetes, pancreatic hypoplasia, intestinal atresia, biliary atresia and gallbladder aplasia/hypoplasia.5 Mutations in RFX6 have also been previously shown to be associated with MODY. Patel et al sequenced the DNA of MODY patients with unknown etiology and compared their findings with a control population.2 They found that RFX6 protein truncating variants were more frequent in their MODY cohorts. They went on to find that RFX6 heterozygotes showed reduced penetration of diabetes compared with other known genetic causes of MODY such as HNF1A and HNF4A mutations. This is very relevant to our case study as our patient's mother has the same RFX6 mutation as the patient; however, the mother does not have diabetes which could be explained by the reduced penetrance of the mutation. Other case reports further support this association between RFX6 and MODY. Zuckerman Levin et al identified four generations of diabetes mellitus in one family caused by a heterozygous mutation in the RFX6 gene.6 Akiba et al also report an RFX6 mutation in a family with three generations of diabetes.7 MODY is often initially misdiagnosed initially as type 1 or type 2 diabetes. Although it is a rare cause of diabetes, accurate diagnosis is important for the management of the patient and the family. Studies have shown that those with HNF1A and HNF4A mutations show increased sensitivity to sulfonylureas, so this will have a great impact on management.3 Identification of the genetic mutation can also guide management for other family members and future generations.
Conclusion: This case report further supports the evidence of the causative relationship between mutations in the RFX6 gene and MODY. It also highlights the importance of early consideration of the less common causes of diabetes such as MODY in atypical presentations. This should improve diagnostic timeframes and result in tailored management for these patients, improving outcomes for the patients and their families.

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Abstract ID: 360

Glucagon-like peptide 1 receptor agonists: inpatient use during the COVID-19 pandemic

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Introduction: Glucagon-like peptide 1 receptor agonists (GLP1RAs) are increasingly used in the management of type 2 diabetes. There is uncertainty surrounding their use during acute hospitalisation and few data for inpatient outcomes – especially during COVID-19 infection.
Methods: Electronic records of all patients using GLP1RAs at the point of hospital admission during the COVID-19 second wave were obtained. Data were collected on COVID-19 status, inpatient glycaemic control, continuation of GLP1RA or reason(s) for discontinuation. Glycaemic control was determined by the number of 'Good Diabetes Days' (GDD), defined as days with no values <4 mmol/L and ≤1 value >11 mmol/L and ≥2 tests/day.
Results: 101 patients fulfilled the inclusion criteria. 43% of these had GLP1RAs discontinued on admission. Positive COVID-19 infection was seen in 14, and 12 of these were treated with dexamethasone. In those with COVID-19 infection, GLP1RAs were discontinued in 71% compared with 38% without COVID (p=0.12). GDD were seen in 19% of total hospital days in COVID-19 positive patients and 47% in COVID-19 negative patients (p<0.001). In COVID-19 positive patients, continuing GLP1RA was associated with poorer glycaemic control than discontinuation (11% vs 20%, p=0.32). In COVID-19 negative patients, glycaemic control was no different in those continuing and discontinuing treatment (48% vs 45% GDD, p=0.44). Discontinuation of treatment with GLP1RAs on admission to hospital was common. In COVID-19 positive patients, this may be due to reduced efficacy in the context of treatment with high-dose steroids but no difference in glycaemic outcomes was seen in non-COVID admissions.