Congress Abstracts*

44th Annual Conference of the Association of Clinical Biochemists in Ireland (ACBI 2022)

The Kingsley Hotel, Cork, Republic of Ireland
Conference Secretary: Dr Seán Costelloe

*These abstracts have been reproduced directly from the material supplied by the authors, without editorial alteration by the staff of this Journal. Insufficiencies of preparation, grammar, spelling, style, syntax, and usage are the authors.

Abstract 01

False identification of icterus by eye in a complex patient with severe neutropenic sepsis

Kerr B[1], Murphy A[1], Mykytiv V[2], Costelloe S[1]
1. Department of Clinical Biochemistry, Cork University Hospital (CUH), Wilton, Cork
2. Department of Haematology, CUH

Background
Lactate can help identify severe septic shock or hypoperfusion in critical patients. However, certain lactate assays are affected significantly by icterus. Where visual inspection for icterus is used, it is subjective and error-prone, impacting the reliable reporting of results.

Case
A patient with a history of severe aplastic anaemia was admitted to the Intensive Therapy Unit (ITU) in week two of their hospital episode. While in ITU, lactate of 10.2 mmol/L was measured using a colourimetric lactate oxidase method. Since serum indices are not run for all fluoride oxalate specimens at CUH, the laboratorian initially judged by eye that the specimen was grossly icteric and considered blocking the result as per manufacturer's instructions. The Consultant Biochemist requested an icteric index, which was inconsistent with gross icterus "1+". Previous results were characteristic of aplastic anaemia, and serum discolouration due to eltrombopag was suspected. The Haematology team confirmed the patient was on this therapy. The lactate result (and subsequent reports) were released with comments advising to interpret values with caution. Discolouration of serum by eltrombopag can mimic icterus in appearance. The effects of this drug on colourimetric assays have been described, although not for lactate. In this case, a specimen appeared grossly icteric, raising the possibility that the elevated lactate result, although consistent with sepsis, was spurious. Measurement of icterus by an automated method proved essential to exclude icterus. Clinical liaison allowed identification of the likely cause of serum discolouration. A different laboratorian may have adjudicated that the specimen was truly icteric and not released the lactate result.

Conclusions
This case emphasises the need for clear clinical details and details of drug regimens and reliable serum indices to be run on all blood specimens. Fundamentally, laboratory staff need procedures when considering assay interferants that have patient safety at their core.

Abstract 02

An unusual cause of Hypertriglyceridemia in an Infant

Chiwara P[1], Lynch Quinn E[1], O'Dwyer J[1], Brady JJ[1], Cotter M[1], Kyne L[2], Elsammak M[1]
1. Department of Paediatric Laboratory Medicine, Children's Health Ireland at Temple Street
2. Department of Paediatrics, Children's Health Ireland at Temple Street

Background
Slight changes in the lipid profile and ferritin can be observed over the acute phase of infectious diseases. We describe a case highlighting iatrogenic causes of hypertriglyceridemia that should be considered early during course of treatment.

Case
An 8 week old boy was admitted after being unwell the previous day with lethargy, vomiting and decreased feeds. His clinical examination was unremarkable. Urine microscopy showed pyuria and bacteriuria. FBC showed leucocytosis, anaemia and thrombocytosis. His CRP was 25 mg/L. He was treated with antimicrobials. However, after 8 days of Ceftriaxone treatment, his LFT's were noted to be mildly deranged (AST 98 U/L, ALT 113 U/L). Antibiotic cover was changed to Meropenem. After 5 days of Meropenem treatment, his blood was noted to be lipaemic. His triglycerides were raised at 16.75 mmol/L and serum ferritin was raised at 1,042 µg/L (reference interval 6–430 µg/L).

In view of raised triglycerides and ferritin haemophagocytic lymphohistioctyosis (HLH) was considered; however, haematological criteria were not met. Secondary causes of hyperlipidemia namely TPN, IDDM, hypothyroidism, renal failure were excluded. Primary hereditary dyslipidemia disorders including lipoprotein lipase and ApoCII deficiency were deemed unlikely as there was no indication of an inherited disorder of carbohydrate metabolism. The possibility that medication may have caused the hypertriglyceridemia was considered. Measurement of triglycerides on stored plasma prior to starting Meropenem was essentially normal and Meropenem was discontinued as the likely cause of the hypertriglyceridemia. A decrease in triglycerides one week post discontinuing Meropenem was observed. The patient was discharged home after 4 weeks and is doing well post review.

Conclusions
In this child with UTI, marked hypertriglyceridemia appeared suddenly after 5 days of Meropenem treatment and resolved quickly after discontinuation. Meropenem has been reported in one other case as a cause of alterations in lipid profile. Monitoring of the lipid profile should be considered in patients treated with Meropenem.

Abstract 03

A Confectionary cause of biochemical mimic for Fructose-1,6-bisphosphatase (FBP1) deficiency

Fitzsimons Pe[1] Gerrard A[2],Brothwell S[3],Brady JJ[1],Schwahn B[5], Morris AA[5],Crushell E[4,6]
1. Department of Laboratory medicine, Children's Health Ireland at Temple Street, Dublin, Ireland
2. Newborn Screening & Biochemical Genetics, Birmingham Women's and Children's NHSFT
3. Department of Paediatrics, Birmingham Women's and Children's NHSFT
4. National Centre for Inherited Metabolic Disorders, Children's Health Ireland at Temple Street, Dublin, Ireland.
5. Willink Metabolic Unit, Genomic Medicine, St Mary's Hospital, Manchester University Hospitals, UK
6. Department of Medicine, University College Dublin, Dublin, Ireland

Background
Fructose-1,6-bisphosphatase (FBP1) deficiency is characterized by episodic crises of lactic acidosis and ketotic hypoglycemia, manifesting as hyperventilation, apnoea, seizures, and/or coma. Crises are often triggered by fever, fasting or ingestion of large amounts of fructose. Characteristic findings include glyceroluria and pseudohypertrigyceridaemia.

Case
We present a 4 year old girl who presented acutely with ketotic hypoglycaemia and reduced level of consciousness. She became unwell shortly after ingestion of a 'slushie' drink. On admission, GCS was reduced, blood glucose was 2.6 mmol/L. She recovered following IV dextrose. Urine organic acid profile, collected after treatment started, revealed a lipolytic-pattern, increased lactate consistent with elevated blood lactate (4.13 mmol/L) and markedly increased glycerol with pseudohypertriglyceridemia (10.85 mmol/L). Blood ketones were 1.06 mmol/L at time of urine collection. She had been investigated in infancy for epilepsy and developmental delay, organic acid analysis then was normal.
Fructose-1,6,- bisphosphatase deficiency (FBP1 gene defect) was suspected. Parents were instructed to avoid fasting and foods/confectionary containing fructose until genetic investigations were completed. Analysis of the FBP1 gene was negative and subsequent whole exome sequencing was also negative. Repeat urine organic acids were normal.

Conclusions
'Slushies' are ice based beverages typically containing water, fruit juices and syrups (often high fructose containing corn syrup). Glycerol is used as a flavour enhancer. We have identified and describe eight other cases who presented similarly. These crises are suggestive of glycerol intolerance, the cause of which is unclear but may represent increased sensitivity of F1,6BP enzyme to inhibition by glycerol-3-phophate. It has been previously speculated that sensitivity to hypoglycaemia may be due to delayed maturation of enzymes of the glycerol metabolic pathway.
In cases of hypoglycaemia associated with lactic acidosis it is important to consider confectionary intake when taking a dietary and medical history and awareness of this potential differential diagnosis for glyceroluria.

Abstract 04

A case of AST assay interference

Brady JJ[1, 6], Cullen R[2], Kavanagh L[2], Oddy S[3], Halsall D[3], Fitzpatrick E[4], Browne F[5]
1. Department of Clinical Biochemistry, Children's Health Ireland at Temple St, Dublin
2. Department of Clinical Biochemsitry, Mater Misericordiae University Hospital, Dublin
3. Department of Clinical Biochemistry, Cambrdige University Hospitals, UK
4. Department of Gastroenterology, Children's Health Ireland at Crumlin,
5. Dublin Department of Dermatology, Children's Health Ireland at Temple St, Dublin
6. School of Medicine, University College Dublin.

Background
An 11-year-old girl attended dermatology as an outpatient presenting with nodular cystic acne. She was otherwise well with no past medical history of note. Routine bloods were taken as Isotretinoin was being considered as a treatment.

Case
Her renal profile was normal. Her liver profile was notable for an increased AST of 318 U/L (0–40) with ALT 14 U/L (0–35), alkaline phosphatase (ALP) 461 U/L (50–350), total bilirubin 11 µmol/L (0–17), albumin 43 g/L (32–48) and total protein 67 g/L (60–80). On review of the discordant AST relative to ALT, the sample was rerun following storage for 3 days at 4 °C. The AST had dropped to 95 U/L. On review of the literature this raised the possibility of macroAST as this complex is unstable upon refrigeration. CK was within the normal range. The discordant AST was confirmed on a repeat blood sample. This sample was subjected to PEG precipitation. The % recovery (AST + PEG result/AST + PBS result) × 100) was low at 3% when compared to patient controls (43–53% recovery). Confirmatory testing by gel filtration chromatography showed elution with immunoglobulins, in keeping with the presence of macroAST. Gamma GT, alpha 1-antitrypsin, caeruloplasmin were all within the normal reference intervals and a connective tissue disease screen was negative. Her liver and spleen were normal on imaging. She was subsequently started on Isotretinoin without any complications.

Conclusions
MacroAST is rare but has been reported in children as well as adults. It is considered to be a benign finding and not associated with liver or muscle pathology. This case highlights the importance of recognising assay interference to ensure that additional unnecessary and expensive investigations are minimised and that there is no impact on patient management.

Abstract 05

Forward Thinking for Reverse PseudoHyperKalaemia

Kavanagh-Wright L[1], Maung SW[2], Lee GR[1]
1. Dept. of Clinical Biochemistry and Diagnostic Endocrinology, Mater Misericordiae University Hospital;
2. Dept. of Haematology, Mater Misericordiae University Hospital

Background
Pseudohyperkalaemia due to *in vitro* red cell haemolysis is commonly observed in the biochemistry laboratory. The term also describes the phenomenon of elevated potassium (K) concentration in serum samples compared to paired plasma, thought to be caused by further release of potassium from platelets and other cellular components during clot formation. Reverse Pseudohyperkalaemia, describes instances where spuriously elevated potassium may occur in plasma samples, with normokalaemia in paired serum. It is believed to be caused by *in vitro* lysis of leukaemic cells or erythrocytes during pneumatic tube delivery or centrifugation, secondary to heparin-mediated cell membrane damage.
We present two cases from our hospital following biochemical analysis of electrolytes on Lithium- Heparin plasma samples with intervention by the Duty Biochemist to enable result reporting.

Case 1
A 58 year old female Chronic Lymphocytic Leukaemia patient attended our Oncology-Haematology Unit. White Blood Cell count (WBC) was 392.55 × 10^9/L (Ref Range: 3.50–11.00). Plasma analysed in Biochemistry had a potassium result of 7.5 mmol/L with borderline haemolysis (H Index 0.63). The Duty Biochemist noted that the paired serum sample, sent for LDH, was not haemolysed (H index 0.11). The potassium request was added to the serum sample (K=4.4 mmol/L) and reported with a serum appropriate reference interval.

Case 2
A 41 year old male, diagnosed with Non-Small Cell Lung Adenocarcinoma attended our Medical Oncology Unit: WBC=14.46 × 10^9/L. Potassium was 5.4 mmol/L in a haemolysed plasma sample (H Index 4.66). Duty Biochemist follow up identified that a paired serum for LDH was not haemolysed (H Index 0.61), and serum K was reported (4.5 mmol/L) with appropriate reference interval.

Conclusions
Our examples demonstrate Reverse Pseudohyperkalaemia occurring in patients with varying WBCs and H indices. We contend that Reverse Pseudohyperkalemia is not a frequently considered cause of *in vitro* haemolysis and pseudohyperkalaemia. Recognising this phenomenon can allow simple intervention and reporting of a basic but important biochemical test.

Abstract 06

An unexpected follow-up of increased Leucine on Newborn Blood Spot Screening

Pasztetnik K[1], Mc Carthy R[1], Trench C[1], Fitzsimons Pe[1], O'Grady L[2], Monavari AA[3], Elsammak M[1]
1. Metabolic Laboratory, Department of Paediatric Laboratory Medicine, Children's Health Ireland at Temple Street
2. National Newborn Blood Spot Screening Laboratory, Department of Paediatric Laboratory Medicine, Children's Health Ireland at Temple Street
3. National Centre for Inherited Metabolic Disorders Children's Health Ireland at Temple Street

Background
The National Newborn Bloodspot Screening Laboratory screens all consented newborns for nine conditions, one of which is maple syrup urine disease (MSUD) using the amino acid leucine.

Case
Plasma branched chain amino acids were requested on a 17-day-old boy exclude a mild variant Maple syrup urine disease (MSUD) because of a borderline leucine on neonatal bloodspot screen performed at day 5. Baby was born at gestational age 41 weeks. His birth weight was 4.4 kg, and he did not have immediate perinatal problems. There were no complaints of nausea, vomiting, or poor oral feeding. He did not show tremor, seizures or any other neurologic symptoms suggestive of MSUD. There was no specific family medical history. Metabolic investigations confirmed slight increase in leucine (231 µmol/L, ref <230) and isoleucine (116 µmol/L, ref <105) with a small peak of alloisoleucine (6 µmol/L, ref <5) detected on plasma amino acids. Leucine was borderline on repeat analysis with no alloisoleucine detected. Urine organic acid analysis were requested to clarify findings and revealed marked increase in 3-Methylcrotonylglycine and 3-hydroxyisovalerate. Acylcarnitine analysis of the newborn screening card showed increased C5-hydroxyacylcarnitine 14.95 µmol/L (ref 0.06 to 0.32) with borderline low free carnitine suggesting isolated 3-methylcrotonyl-coenzyme A carboxylase (3MCC) deficiency, an autosomal recessive disorder in leucine catabolism. Many individuals with 3MCC remain asymptomatic into adulthood. Others can present with a Reye-like syndrome of ketoacidosis, hypoglycemia, hyperammonemia which can lead to seizures, coma and possibly death. Others present with failure to thrive, hypotonia or spasticity. Baby was referred to the Metabolic Team at Temple Street for follow-up including carnitine supplementation, a trial of biotin and genetic confirmation of 3MCC.

Conclusions
In the absence expanded newborn screening urine organic acid analysis may be helpful in clarifying increased leucine levels on initial screen when MSUD is not suspected clinically.

Abstract 07

‘That’s Gas!’ – Evaluation of the Abbott Alinity Carbon Dioxide assay

Boyle A, Walsh I, Lee GR, Cullen MR
Dept. of Clinical Biochemistry and Diagnostic Endocrinology, Mater Misericordiae University Hospital, Eccles St, Dublin 7

Background
The determination of total serum carbon dioxide (TCO2) in conjunction with other biochemistry is necessary for the evaluation of acid base status. Accurate analysis of TCO2 is confounded by known stability issues of the reagent, internal quality control material and patient samples. The aim of this study was to analytically verify the Abbott Alinity Carbon Dioxide assay.

Methods
Accuracy was assessed using UKNEQAS EQA samples (n=6). Imprecision was determined at three TCO2 concentrations by analysing fresh internal quality control (IQC) material five times over five days. A method comparison was performed with the Randox TCO2 assay (n=280 samples). On-board reagent calibration and IQC stability studies were performed.

Results
Five of the six EQA samples were within 2SD of UKNEQAS Abbott Alinity method laboratory trimmed mean (MLTM). Intra-assay imprecision at mean TCO2 concentrations of 18 mmol/L, 24.8 mmol/L and 34.4 mmol/L was found to be 0.8, 0.6 and 0.6% respectively. Inter-assay imprecision at the same mean concentrations was 2.0, 1.3 and 0.9% respectively. Bland–Altman analysis of patient samples demonstrated an average negative bias of 3.2 mmol/L when the Alinity assay was compared to a Randox TCO2 assay. At day 14 post calibration, there was an average of 5.2% decrease of TCO2 concentrations in fresh IQC material when compared to day 1. Aliquots of IQC were less stable when stored at 4 °C compared to storage at −20 °C over 38 hrs.

Conclusions
This study highlights the issue of verifying an assay with known stability issues. The manufacture’s claims for imprecision were verified, however the reagent may require more frequent calibration than the 14 day claim. Further work will be required to verify the reference interval.

Abstract 08

Calcium Verification with a Difference?

Azeez A, Lee GR
Dept. of Clinical Biochemistry and Diagnostic Endocrinology. Mater Misericordiae University Hospital. Eccles St. Dublin 7. Dublin. Ireland.

Background
Method verification invariably involves studies of imprecision and inaccuracy however the incidence of irregular analytical errors, or “fliers”, is neither validated by manufacturers nor routinely verified. Some tests (e.g. calcium, Ca) seem particularly prone in our experience, identified in our laboratory routinely through duplicate testing, to help reduce reporting of erroneous results and patient harm. Upon replacing Abbot Architect with Alinity instrumentation, we aimed to verify a third party (Randox) calcium method and to evaluate any effect of calcium methodology and/or instrumentation on the incidence of fliers for calcium and other biochemical tests.

Methods
Verification studies of imprecision, inaccuracy and method comparison were extended to duplicate analysis (n=472) and flier estimations involving the Randox and Abbott Arsenazo III Ca methods, on the Abbott Alinity. Flier estimations (Alinity, 21–28/06/2022) based on duplicates from Ca (n=6,039) analysis were also obtained for sodium (Na, n=7,620) and

Alkaline Phosphatase (ALP, 7,263) and compared to historical Architect-based estimations from the same period in 2021. Fliers were identified when differences between duplicate results exceeded laboratory-defined criteria as follows: Ca >0.04 mmol/L, Na >4 mmol/L and ALP >18%.

Results
The Randox Ca method showed acceptable imprecision (CV <0.7%) but was positively biased (median: 0.07 mmol/L) and showed a higher incidence of Ca fliers (4.8 vs 1.9%) than the Abbott method. However, notable improvement in flier incidence was observed with Alinity-compared to Architect-based analysis, particularly for Ca (4.5 vs 20.6%) but also for Na (0.03 vs 0.08%) and ALP (0.03 vs 0.07%).

Conclusions
The higher incidence of fliers with the Randox method does not support a change from the Abbott calcium method. Considerable improvement in the incidence of fliers for all chemistry-based tests on the Alinity compared to the Architect platform might support a change to singlet analysis.

Abstract 09

Changes in Diagnosis of Gestational Diabetes Mellitus during the Covid-19 Pandemic at a large Maternity Hospital in Southwest Ireland

Costelloe SJ[1], Neville J[1,2], Rico Rios N[1], Culliney L[3], Foley K[1], Mykytiv V[4], O'Halloran F[2], Kgosidialwa O[5], O'Riordan M[6]
1. Department of Clinical Biochemistry, Cork University Hospital (CUH), Wilton, Cork
2. Department of Biological Science, Munster Technological University, Bishopstown Campus, Cork
3. Department of Clinical Nutrition, Cork University Maternity Hospital (CUMH), Wilton, Cork
4. Department of Haematology, CUH
5. Department of Diabetes and Endocrinology, CUMH
6. Department of Obstetrics and Gynaecology, CUMH

Background
Targeted screening for Gestational Diabetes Mellitus (GDM) occurs routinely at 24–28 weeks gestation using the oral glucose tolerance test (OGTT). During the COVID-19 pandemic, the Health Service Executive (HSE) and the Royal College of Obstetricians and Gynaecologists recommended discontinuing the OGTT to minimise hospital visits. Fasting plasma glucose (FPG), random plasma glucose (RPG), and glycated haemoglobin (HbA1c) were instead proposed for diagnosing GDM. This study retrospectively compared testing patterns and putative diagnostic rates for GDM in pregnancies using the HSE guidelines pre- and post-pandemic.

Methods
Pregnancies with complete gestation in the 18 months before (Group1) or 18 months after (Group2) adoption of revised HSE guidance at CUMH (01/05/2020) were included. Women with pre-existing diabetes mellitus were excluded. Results were extracted from databases at the Departments of Clinical Biochemistry and Haematology at CUH. Diagnostic cut-offs for GDM were: OGTT (FPG ≥5.1 mmol/L or 2-h plasma glucose ≥8.5 mmol/L), FPG (≥5.1 mmol/L), RPG (≥9 mmol/L), and HbA1c (≥39 mmol/mol). Diagnostic rates were compared using Chi-square analysis. The study was approved by the Cork Teaching Hospitals Clinical Research Ethics Committee.

Results
In Group1, 43.8% of 6,737 pregnancies had an OGTT, compared with 20.5% of 6,743 pregnancies in Group2. After implementing the revised guidelines, OGTT requests were 34.5% and 79.7% lower for primary and secondary care, respectively. Comparing Group1 with Group2, FPG was measured in 46.9 vs 49.8%, RPG in 13.3 vs 11.8%, and HbA1c in 23.7 vs 51.9%. The positive rate for GDM testing was 15.9% in Group1 and 22.0% in Group2 ($p<0.00001$).

Conclusions
OGTT use fell significantly with revised HSE guidelines, although only a modest reduction was observed in primary care. HbA1c use in pregnancy doubled during the pandemic. The proportion of pregnancies with biomarkers positive for GDM showed a small but significant increase upon adopting the new diagnostic guidelines.

Abstract 10

NT-proBNP in primary care. What`s the indication and can it be interpreted?

Cunning C, Lee GR

Background
The term “CDM”, Chronic Disease Management, has become a familiar “clinical” detail accompanying NT-proBNP requests from primary care. We forecasted need to better capture the test’s indication and other relevant clinical information. We designed and implemented a “Clinical Information Form” (CIF) and reviewed its use. The aim of this study was to review NT-proBNP testing in primary care.

Methods
Completed CIFs were collated from laboratories at two hospitals; Mater Misericordiae University Hospital Dublin (MMUH) and Midlands Regional Hospital, Mullingar (MRHM). Results were extracted from respective LISs from the date of first implementation of NT-proBNP at each laboratory (MMUH: January to September 2022, n=1922 and MRHM: August-September 2022, n=122).

Results
Patient median age was similar at both sites but disproportionately more males were tested for NT-proBNP at MRHM (64%, 49% at MMUH). NT-proBNP requests per week averaged 51 and 41 in MMUH and MRHM, respectively. The most common reason for testing [MRHM: 44%, MMUH:25%] was to obtain a baseline NT-proBNP for patients with existing heart failure (HF), atrial fibrillation (AF), ischaemic heart disease (IHD) or type 2 diabetes (DM). Case finding was the second highest indication in MMUH (25%, 20% at MRHM). Obesity (BMI >30 kg/m^2) and NT-proBNP lowering drugs were reported in almost one third (MRHM: 27%, MMUH: 32%) and up to over one half (MMUH: 25%, MRHM: 54%) of requests, respectively.

Conclusions
The CDM programme has increased availability of NT-proBNP testing in primary care where it is indicated not only for patients with the programme’s named chronic diseases (HF, AF, IHD, DM) but also for high risk or suspicion of HF. Result interpretation and management varies accordingly to indication and is influenced by variables affecting NT-proBNP concentration, prevalent in this patient cohort. Our CIF initiative may have national appeal to help support audit, quality improvement appropriate result interpretation and management.

Abstract 11

Elevated serum Neurofilament Light chain (NfL) as a potential biomarker in neuropsychiatric disorders

Einstein, H[1], Coada, I[2], McCarthy, G[2,3], Adamis, D[2], Moran, B[1], Finn, K[1]
1. Department of Analytical, Biopharmaceutical and Medical Sciences, School of Science and Computing, Atlantic Technological University Galway City, Dublin Road, Galway, Ireland
2. Department of Psychiatry, Sligo Mental Health Services, Sligo University Hospital, Clarion Road, Sligo, Ireland
3. School of Medicine, University of Galway, Galway, Ireland

Background
Neurofilament light chain (NfL) is a well characterised biomarker for axonal damage in several neurodegenerative disorders. However, its clinical utility in neuropsychiatric disorders remains to be elucidated. The aim of this study was to investigate the biomarker potential of serum NfL concentrations in patients with neuropsychiatric disorders.

Methods
The patient cohort (n=107; 58.9% males) had a mean age of 43 (SD 14.9) and were categorised following psychiatric assessment into the following diagnostic groups; affective disorders 52 (48.6%), alcohol/substance misuse 26 (24.3%), schizophrenia 21 (19.6%) and personality disorders 8 (7.5%). A longitudinal study was also carried out with patients having up to three follow-up assessments. Each serum NfL sample was measured in duplicate using the NF-light ELISA (UmanDiagnostics) as per manufacturer's instructions. Data was analysed using a 1/y2 -weighted 4-parameter logistic curve (4 PL) using GraphPad Prism (Version 8).

Results
The intra- and inter-assay coefficients of variance (CV%) were <10%; assessed using quality control material supplied by the manufacturer. No significant difference in serum NfL concentrations were observed between genders or patients presenting with/without psychotic episodes ($p>0.05$). When compared to age-matched healthy controls, NfL concentrations in all diagnostic categories were significantly elevated in all age groups examined 20–29 years ($p<0.001$), 30–39 ($p<0.001$), 40–49 ($p<0.001$), 50–59 ($p<0.001$), except 60–69 ($p>0.05$). Additionally, the NfL concentrations were elevated in the 50–59 and 60–69 age categories compared to the younger age categories (20–49; $p<0.001$).
Comparative analysis between the four diagnostic groups demonstrated the alcohol/substance misuse disorders had the highest NfL concentrations which differed significantly compared to the other diagnostic groups: affective disorder ($p<0.05$), personality disorders ($p<0.05$) and schizophrenia ($p<0.001$). Furthermore, longitudinal analysis showed no significant difference in NfL levels across the diagnostic groups.

Conclusions
This study demonstrates serum NfL may be a potentially useful biomarker for neuropsychiatric disorders and allow differentiation between neuropsychiatric subtypes.

Abstract 12

Evaluation of the Helge H10 Analyser to Detect Haemolysis at Phlebotomy

Holland S[1], Foley K[1], Bransfield A[1], Caverley H[2], Butler M[2], Heeney L[3], Mulcahy R[3], Deasy C[4], O'Sullivan Í[4], Costelloe Sj[1]
1. Department of Clinical Biochemistry, Cork University Hospital (CUH), Wilton, Cork.
2. Point-of-care Department, CUH.
3. Phlebotomy Department, CUH.
4. Emergency Department (ED), CUH.

Background
Haemolysis commonly causes interference in biochemistry analyses. Medical laboratories define haemolysis indices (HI) for analytes above which the reporting of potentially spurious results is prevented. However, clinicians often discover that specimens are haemolysed only after the final laboratory report is generated (~1.5 h at CUH). Haemolysed specimens may prompt repeat phlebotomy, resulting in an undesirably long time-to-result for critical analytes such as cardiac troponin (cTn). Detection of haemolysis at phlebotomy might help minimise the number of haemolysed specimens sent to the laboratory and aid patient triage and treatment. The aim of this study was to evaluate the accuracy of the Helge H10 (Hemcheck Sweden) point-of-care analyser to detect haemolysis in ED specimens and consider the potential clinical risks and benefits of using this device.

Methods
Over three weeks, whole-blood serum specimens taken at ED rounds by phlebotomists were analysed on the H10, which was configured to classify specimens with haemoglobin >0.5 g/L as "positive" for haemolysis. Specimens also had HI calculated on a Beckman AU5800 autoanalyser, and paired results were compared.

Results
The H10 demonstrated 37.5% sensitivity and 98.0% specificity for detecting haemolysis (n=311). Of nine positive results on the H10, 6 were false positives. In 5 false negatives (FNs) on the H10, haemolysis ranged from HI1-3 on the AU5800, and certain results were withheld, including cTn in 2 instances.

Conclusions
Haemolysis was infrequent in the samples examined, reflecting the skill of the phlebotomists. Were the H10 to be used to guide repeat sampling at phlebotomy, it might be helpful to tailor the cut-off to those more critical results, such as troponin and evaluate, if feasible, the use by other potential users such as triage nurses. The H10 appears to perform well as a pre-laboratory'rule out' for haemolysis, but the impact of false reassurance provided by FNs should be carefully considered before implementation.

Abstract 13

Investigation of the Effect of Increased Centrifugation Time During Polyethylene Glycol Precipitation on the Percentage Recovery of Prolactin

Herbert E, Finnegan S, Bransfield A, Joyce CM, Costelloe S
Department of Clinical Biochemistry, Cork University Hospital (CUH), Wilton, Cork.

Background
Hyperprolactinemia is a common infertility investigation and may be the first indication of pituitary dysfunction. Prolactin (PRL) immunoassays are prone to interference from a biologically inactive complex of PRL with Immunoglobulin G, termed macroprolactin (MPRL). Most laboratories use polyethylene glycol (PEG) precipitation to detect the presence of MPRL and estimate monomeric prolactin for clinical management. Comparison of results from Addenbrooke's Hospital for another macro-complex (thyroid stimulating hormone (TSH), AutoDELFIA®) suggested under-recovery with the methodology used at CUH. This observation prompted a review of PEG-precipitation procedures at CUH and revealed a shorter centrifugation time for MRPL analysis compared with other sites. This study investigated if increasing the centrifugation time (from 5 to 30 minutes) during PEG precipitation affected the recovery of prolactin.

Methods
Forty-two patient samples were selected based on laboratory criteria for MPRL analysis at CUH (>600 IU/L, males and >700 IU/L, females). Serum samples were split into two batches. Batch 1 was analysed using the standard MPRL protocol at CUH. Batch 2 had a longer PEG centrifugation step (30 min), but all other variables remained constant. Prolactin in the supernatant was analysed on the Abbott Architect i4000SR by a chemiluminescent immunoassay. Statistical analyses were performed in Excel.

Results
There was a statistically significant difference between both methods of PEG precipitation ($p<0.001$, Student t-test). Passing-Bablok regression showed a linear relationship between batches ($y=x-2$), and Pearson's correlation coefficient was $r=0.9824$. Bland–Altman analysis showed a mean difference of –1.5 mIU/L (limits of agreement: +2.1 mIU/L to –5.1 mIU/L).

Conclusions
Recovery of MPRL showed a small but statistically significant decrease with increased centrifugation time during PEG precipitation. This difference is unlikely to affect the detection of MPRL or impact patient care. It is proposed that the differences in macro-TSH results which prompted this study were due to inter-assay bias.

Abstract 14

Angiotensin Converting Enzyme (Ace) Levels in Irish Population after Covid

Hutchinson K[1], Carroll C[2], Mahony A[1], Ryan A[1], Louw M[1], Rochev Y[3]
1. Eurofins-Biomnis, Sandyford, Dublin 18, Ireland
2. School of Biological and Health Science, Technological University Dublin
3. School of Chemistry, National University of Ireland, Galway, Ireland

Background
ACE is a potent pro-inflammatory modulator that controls chemokines and adhesion molecules, and elevated ACE activity associated with immunoinflammatory conditions, including cardiovascular diseases (CVD) and diabetes. The ACE inhibitors are recommended as primary treatment for these illnesses. ACE is a peptidyl-dipeptidase that catalyses Angiotensin I to Angiotensin II, whilst inactivating bradykinin during blood pressure regulation via the Renin-Angiotensin System. The purpose of this study is to establish a reference interval (RI) for ACE in the Irish population after COVID, and to examine if there is an underlying correlation between ACE concentrations and a range of biomarkers.

Methods
Serum samples of 200 randomly selected patients were obtained from several Irish hospitals in March 2022 (in compliance with"Guidance on Anonymisation and Pseudonymisation", June 2019). We analysed for ACE (Bühlmann reagents), HBA1C, 25OHD and other biomarkers on the Abbott Architect ci8200. Full Blood Count was measured on Sysmex CS-2500. The statistical analysis used the EP Evaluator 11.3.0.23 and SPSS 22.0 software.

Results
The RI based on the central 95% of data was 8–78 U/L. This is higher than the RI proposed by the manufacturer (20–70 U/L) but is very close to our RI (5–79 U/L) from 2019. We found a significant positive correlation between ACE concentration and HBA1c, Urea, Creatinine, White Blood Cells ($p<0.0001$), Glucose ($p=0.02$), LDL ($p=0.03$), Neutrophils ($p=0.003$), Lymphocytes ($p=0.001$). A significant negative correlation was observed with 25OHD ($p<0.0001$).

Conclusions
This study did not show any notable change in the RI for ACE after COVID in Ireland. The significant positive correlations with HBA1c and other biomarkers may indicate the importance for ACE testing for diabetic management and progression, but further studies will be needed. Patients' overall health and medical history should always be considered when evaluating ACE results, including Vitamin D levels.

Abstract 15

Capillary based sampling and laboratory measurement, a convenient adjunct primary care testing model for management of patients with chronic disease?

Kearney A, Lee GR
Dept. of Clinical Biochemistry and Diagnostic Endocrinology. Mater Misericordiae University Hospital. Eccles St. Dublin 7. Dublin. Ireland.

Background
Chronic Disease Management (CDM) in primary care is a prominent feature of Slaintecare reform. The CDM programme has been supported recently through laboratory implementation of NT-proBNP, now available widely to primary care. We considered feasibility of a novel testing model, involving capillary blood sampling coupled to laboratory-based NT-proBNP analysis, extended to other candidate tests within the CDM programme (lipids and TSH). The aim of this study was to determine the comparability of NT-proBNP, lipid and TSH analysis in capillary and venous blood.

Methods
Following hospital ethical approval, consented healthy volunteers (n=37, 23 females and 14 males, 21–47 years) were recruited for paired venous and capillary blood collection, using S-Monovette® Lithium Heparin and Gel Microvette® 200 tube and Super Lancet respectively. Plasma Cholesterol (Total, LDL and HDL), Triglyceride, NT-proBNP and TSH were measured simultaneously in paired samples using Abbott Alinity analysers. A sub-cohort of volunteers (n=7) provided paired samples for plasma NT-proBNP and cholesterol measurement at several time periods post collection (1, 24 and 48 h) at room temperature. Passing–Bablock (PB) regression and Bland Atman (BA) analysis was used for comparison studies, ANOVA (analysis of variation, repeated measures) for analyte stability studies.

Results
Capillary and venous plasma showed good comparability for all analytes, with no significant slope and intercept (PB regression) and a mean difference (BA analysis) between sample types across all analytes ranging from –7.3% (Triglyceride) to 2.1% (NT-proBNP). Cholesterol increased significantly with storage ($p<0.05$, 6.8% increase at T48h) whereas NT-proBNP was stable ($p>0.05$, 0.5% difference at 48 h) for both sample types.

Conclusions
NT-proBNP, lipid and TSH analysis in capillary and venous plasma show analytical equivalence. NT-proBNP in particular shows stability conducive for a standard postal service for patients who opt for home-based capillary sampling. The feasibility of such a model deserves further exploration under field conditions and across a broader case mix.

Abstract 16

Validation of a Liquid Chromatography – Tandem Mass Spectrometry Assay for the Measurement of Amino Acids in Plasma as second tier confirmation for Newborn Screening: Method comparison with ion-exchange chromatography

Urbano G, Doody A, Duignan S, Fitzsimons PE, Brady JJ, Elsammak M
Metabolic Laboratory, Department of Paediatric Laboratory Medicine, CHI Temple Street

Background
Amino acid analysis is essential for diagnosis and monitoring of inborn errors of metabolism and confirmatory testing for newborn screening. Ion Exchange Chromatography (IEC) has been considered the gold standard method since its introduction over 40 years ago; however, in recent years Ultra- High-Performance Liquid Chromatography–Tandem Mass Spectrometry (LC-MS/MS) is more widely used given its greater sensitivity and rapid analysis capabilities. Upon the introduction of a Waters- ACQUITY-UPLC I-Class instrument into the metabolic laboratory, a method comparison was completed as part of the validation of a LC-MS/MS amino acid assay.

Methods
The analytical performance of the Chromsystems MassChrom® Amino Acid LC-MS/MS assay for seven amino acids: methionine, phenylalanine, tyrosine, leucine, isoleucine, valine and alloisoleucine was evaluated and compared to in-house Jeol Aminotac IEC method for follow-up of suspected and known cases of phenylketonuria (PKU), maple syrup urine disease (MSUD) and homocytinuria.

Results
The specific % bias goals were calculated from 2021 ERNDIM EQA scheme surveys. Comparison of patient samples showed acceptable agreement for branched chain amino acids, phenylalanine and tyrosine (n=76) and methionine (n=73) when compared with IEC and % bias at relevant clinical decision points determined and deemed acceptable using Bland Altman and Passing Bablok. Within laboratory precision was ≤5% for all analytes except valine (≤8%). However, valine results are comparable with other ERNDIM users (n=275).

Conclusions

Overall, there was good agreement between the two methods. There was a negative bias for alloisoleucine at clinically significant low concentrations. This negative bias was taken into account and reference range and medical decision points adjusted.

The Chromsystems MassChrom® LC-MS/MS kit has been successfully validated and implemented for routine use as a second tier assay for follow-up NBS and monitoring of known patients with MSUD and PKU. Samples are analysed and processed in batches with individual sample analysis time reduced from 45 mins to 9 mins.