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Antimicrobial Resistance Profiles in Community-Acquired Urinary Coliforms from Older Adults

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Abstract

Aim

This study examined resistance rates of guide-line recommended antimicrobials in community-acquired urinary isolates received by the Medical Microbiology department at Cork-University Hospital (CUH)

Methods

Antimicrobial susceptibility test (AST) data for coliforms isolated from urines of patients over sixty-five years and received between the study period (2019-2025) was extracted from the CUH Laboratory Information System (LIS), using Rocket® CorVu® software. Following ethical approval, patient data was anonymised prior to analysis. Resistance to Nitrofurantoin, (first-choice guideline option), as well as resistance to alternative antibiotics, Cephalexin and Trimethoprim was reviewed. A chi-squared test was performed to compare the resistance rate between women and men for each antimicrobial using Microsoft Excel.

Results

Nitrofurantoin resistance in *E. coli* isolates (N=26,118) was 2.97% in women and 5.03% in men ($p<0.001$). Cephalexin resistance in coliform isolates (N=44,738) was 15% in women and 22.22% in men ($p<0.001$). Trimethoprim resistance in coliform isolates (N=41,217) was 29.97% in women and 29.78% in men ($p=0.75$).

Discussion

Resistance rates for Nitrofurantoin remain low, confirming its suitability as first-line treatment option for coliform-associated UTIs in older adults, consistent with current guidelines. Cephalexin and Trimethoprim showed higher resistance rates. Interestingly, resistance was consistently higher in isolates from men for nitrofurantoin and cephalexin, highlighting gender as an important factor in antibiotic treatment.

No Declarations of Conflicts of Interest declared

Coagulation Testing in the Critical Care Setting

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Abstract

Aim

To evaluate the frequency and clinical utility of routine PT and aPTT testing in ICU and HDU patients, and to determine whether repeat coagulation testing at 48 hours provides clinically meaningful changes compared with admission results.

Methods

A retrospective, blinded review of coagulation screen results was performed for all patients admitted to ICU and HDU over a three-month period. Testing frequency and the proportion of PT and aPTT values within and outside the reference range were assessed at admission (T0) and 48 hours post-admission (T48). Statistical analysis was conducted to evaluate whether differences between T0 and T48 were statistically and clinically significant.

Results

In ICU patients, 56% of PT and 52% of aPTT results were within the reference range; in HDU patients, 52% of PT and 60% of aPTT results were within range. No statistically significant change in PT values was observed between T0 and T48. A statistically significant increase in aPTT values occurred over time, but this change was not clinically meaningful. Bidaily coagulation testing was observed in 95% of ICU patients and 91% of HDU patients.

Discussion

These findings support a risk-stratified testing strategy across critical care. Most PT and aPTT values were normal at admission and remained stable at 48 hours, supporting de-escalation in stable patients with normal results. Patients with abnormal findings require continued monitoring with daily or clinically indicated testing.

No Declarations of Conflicts of Interest declared

Artificial Intelligence and Machine Learning for Heart Disease Risk Prediction: A Framework for Laboratory-Based Decision Support

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Abstract

Aim

This study aimed to explore associations between demographic, behavioural, and clinical variables with heart disease and to evaluate multiple ML models as a framework for future laboratory-integrated risk stratification.

Methods

Data were derived from the centers for disease control and prevention behavioral risk factor surveillance system (brfss) (n = 319,795). Following data cleaning and feature engineering, exploratory data analysis assessed univariate associations using chi-square testing and odds ratios. Binary classification models evaluated included multivariable logistic regression, ridge regression, naïve bayes, classification and regression tree, and random forest. performance was assessed using receiver operating characteristic area under the curve (ROC AUC), sensitivity, specificity, precision, and f1 score on a held-out test dataset.

Results

Heart disease prevalence was 8.56%. Strong associations were observed for age, diabetes, stroke, mobility limitation, and self-reported general health. Logistic regression achieved the highest test AUC (0.842), followed by tuned random forest (0.834) and naïve bayes (0.800). Threshold optimisation demonstrated clinically relevant trade-offs between sensitivity and specificity. Logistic regression provided robust generalisation with transparent coefficient-based interpretability.

Discussion

AI and ML models demonstrated strong discriminative ability for heart disease prediction using large population-level data. Logistic regression offered the optimal balance between performance and interpretability, supporting clinically governed implementation. These findings provide a structured framework for future integration of objective laboratory biomarkers, such as lipid profiles, high-sensitivity troponin, and NT-proBNP, into predictive models. Incorporation of biochemical parameters may enhance

discrimination and calibration, supporting laboratory-based cardiovascular risk stratification and decision support within laboratory information systems.

No Declarations of Conflicts of Interest declared

Investigation into the Diagnostic Use of IL-1 β , ICAM-1 and/or E-selectin in Identifying the Effects of Infection in Placental Tissue

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Abstract

Aim

The aim of this pilot study was to determine the potential diagnostic value of IHC for Interleukin-1 β (IL-1 β), Intercellular Adhesion Molecule 1 (ICAM-1) and E-Selectin for evaluating the severity of the fetal inflammatory response (FIR) to chorioamnionitis in placenta tissue.

Methods

30 patients of Cork University Maternity Hospital with varying severity of chorioamnionitis infections were enrolled. Formalin fixed, paraffin embedded sections of umbilical cord and chorionic plate were stained with the above antibodies using the Roche BenchMark ULTRA IHC staining instrument. Slides were screened under the following rubric: staining intensity of both major vessels and capillaries, number of major vessels stained and location of perivascular staining, if present. Chi-squared tests, or Fisher's exact tests, were employed to determine if a statistically significant association was present between the IHC findings and the original diagnosis.

Results

A statistically significant association between chorioamnionitis FIR severity and perivascular staining of both ICAM-1 and IL-1 β was demonstrated. Importantly, the production of IL-1 β by umbilical cord mesenchymal stromal cells, in response to infection, was demonstrated for the first time.

Discussion

Immunohistochemistry for ICAM-1 and IL-1 β both warrant further investigation as potential histological markers of severity of the FSIR to acute chorioamnionitis.

No Declarations of Conflicts of Interest declared.

Appropriate Communication of Critical Laboratory Results in a Chemistry Laboratory

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Abstract

Aim

To assess whether revising critical-result alerting thresholds reduces the time spent on telephone notifications by laboratory staff, while monitoring for unintended consequences that may affect clinical care.

Methods

Lab staff recorded results phoned during 5 periods in August 2024, 3 daytime / 2 overnight periods. Number of calls, time spent phoning, and call destinations were recorded. New phone thresholds based on national guidance were implemented in January 2025 following a memo to all lab users. Discussion with staff in laboratories and ED helped achieve buy-in. Repeat audit over similar time periods was undertaken in August 2025.

Results

Over 55 hours, there was a significant reduction in calls made (167 to 105: 37%) and minutes spent phoning (334 to 225 : 33%). The impact was most noticeable in ED 8pm - midnight, when there is a single lab staff member. Lab staff immediately noticed having more time available to process results. No unintended consequences reported.

Discussion

Measurement of change objectively demonstrated benefit to service delivery and lack of risk. Engagement all stakeholders was important for successful change.

No Declarations of Conflicts of Interest declared

Development and Implementation of 'Blood on Board': A Helicopter Emergency Medical Service

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Abstract

Aim

To establish a safe and validated blood transfusion support service from Cork University Hospital to enable pre-hospital administration of red blood cells by HEMS.

Methods

Developed a Project Plan and completed a Risk Assessment. Purchased and performed a full validation, including temperature mapping, of a Credo Cube[®] Series 4 Blood Transportation Box. Arranged a site visit to HEMS, Rathcoole, Co. Cork. Documented Standard Operating Procedures, and provided training to medical scientists and ED Consultant in Haemovigilance, traceability and blood sampling requirements, as well as, packing and use of Credo Cube[®].

Results

Temperature mapping confirmed that the Credo Cube[®] Series 4 Blood Transportation Box can maintain temperature of 2-6°C for over 48 hours, maintaining the cold-chain requirements for red blood cells.

Discussion

Blood Transfusion Laboratory in CUH commenced provision of blood components to HEMS on 29.1.2025, which coincided with the official launch of CUH Helipad on 7.2.2025. The use of red cells in the pre hospital setting is a well-established practice and has been shown to definitively reduce mortality if given early in hypovolemic shock (1,2,3).

No Declarations of Conflicts of Interest declared

Comparison of CKD-EPI 2009 Creatinine and EKFC Cystatin C eGFR Equations

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Abstract

Aim

To assess the impact of cystatin C-based eGFR on CKD classification compared with creatinine-based eGFR.

Methods

Residual serum samples from 267 patients were analysed for creatinine and cystatin C. eGFR was calculated using the CKD Epidemiology Collaboration (CKD-EPI) 2009 creatinine equation and the European Kidney Function Consortium (EKFC) cystatin C equation. Agreement was assessed using correlation and Bland–Altman analysis. Cystatin C and creatinine concentrations were examined in hypothyroid (thyroid-stimulating hormone >10 mIU/L, n=18) and hyperthyroid (thyroid-stimulating hormone <0.10 mIU/L, n=22) patients.

Results

Creatinine- and cystatin C-based eGFR estimates were strongly correlated ($r=0.92$, $p<0.0001$). Bland–Altman analysis demonstrated a mean negative bias of -8.0 mL/min/1.73 m², with EKFC cystatin C eGFR values frequently lower than CKD-EPI creatinine estimates. Use of EKFC cystatin C resulted in frequent upward CKD stage reclassification, particularly in stage G3a. Cystatin C concentrations were lower in hypothyroid and higher in hyperthyroid patients, while creatinine remained largely within reference intervals.

Discussion

Although strongly correlated, EKFC cystatin C and CKD-EPI creatinine eGFR estimates show clinically relevant disagreement, leading to systematic CKD upstaging. Thyroid dysfunction should be considered when interpreting cystatin C-based eGFR in clinical practice.

No Declarations of Conflicts of Interest declared

Assessment of Cytokine Release Associated Post CAR T-Cell Therapy

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Abstract

Aim

This study evaluated the utility of a novel 8-cytokine ELLA (Enzyme-linked Lectin Assay) Simple Plex Immunoassay for measuring cytokine levels in patients following CAR T-cell therapy.

Methods

This study involved using the ELLA Simple Plex Immunoassay for measuring cytokine levels. Eight different cytokine levels were investigated. 20 CAR-T patient samples from across three different timepoints; pre CAR-T infusion, Day 7 and Day 28 post CAR-T infusion were assessed.

Results

60% of CAR T patients in this study (n=20) achieved complete remission and 40% had persistent disease, which would correlate with CAR-T outcomes for DLBCL internationally. Within the patient cohorts that experienced CRS or ICANS, raised IL-6 and IL-10 correlated with the severity of the disease. IFN-gamma levels trended upwards in ICANS patients from pre CAR-T to day 28 where it was statistically significant. In individual patients, a higher immune profile including high CRP levels pre-treatment is trending to indicate severity of CRS /ICANS.

Discussion

This preliminary study has successfully established a rapid, reliable 8 cytokine biomarker assay that can indicate severity of CRS/ICANS post CAR-T therapy. This pilot study has successfully identified a new clinical grade cytokine biomarker assay that can indicate Grade 2 CRS post CAR-T therapy, which could aid in patient management and may serve as an improved risk-stratification algorithm for evaluating patients prior to initiating treatment.

No Declarations of Conflicts of Interest declared

Optimising Coagulation Screen Requests in University Hospital Limerick: Impact of Mandatory Clinical Details

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University Hospital Limerick

Abstract

Aim

To assess the impact of mandating clinical and anticoagulation details on coagulation test requests on the volume of coagulation testing performed in a hospital department.

Methods

In June 2024, the Blood Sciences request form was modified to require clinical and anticoagulation details for adult coagulation requests, and was subsequently introduced into the department. Coagulation requests lacking mandatory clinical details were rejected. Laboratory Information System and IBM® Cognos® Impromptu®, was used to analyse adult coagulation test volumes in the department from April–May 2024 (pre-intervention) and July–August 2024 (post-intervention). Abnormal coagulation parameters were defined as PT $\geq$ 17s, APTT $\geq$ 44s, and fibrinogen $<$ 2g/L per UHL reference ranges. Data analysis was performed using Microsoft Excel®.

Results

Since implementation of the new request form and mandating clinical details; coagulation screen requests and fibrinogen testing in this department decreased by 48.5% and 40% respectively.

Discussion

Mandating clinical details for coagulation screen requests significantly reduced unnecessary phlebotomy and coagulation testing of patients.

No Declarations of Conflicts of Interest declared

Green Procurement: A Study to Support Sustainability in Molecular Pathology Laboratories

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Abstract

Aim

This project aimed to evaluate green procurement practices within a molecular pathology laboratory in Beaumont Hospital to support more sustainable purchasing decisions.

Methods

A qualitative sustainable review was conducted focusing on molecular reagents and consumables currently in use. Manufacturers were assessed using defined green procurement criteria, including sustainability policies, environmental certifications, packaging and waste reduction initiatives, product environmental impact, recycling programmes, and environmental reporting transparency. Publicly available sustainability information was reviewed, and suppliers were contacted directly to request further environmental data on commonly used kits and reagents within the molecular pathology laboratory.

Results

Preliminary review identified variation between manufacturers in the availability of sustainability policies, environmental certifications, and waste reduction initiatives. Several suppliers provided publicly available sustainability reports and environmental commitments, while further information was requested to assess product-specific environmental impact and packaging practices.

Discussion

This project demonstrates the role of green procurement in supporting laboratory sustainability and aligns with HSE climate action objectives. Supplier evaluation using defined sustainability criteria provides a practical framework to support environmentally responsible procurement within molecular pathology laboratories without compromising clinical quality.

A Case Study of Undetectable Serum Sodium in Acute Adrenal Crisis: A Diagnostic Challenge

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Abstract

Presentation

A 25-year-old patient presented with neurological symptoms following a two-week history of vomiting and oliguria with background hypothyroidism and worsening psychological symptoms.

Diagnosis

Serum sodium was reported as <100 mmol/L on both Alinity and GEM blood gas analysers. Calculated plasma osmolality was used to derive a reverse sodium estimate, the concentration was approximately 85 mmol/L. Further investigation showed hyperkalaemia, uraemia, elevated renin and low aldosterone, consistent with primary adrenal insufficiency rather than SIADH.

Treatment

Sodium correction was fully controlled with 3% hypertonic saline followed by maintenance fluids. A desmopressin clamp was used to prevent overcorrection. Correction was limited to 6mmol/L per 24 hours. The patient recovered fully and was discharged after 19 days with sodium of 138 mmol/L.

Discuss

This case highlights the diagnostic complexity of sodium values below the AMR, the importance of biochemical pattern recognition in differentiating adrenal insufficiency from SIADH, and the need for controlled correction to prevent osmotic demyelination.

Verification of Molecular Assay for the Rapid Diagnosis of *Mycobacterium Tuberculosis* in Respiratory Samples at Cork University Hospital

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Abstract

Aim

To verify the performance of the Cobas MTB molecular assay for the detection of *Mycobacterium tuberculosis* in respiratory samples and compare its diagnostic performance with conventional microscopy and culture methods.

Methods

Patient respiratory samples were tested for *Mycobacterium tuberculosis* using auramine-phenol fluorescent microscopy, solid culturing using Löwenstein–Jensen slopes, liquid culturing using the Biorad BacT/ALERT® 3D automated liquid culturing system and molecular testing using the cobas MTB assay. Samples positive using culturing methods were referred to the Irish Mycobacteria Reference Laboratory for confirmation and sub-speciation using whole genome sequencing[3]. Sensitivity and specificity were calculated using culture as the gold standard identification method.

Results

This verification obtained a sensitivity of 90% and a specificity of 100% using the molecular assay. Microscopic analysis using the same samples resulted in a sensitivity of 15% and a specificity of 100%.

Discussion

The significantly improved sensitivity of the molecular assay compared to microscopy highlights the potential for this assay to replace microscopy in the initial diagnosis of *M. tuberculosis* disease. This rapid method could reduce the diagnostic turnaround time and result in quicker treatment commencement for patients with *M. tuberculosis*.

Tackling Human Error in Blood Transfusion: Staff Perceptions of Teamwork in a Hospital Blood Transfusion Delivery Service

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2. Haemovigilance, Mercy University Hospital, Cork

Abstract

Aim

To assess teamwork and non-technical skills among staff involved in blood transfusion delivery and identify areas for targeted TeamSTEPPS® training to improve communication, teamwork and patient safety.

Methods

The TeamSTEPPS Teamwork Perception Questionnaire (T-TPQ), a validated Likert scale self assessment tool, was used to identify training needs. The T-TPQ was issued electronically to 59 staff in the Blood Bank (BB) and Emergency Department (ED) in the Mercy University Hospital (MUH). Prospective sampling ensured inclusion of the four staff cohorts involved in transfusion delivery. Descriptive statistical analysis and comparison of BB and ED responses was applied to generate a phase one training needs assessment within a broader Plan Do Study Act (PDSA) cycle.

Results

Overall response rate was 41% with 100% response from the BB (11/11) and 27% from ED (13/48). Analysis across the five teamwork domains; team function, leadership, situation monitoring, mutual support and communication showed training needs in mutual support in the BB and team function in ED. Skill development in communication (BB) and leadership (ED) would also be of practical benefit.

Discussion

The T-TPQ effectively identified areas where training could improve teamwork and reduce human error in blood transfusion delivery. Analysis of individual staff cohort training needs in ED would also be relevant in phase-two.

Five-Year Retrospective Study on the Sustainability Practices in the Irish Blood Transfusion Service

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Irish Blood Transfusion Service

Abstract

Aim

To assess the implementation and maintenance of sustainable laboratory practices within the National Donor Screening Laboratories through the My Green Lab certification programme from 2021 to 2025.

Methods

An initial baseline assessment survey was completed by all NDSL staff in 2021. Using MGL feedback, the following tools and approaches were conducted and implemented over the next four years: the MGL Freezer challenge, the Bio-safety Cabinet (BSC) project, IBTS Green guide, updated signage on appliance switch-on/switch-off requirements, coloured waste streams with supporting standard operating procedures (SOPs) and ongoing staff education on sustainability practices.

Results

Changes contributed to a score of 88% within the first certification in 2021, making the NDSL the first clinical laboratory in Ireland to become MGL certified. In 2023, our certification score increased to 94%. In 2025, our certification score was 83% completed through MGL 2.0. We have therefore maintained 'Green' status over the past 5 years.

Discussion

MGL has been essential in the implementation and maintenance of sustainability practices in NDSL. Best practices in lab sustainability are now being rolled out across all laboratories in the IBTS.

Developing a Testing Algorithm for the Recovery of Bacterial Isolates in Tissues, Sterile Fluids and Periprosthetic Joint Infection Specimens using the BD BACTEC™ FX

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Abstract

Aim

To compare the BD BACTEC™ FX with the established culture-based method for isolate recovery and time to positivity, and to determine its suitability for routine processing of sterile specimens.

Methods

Seventy- five patient specimens were processed overall using both the BACTEC FX and the established method.

Results

It was determined that the BACTECTM FX produced comparable sensitivity (100% overall sensitivity for both methods) and improved time to positivity compared to the established method (median 10 hours for the former and median 19 hours for the latter). Specimen contamination rates however were higher in the BACTECTM FX (28% overall for the BACTECTM FX and 9.3% overall for the established method). It was determined that processing specimens in a paediatric bottle alone is sufficient for the recovery of aerobic organisms. The utility of adding a fastidious supplement to blood culture bottles could not be deciphered due to a limited presence of fastidious isolates in specimens processed.

Discussion

Whilst many of these results are promising, further work is essential to determine whether the proposed algorithm is suitable for introduction to our laboratory.

The Significance of Designing an Immunohistochemistry Manual

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Abstract

Aim

To develop a standardised immunohistochemistry manual as a training and reference resource for Pathologists and Medical Scientists, supporting consistent interpretation, quality control and optimisation of IHC staining.

Methods

The manual was created by compiling a list of all IHC stains performed in St. Vincent's University Hospital. Using scientific resources, each antibody was added to the manual using the following headings: expected staining pattern, application, control tissue used and images displaying expected staining.

Results

When introducing a new stain; antibody selection, optimisation and validation is key to reach optimal and standardised staining for diagnostic use. This allows full confidence, reliability and consistent staining performed to the highest standard. When a Medical Scientist is optimising a primary antibody, it is important to select the appropriate positive (low and high expressors) and negative controls. Controls with high and low expression assess the sensitivity of the antibody at low and high levels of expression to avoid false negatives or positives. Due to the instrumentation and polymer-based detection kits for IHC, there can be slight variability in staining. This is applicable for HER2 testing due to the significance of 0, 1+, 2+ and 3+ expression.

Discussion

While it is important to know the staining pattern and component it is staining; the intensity is also crucial which can naturally be subjective, thus having a manual to refer to is essential.

Transforming Surveillance in Microbiology: Using Power BI to Analyse Trends in Healthcare Associated Infection and Inform Infection Prevention and Control Practice

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Abstract

Aim

To develop and implement Power BI dashboards to improve the efficiency, timeliness and accessibility of healthcare-associated infection and multidrug-resistant organism surveillance, supporting data-driven infection prevention and control activities.

Methods

Data were extracted from the Laboratory Information Management System using Cognos Impromptu (IBM) and imported into Microsoft Excel where master files were created for HCAs and MDROs. The data in each Masterfile underwent cleaning and validation and were exported to Power BI. Interactive dashboards were developed for the surveillance of Methicillin Resistant *Staphylococcus aureus* (MRSA), Vancomycin Resistant Enterococci (VRE), *Clostridioides difficile*, Hospital Associated *Staphylococcus aureus* bloodstream infections and respiratory viruses.

Results

The dashboards significantly enhanced the presentation and analysis of infection surveillance data. They enabled the IPC team to monitor temporal trends, assess MDRO screening positivity and impact, quantify infection burden across clinical areas, and identify outliers or emerging clusters. Real-time data exploration supported prioritisation of IPC interventions and informed policy review. Interactive reporting improved visibility of key infection metrics for clinical and senior management teams. The Influenza A dashboard highlighted seasonal increases and supported staff awareness and vaccination campaigns.

Discussion

Power BI improved surveillance performance, reduced manual reporting, and increased operational efficiency. Ongoing refinement and planned expansion aim to sustain improvements and further embed data-driven IPC practice across the laboratory service.

Beyond the Image: Documenting Expert Examination Patterns in Malaria Blood Film Analysis

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Abstract

Aim

This study proposes a framework to systematically document expert diagnostic processes during malaria blood film examination.

Methods

A capture protocol was developed to document the complete diagnostic process of expert haematologists examining blood films. The protocol records synchronised video of microscope fields, audio commentary of morphological observations, and metadata of magnification transitions. Experts examine films following protocols while verbalising their reasoning, progressing from low-power screening through oil immersion assessment to region-of-interest identification and diagnostic summary.

Results

Preliminary validation confirms the feasibility of capturing complete examination workflows. The framework documents spatial navigation patterns, magnification transition strategies (40×, 60×, 100×), and morphological reasoning characterising expert approaches. Initial data captures the diagnostic progression from detecting potential parasites at low magnification, through focused morphological assessment, to verbal confirmation of ring-form trophozoites at 100×, with synchronised expert commentary.

Discussion

This framework addresses a fundamental gap in diagnostic datasets by capturing expert examination context absent from existing image-centric resources. By documenting slide exploration strategies, magnification transitions, and verbalised morphological reasoning, it enables the development of context-aware digital morphology systems that more closely resemble expert diagnostic workflows. This approach provides a foundation for improving automated parasite detection and advancing explainable AI in haematological microscopy.

Case Study: Aggressive NK-Cell Leukaemia with Secondary Haemophagocytic Lymphohistiocytosis (HLH)

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Abstract

Aim

Here, we describe a patient with ANKL who presented with unresolved pyrexia, bicytopenia alongside an atypical lymphocyte population, and proinflammatory changes.

Methods

Peripheral blood and bone marrow aspirate smears were stained with May-Grünwald-Giemsa. Immunophenotyping was performed on aspirates prepared using standard 'Incubate-Lyse-Wash' procedure and analysed using a BD FACSLyric Flow Cytometer and FACSuite software (v1.5).

Results

Patient presented with an atypical lymphocyte population, anaemia (11.4 g/L; nadir: 8.7 g/L), and thrombocytopenia (58 x 10⁹/L; nadir: 42 x 10⁹/L). Aspirate smears showed a population of atypical mononuclear cells and activated macrophages with prominent haemophagocytosis. As ferritin concentrations (2887 ng/mL; peak: 3053 ng/mL) were elevated, initial presentation was consistent with haemophagocytic lymphohistiocytosis (HLH). Bone marrow aspirate immunophenotyping identified a population of abnormal mononuclear cells positive for CD2, CD16 (weak), CD38, CD56 (strong), CD71 (weak) and HLADR – most likely representative of an NK-cell lymphoid neoplasm. A similar population was also later identified in cerebrospinal fluid.

Discussion

Immunophenotyping confirmed an abnormal NK-cell population consistent with the diagnosis of ANKL with secondary malignancy-associated HLH. ANKL is an extremely rare and devastating disease accounting for <0.1% of all lymphoid neoplasms 2. The complex, cryptogenic nature of ANKL necessitates a prompt accurate diagnosis with immunophenotyping 1.

The Cost & Frequency of Hospital Laboratory Testing. An Evidence-Based Approach to Improve Best Practice and Laboratory Efficiency

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2. Cork University Hospital, Cork

Abstract

Aim

To quantify laboratory testing activity across Biochemistry, Haematology, and Microbiology at Cork University Hospital and evaluate the associated financial impact, including testing generated by primary care.

Methods

A cost analysis investigated test costs associated with Biochemistry, Haematology and Microbiology laboratories in one calendar year. In addition, the total cost of laboratory testing for one GP practice was calculated.

Results

Over 13 million tests were performed across three laboratories in CUH in 2024, with Full Blood Count (FBC) identified as the most frequently performed test (n=775,936). One GP practice generated ~60,000 test requests in one calendar year, with corresponding expenses of €51,580.90. It was estimated that > €6 million (€6,447,613) was spent on GP testing alone in the Blood Science laboratories of CUH. Cost analysis of n=140 tests determined that platelet aggregometry was the most expensive test (€210.13 per test), while tests included in diagnostic panels, such as total protein (€0.35 per test), were among the cheapest tests. In addition, data confirmed that laboratory testing, specifically tests related to the Chronic Disease Management Programme and vitamin D testing, increased annually (2018-2024).

Discussion

Data from this study provides evidence of increased testing in Irish clinical laboratories with cost analysis highlighting the economic impact in just one healthcare setting. There is a need to address the increased laboratory workload to help improve laboratory efficiencies as well as reduce the associated financial burden on the Irish healthcare system.

Paediatric Aplastic Anaemia: A Comprehensive Review and Case Study Analysis

L. Griffin, S. Kelly

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Abstract

Aim

To highlight the role of laboratory investigation, transfusion support and early HLA typing in the diagnosis and management of paediatric severe aplastic anaemia.

Methods

An 8 year old female presented with bruising and fever. Initial investigations included full blood count (FBC), peripheral blood film and biochemistry inflammatory markers. Further diagnostics included flow cytometry, bone marrow analysis, and viral serology. Human leucocyte antigen (HLA) typing was performed for transplant assessment. Transfusion support was provided and monitored.

Results

Initial laboratory findings demonstrated severe neutropenia, thrombocytopenia and anaemia with elevated lactate dehydrogenase (LDH). Bone marrow examination confirmed marked hypocellularity without excess blasts, consistent with idiopathic SAA. The patient required recurrent red cell and platelet transfusions with poor platelet increment response, highlighting risks of alloimmunisation and transfusion refractoriness. Viral screening was positive for cytomegalovirus. Genetic testing identified a heterozygous SMC3 variant of uncertain significance. HLA typing identified a fully matched sibling donor, enabling progression to matched familial donor HSCT.

Discussion

This case study highlights the integral role of transfusion science and early HLA typing in managing and curing paediatric AA. Co-ordinated transfusion management and transplant planning significantly influence the patient outcome.

When a Venous Blood Gas Shouts Loudly and Why a Low Bicarbonate Should Never be Ignored: A Case Report

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Naas General Hospital

Abstract

Presentation

Early warning scores (INEWS) are used extensively to prompt early intervention and escalation in a deteriorating patient. The parameters evaluated include respiratory rate, inspired oxygen, heart rate, blood pressure, neurological response, temperature, urine output and Lactate. A score is calculated based on the observed parameters. Sepsis should be considered if the early warning score is > 3 with an elevated Lactate.

This case outlines a 73 yr old female post operative colonoscopy patient. Pre-operative history included type 2 diabetes, hypercholesterolemia, hypertension and vitamin B12 deficiency. Pre-operative blood analyses were unremarkable. Medications noted at pre-operative assessment included Metformin (1000mg); Atorvastatin Teva (20mg); Propanolol (10mg); Amlodipine Teva (5mg); Vit B12 (1mg). The patient was recovering well post operatively and commenced on a light diet. Pharmacy reconciliation noted the drug Empagliflozin. On day 6 and day 7 post-operatively, the patient reported feeling unwell and blood gases were performed. Day 6: pH = 7.22 (7.35 – 7.45), bicarbonate (HCO_3) = 9.00 mmol/L (24 – 28), lactate = 1.4 mmol/L (<1.5). Day 7: pH = 7.23, HCO_3 = 10.0 mmol/L, lactate = 1.2 mmol/L.

Diagnosis

On day 8, a venous blood gas performed incidentally by the POCT manager indicated a critical metabolic acidosis requiring immediate escalation. pH = 7.07, HCO_3 = 4.0 mmol/L. The patient was evaluated by the anaesthetic team and immediately admitted to ICU. Ketones = 5.9 mmol/L. The patient was diagnosed with euglycaemic diabetic ketoacidosis secondary to an SGLT2 inhibitor.

Treatment

The patient was admitted to ICU and managed for severe metabolic acidosis and euglycaemic diabetic ketoacidosis.

Discuss

A focus solely on the INEWS parameters including lactate has the potential to miss other critical parameters. This patient developed a Euglycaemic Diabetic Ketoacidosis secondary to a SGLT2 inhibitor.

No Declarations of Conflicts of Interest declared.

Demographic Error in POCT Glucose Analysis – Does it Matter?

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Abstract

Aim

To evaluate demographic mis-scanning rates in point-of-care glucose analysis.

Methods

ACCU®-Chek Inform 11 Glucometers (30), Cobas® POC Infinity data management system connected to PAS and LIS systems. The monthly mis scan rate for glucometry for all ward areas was manually collected from Cobas POC Infinity for 2021, 2023, 2024 in a 250 bedded acute hospital in Dublin Midlands Group, Ireland. The mis scan percentage rate for each month was calculated and the average rate for per annum.

Results

Total Glucose: 2021 (34,491), mis scan: 4.6% (2.9% - 7.5%); 2023 (40,577) mis scan: 1.3% (0.8 % - 1.9%); 2024 (47,325) mis scan: 2.1% (1.5 % - 3.4%).

Discussion

This study demonstrates that rates of demographic mis scanning errors at POCT glucose analysis can be improved with evaluation and ongoing training. However, systematic errors in the barcode scanning process including ease of scanning of the strip container barcode, lead to incomplete electronic patient files, a reliance on paper transcription, incomplete patient reviews and ward audits. The evaluation and reporting of mis scanning rates and more importantly incomplete patient identification records within POCT Glucose analysis is required, to improve future glucometer scanning and patient safety.

No Declarations of Conflicts of Interest declared

Validation of Novel Upper Gastrointestinal Biomarkers Claudin 18.2 and PD-L1

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2. Technological University Dublin

Abstract

Aim

This study aimed to implement these two companion diagnostic assays into routine use and to improve patient care.

Methods

In this study, 23 adenocarcinoma tumours were evaluated for the expression of Claudin 18.2, and 20 tumour, both adenocarcinoma and squamous cell carcinoma, were evaluated for the expression of PD-L1 using the Roche PD-L1 SP263 assay, to compare to the Dako 22C3 assay.

Results

The results of this study show that Claudin 18.2 was expressed in 21.74% of adenocarcinoma tumours, this figure has since increased since the completion of the study. There was a concordance agreement of 65% between the SP263 and 22C3 assays, indicating moderate agreement.

Discussion

Claudin 18.2 and PD-L1 show potential as biomarkers for targeted immunotherapy in upper gastrointestinal cancers. There was a degree of inter observer variability associated with Claudin 18.2, highlighting the need for standardisation in this novel biomarker. The moderate concordance between PD-L1 assays suggest further investigation is required.

No Declarations of Conflicts of Interest declared

In-Silico Characterisation of Metagenome Assembled Genomes (MAGS) Obtained from the Gut Microbiota of Healthy Irish Infants

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Abstract

Aim

To characterise the genomic and metabolic profiles of selected gut microbiota from healthy Irish infants during the first 8 weeks of life and identify potential metabolic interactions between bacterial species.

Methods

Genomic sequences of ten “Metagenomic Assembled Genomes” (MAGs) were obtained from faecal samples of healthy Irish Infants during the first 8 weeks of life. During initial stages of this project, species assignment of the ten genomes was conducted using the NCBI “Blast” online tool. Sequences were defined as *Eggerthella lenta*, *Collinsella*, *Lacticaseibacillus rhamnosus*, *Bifidobacterium longum* and *Bifidobacterium breve*. The genomes underwent annotation using the annotation tool “Prokka” and “Clusters of Orthologous Groups” were defined using “EggNOG-mapper” and “Roary” tools.

Results

Comparison with reference genomes confirmed suitability of all MAGs for genomic analysis. *Bifidobacterium* were enriched in carbohydrate transport and metabolism genes ($n = 171$ to 198), while *Eggerthella* showed high numbers of genes linked to energy production ($n = 346$ to 351) and RNA processing ($n = 355$ to 364). *Collinsella* instead displayed intermediate levels of both.

Discussion

Metabolic profiling indicated cross-feeding interactions in the infant gut: *Bifidobacterium* metabolizes human milk oligosaccharides into acetate and lactate, while *Eggerthella* utilizes acetate for biosynthesis and arginine (411.2 ± 19.8 mg/L in breast milk) as a carbon source. *Eggerthella*’s elevated energy genes reflect a unique anaerobic respiratory pathway, while its abundance of RNA processing genes suggests complex transcriptional regulation. *Collinsella* and *L. rhamnosus* utilise carbohydrates as their main carbon source.

No Declarations of Conflicts of Interest declared

Benzalkonium Interference in Near Patient Testing of Sodium: A Systematic Mitigation Strategy at Cork University Hospital

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Abstract

Aim

To investigate the impact of benzalkonium chloride-containing disinfectants on sodium measurement using point-of-care blood gas analysers and evaluate the effectiveness of a quality improvement strategy to reduce sodium interference errors at Cork University Hospital.

Methods

A phased quality improvement approach was undertaken. Intervention 1 (2022): Replaced BAC containing wipes with alcohol wipes and delivered targeted staff training. Intervention 2: (2024) Persistent Neonatal issues prompted escalation to POCT Steering Group. Radiometer ABL90 Flex Plus analysers were introduced in Neonatal Unit in 2024. Intervention 3 (2025): Incidin OxyWipes, a BAC free disinfectant, were introduced hospital wide.

Results

Intervention 1 resulted in a reduction in error from 24% to 17% for adult samples. Intervention 2 resulted in the elimination of NIEs from the Neonatal department. Intervention 3 in 2025 resulted in a sharp decline in NIEs. NIEs were highest in Q1 (22.5%) and declined after Incidin OxyWipes were introduced in Q2 (3%), stabilising below 2% for Q3 and Q4. Paediatric samples were disproportionately affected with extreme Q1 error rates (55–61%) before falling to 0.15% in Q4 following mitigation.

Discussion

CUH's mitigation strategy reduced and, in high risk areas, essentially eliminated BAC related Na⁺ interference, highlighting the importance of analyser design, disinfectant selection and governance in maintaining high quality near patient testing.

No Declarations of Conflicts of Interest declared

Successful Collection and Processing of Patient Cells for CAR T Cell Therapy: The St James Hospital Experience

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Abstract

Aim

To evaluate the CAR T Cell therapy treatment process and clinical outcomes in patients undergoing CAR T cell collection and treatment in at St James Hospital.

Methods

The starting product, mononuclear cells, MNC(A) are collected using the Optia apheresis system (Terumo). Patients have an FBC and CD3 enumeration at start of apheresis. All MNC(A) products are assessed for sterility, CD3 and WBC enumeration. The laboratory ship the cells, fresh on the day of collection (KITE) or cryopreserved (Novartis). Once manufacturing is complete, cryopreserved CAR T cell products are received back to the laboratory and LN2 stored until thawing at the patient's bedside following leukodepletion.

Results

171/177 (97%) patients had successful CAR T manufacturing with median manufacturing turnaround of 27 days. 2 had a low CD3 T cell count and 1 had a positive culture during manufacturing. 139/177 patients (78.5%) received a CAR T product and 38 (21.5%) patients did not have CAR T product infused to date. Of the first 100 patients to receive CAR T (2021-2025), 84% of developed cytokine release syndrome (CRS). 29% of patients developed immune effector cell-associated neurotoxicity syndrome (ICANS). There were no treatment related deaths. At median follow up of 19 months, the estimated overall survival was 77% and event free survival was 54%.

Discussion

CAR T cell therapy is delivered successfully by a multidisciplinary team at SJH with data that reflects international outcomes.

No Declarations of Conflicts of Interest declared

Introduction of the Axlabs AS-410M and its Impact in the Cellular Pathology Lab

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Abstract

Aim

To introduce the Axlabs AS-410M (ASM) into the Cellular Pathology department at Tallaght University Hospital (TUH) to automate microtomy, reduce backlogs and relieve ergonomic strain while increasing laboratory capacity.

Methods

The first Axlabs AS-410M (ASM) in Ireland was installed into the Cellular Pathology department in Tallaght University Hospital (TUH) in March 2025 and the validation process was completed by the beginning of April 2025. The ASM has the capacity to cut 96 paraffin blocks in one run with the hugely beneficial feature of a setting that can complete an overnight run. It has the ability to deliver 400 sections mounted on slides, dried and ready for H&E staining in just 4–6 hours.

Results

The ASM can automate the most time-consuming, manual and repetitive task in the Histology lab, microtomy. The introduction of the ASM has provided increased capacity within the laboratory and the ability to process 96 paraffin blocks in one run, including an overnight run. It can deliver 400 sections mounted on slides, dried and ready for H&E staining in just 4–6 hours.

Discussion

TUH is currently in an expansion phase with increasing capacity in dermatology, gynaecology, surgery and endoscopy. This has put extreme pressure on the demand for Cellular Pathology services. We are excited and honoured to be the first site to introduce this vital new equipment. The ASM will help the laboratory to reduce backlogs and relieve ergonomic strain. It ensures high-quality, consistent sectioning and enables Medical Scientists to focus on cutting specialised tissue types and performing other, higher value tasks in the laboratory.

No Declarations of Conflicts of Interest declared

Validation of a New High-Throughput Molecular Screening Assay for the Detection of Carbapenemase-Producing Organisms

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Abstract

Aim

To validate the performance of the UC-TIB-CPO PCT assay on the cobas 6800 system for the detection of carbapenemase-producing organisms and compare its performance with established molecular and bacterial culture methods.

Methods

The UC-TIB-CPO PCR assay on the cobas6800 (Roche) system was compared to the Modular LightMix CPE PCR assays on the FLOW system (Roche), the Xpert Carba-R PCR assay on the GeneXpert Infinity (Cepheid) system and bacterial culture methods. A total of 186 samples, a mix of FecalSwab buffer and Amies swabs, were used in the test method validation. Five external quality control panels were included along with a third- party independent control.

Results

The UC-TIB-CPO assay displayed excellent correlation with the two molecular assays and bacterial culture methods. The assay had an overall sensitivity and negative predictive value of 100%, with a specificity and positive predictive value of 99%.

Discussion

This new molecular screening assay will improve test turnaround time and reduce hands-on time in the laboratory. It will also result in a significant reduction in laboratory waste helping us to support our 'green labs' initiatives. Current culture methods, used in conjunction with the UC-TIB-CPO PCR screening assay on the cobas x800 systems will allow the timely implementation of enhanced infection control and bed management protocols and ensure the judicious use of antibiotics in patient management. This will help prevent the spread of infection in the hospital environment resulting in better outcomes for patients.

No Declarations of Conflicts of Interest declared

You've Got the Power BI: Enhancing Insight into Pathology Turnaround Time (TAT) Data

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Our Lady's Hospital Navan

Abstract

Aim

This project aimed to develop a Power BI dashboard for haematology to provide more efficient and enhanced analysis of TAT performance.

Methods

Sample and patient datasets were extracted from the laboratory information system for Q3 2025. Data cleaning included correction of data types and exclusion of non-patient data. Data modelling included linking sample, patient and location specific TAT target datasets. Calculated columns and measures were created for use in visualisations. A dashboard was designed to explore performance by test, demographics, location and time of day.

Results

Overall compliance was good; however, test and location specific issues were identified. Emergency (ED) and Intensive Care (ICU) demonstrated consistent under performance, particularly for D-Dimer, ESR and all tests between 3-8am. A number of samples with no requesting clinician and from non-registered GP practices was noted. Dashboards also highlighted demographic patterns and differences between routine and on call workflows.

Discussion

Power BI provided deeper insight than static reporting, enabling identification of operational and test specific issues. Lower performance in ED and ICU reflects shorter TAT targets. Reduced compliance for D Dimer and ESR correlated with add-on and batch processing. Evidence of non-registered GP's initiated follow up regarding critical result communication. Recommendations include improving clinician documentation, on call communication and refinement of TAT targets to improve performance and patient care.

No Declarations of Conflicts of Interest declared

The Contribution of a Perinatal Pathology Service to Memory-Making for those who have Experienced a Pregnancy Loss

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Abstract

Aim

To explore opportunities for memory-making during perinatal post mortem.

Methods

Case study of memory-making at the time of perinatal post mortem in a regional perinatal pathology service.

Results

The PNP team recognised two memory-making opportunities. At early gestations, 12-22 weeks, babies are fragile, reducing opportunities for creating mementos. At PME, a unique opportunity was identified to create memento photographs to return to parents in a card designed by the team. The PNP team use a spray from GROUND Wellbeing containing elements promoting resilience, healing and connection. Seeing an opportunity for memory-making, the PNP team collaborated with GROUND to develop a sample of this scent including a message from PNP to return with the baby.

Discussion

Feedback from BMW and parents has been overwhelmingly positive. Parents cherish these photographs as they are often one of the few mementos they have, frequently requesting extra copies. Providing something tangible preserves irreplaceable moments and allows parents to share precious memories². Parents have been comforted by the scent on the return of their baby after PME. Scent memories evoke long-standing and emotional recollections more intensely than other sensory cues.

No Declarations of Conflicts of Interest declared

Describing the Electron Microscopic Characteristics of Linear Nuclear Patterning in Placental Syncytiotrophoblast

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Abstract

Aim

To characterise the ultrastructural features underlying nuclear positioning and aggregation within the syncytiotrophoblast of term human placentas.

Methods

Using transmission electron microscopy guided by light microscopy of semi-thin toluidine blue and H&E-stained sections, we characterised features mediating linear nuclear patterning, and aggregation, in term human placentas.

Results

Firstly, we observed a meshwork of actin microfilaments interacting directly with nuclear pore complexes (NPCs) in a process that likely mediates nuclear positioning. As nuclei approach one another to form nuclear aggregates, we demonstrated for the first time a process whereby 1) their outer nuclear membranes bind tightly to one another 2) that bound membranes take on a characteristic wavy appearance due to widening of the perinuclear space (between inner and outer nuclear membranes) while the outer membranes remained tethered at NPCs of the adjacent nuclei. 3) the majority of the outer nuclear membrane is then selectively removed and incorporated into annulate lamellae, 4) following extensive membrane removal, small tubular or circular remnants of outer membrane persist between nuclei, still bound at NPCs. These processes likely reflect necessary structural alterations required for nuclear shedding and turnover in the syncytiotrophoblast.

Discussion

Our study provides the first direct observations of these novel processes We have also identified the key role NPCs play in these events and thus highlight multiple avenues for investigating the role of these features in placental health and disease.

No Declarations of Conflicts of Interest declared

An In Vitro Investigation of Garadacimab Interference in Routine and Specialised Coagulation Testing, with a Focus on Different aPTT reagents

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Abstract

Aim

We evaluated the extent of interference imposed by garadacimab at therapeutic concentrations on routine and specialised coagulation testing and determined whether aPTT reagents demonstrate different susceptibilities to garadacimab.

Methods

Pooled patient plasma obtained from 30 healthy volunteers was spiked with increasing concentrations of garadacimab (0-30 ug/mL). Spiked samples were assayed for the aPTT using 14 different reagents with either silica and ellagic acid as activators. Samples were additionally tested for prothrombin time (PT), fibrinogen and D-dimer levels, and certain specialised assays. All assays were performed on the Sysmex CN-series. Subsequently, samples were incubated with activated charcoal (DOAC-Stop™) in an effort to remove the interference.

Results

Consistent with the VANGUARD trial, interferences in the aPTT increased in proportion to the concentration of garadacimab. Garadacimab demonstrated varying levels of interference across aPTT reagents, but no interference in PT, fibrinogen, and D-dimer tests. aPTT-like specialised assays were similarly affected. No impact on results was observed after spiked plasma was incubated with activated charcoal.

Discussion

Garadacimab demonstrates interferences in aPTT testing in a concentration-dependant manner. Moreover, activated charcoal does not reverse the interference. Laboratories should be aware that garadacimab may be present in samples from patients with unexpectedly prolonged aPTT results.

No Declarations of Conflicts of Interest declared

Retrospective Surveillance of Enterovirus D-68 Circulation in Ireland in 2025

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Abstract

Aim

We undertook a retrospective study to determine the incidence of EV-D68 in samples positive for Rhinovirus/Enterovirus (RhV/ENT) RNA in 2025.

Methods

From 1st July to November 30th 2025, 6098 respiratory samples were tested using the Luminex NxTAG Respiratory Pathogen panel. Of these, 1232 were RhV/EnV RNA detected and subsequently 622 were tested by one-step real-time reverse-transcriptase PCR (RT-qPCR) for EV-D68.

Results

In 2025, EV-D68 was detected in 14/622 (2%) of samples tested. Age range: 8 - 87 years (median 48 years). No symptoms suggesting AMP/AMF were reported for any patients. EV-D68 was most commonly detected in October and November.

Discussion

EV-D68 continued to circulate in Ireland in 2025, with a decrease in the number of positive cases in comparison to 2024. This coincides with previous studies which observed a biennial pattern, with an increase in detections across even years.

No Declarations of Conflicts of Interest declared

Verification of Thromboexact (MgSO⁴) and Sodium Citrate for Platelet Measurement in Suspected EDTA-Induced Pseudothrombocytopenia

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Abstract

Aim

This study evaluated sodium citrate and magnesium sulphate (Thromboexact) anticoagulated samples for platelet measurement compared with standard K₂EDTA samples.

Methods

The study was performed on the Sysmex XN-20 analysers across three sites: University Hospital Limerick (UHL), Nenagh Hospital, and Ennis Hospital. For method comparison, 33 samples (UHL n=20, Nenagh n=7, Ennis n=6) were analysed in K₂EDTA, sodium citrate, and Thromboexact tubes using the PLT-F fluorescence method. Percentage bias was calculated and assessed against Westgard total allowable error (TEa $\pm 25\%$; CLIA 2025). Stability was assessed using 24 samples (UHL n=10; Nenagh n=8; Ennis n=6) stored at room temperature and analysed at 0, 12, and 24 hours. Single-factor ANOVA evaluated temporal differences. Inter-laboratory comparability was also assessed using Westgards TEa $\pm 25\%$

Results

Thromboexact demonstrated acceptable bias within TEa limits, stability over 24 hours, and consistent inter-site performance. Sodium citrate showed unacceptable inter-laboratory variability and failed verification criteria.

Discussion

Magnesium sulphate (Thromboexact) demonstrates acceptable analytical performance for platelet enumeration in cases of suspected EDTA-induced pseudothrombocytopenia, meeting predefined verification and stability criteria. In contrast, sodium citrate showed unacceptable inter-laboratory variability and did not satisfy performance specifications, limiting its suitability for this application.

No Declarations of Conflicts of Interest declared

A Verification of the PFA-200 Involving a Comparative Analysis with the PFA-100 and Drug Interference Monitoring

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Abstract

Aim

We aim to verify the PFA-200 and compare against the existing PFA-100. Moreover, we aim to determine the extent of interference of common medications, known to affect platelet aggregometry, on the PFA closure time.

Methods

40 citrate samples were collected from 20 healthy volunteers and were analysed in parallel on both the PFA-100 and PFA-200. Comparability and bias were assessed by Passing-Bablok regression and Bland-Altman analyses. Precision was assessed within-run. Reference ranges provided by the manufacturer were verified in accordance with Clinical and Laboratory Standards Institute (CLSI) guidelines. Samples were subsequently spiked with commonly encountered medications to monitor the interference on the closure time.

Results

The PFA-100 and PFA-200 had slight variances in results but were found to be clinically comparable. Bias and precision were also found to be acceptable. Reference ranges were considered transferrable according to CLSI guidelines. Spiking studies found that aspirin and ibuprofen interfered with the closure time; no effect was seen for paracetamol, sertraline and citalopram.

Discussion

The PFA-200 is comparable to the PFA-100 and is considered acceptable for routine use. Full medication history should be considered when interpreting results as different medications have varying effects on the closure time.

No Declarations of Conflicts of Interest declared

ESR: The Oldest, Non-Specific, Overutilised Laboratory Test. But Why?

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Abstract

Aim

To evaluate the ESR test utilisation at Our Lady's Hospital Navan, identify patterns of potentially unnecessary testing, and explore opportunities to promote more appropriate ESR requesting

Methods

A review was conducted using the Laboratory Information System (LIS) at Our Lady's Hospital Navan (OLHN). Data from Quarter 3 (Q3) 2023 and Quarter 1 (Q1) 2024 were analysed, including total ESR requests, result patterns, and ordering locations, to identify opportunities to reduce unnecessary testing.

Results

A total of 11,034 ESR tests were ordered across both quarters: 5,201 in Q3 2023 and 5,833 in Q1 2024, representing an 11% increase. General practice accounted for approximately 68% of all requests. Within hospital services, the Rheumatology Out-Patients Department generated the highest volume, with orders rising from 1,146 in Q3 2023 to 1,490 in Q1 2024 (a 23% increase), reflecting service expansion. Elevated ESR results were evenly distributed across all ordering sources.

Discussion

Raised demand on laboratory services highlights the need to limit overused tests. The HSE's 2025 ESR Guidance emphasises the test's limited sensitivity and recommends providing clinical justification. OLHN distributed a clinical memo to advocate appropriate ordering and plans to utilise MEDLIS to reduce requests without clinical details, ultimately minimising unnecessary testing.

No Declarations of Conflicts of Interest declared

Patience Pays Off: Optimising the Heat-Inactivation of Efanescitocog Alfa

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Abstract

Aim

We aimed to assess extended pre-analytical heat treatment on residual FVIII concentrations (FVIII:C).

Methods

FVIII-deficient plasma was spiked with increasing concentrations of EFA, ranging from 5 IU/dL to 166 IU/dL. FVIII:C was measured before and after heat treatment for 30 – 120 minutes at either 56 °C or 58 °C, using a one-stage clotting assay (Dade® Actin® FSL; Sysmex UK).

Results

All measured FVIII:C values exceeded expected post-spike activity with EFA (8.6–199.2 IU/dL), consistent with the known effect of Dade® Actin® FSL. After 30 minutes at 56 °C or 58 °C, complete degradation occurred in only 33.3% of concentrations (n=3). Complete degradation increased to 88.9% (n=8) after 120 minutes at 56 °C and 90 minutes at 58 °C. Residual FVIII:C levels were consistently lower following heat treatment at 58 °C than at 56 °C, irrespective of incubation time.

Discussion

Overall, longer pre-analytical heat treatments are needed for EFA compared to other FVIII products. Pre-analytical heat treatment at 58 °C rather than 56 °C may be more efficacious at degrading EFA prior to Bethesda assays, however, further research is needed on the impact of increased pre-analytical temperatures on FVIII inhibitors.

No Declarations of Conflicts of Interest declared

Measuring Edanesoctocog Alfa Using the One-Stage Clotting Assay: A Laboratory Experience

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Abstract

Aim

We describe our experience validating and measuring EFA using the OSA with different APTT reagents.

Methods

The OSA for edanesoctocog alfa (EFA) was validated on Sysmex CN-series analyzers using Dade® Actin® FSL reagent - as used in the XTEND trials [2]. Assay performance was evaluated by assessing precision, accuracy, recovery, linearity, and comparability. Testing was performed using either commercial control materials or factor VIII-deficient plasma spiked with increasing concentrations of EFA (5–166 IU/dL). In addition, an EFA-specific calibrator was developed to determine whether it could reduce the wide variability in recovered EFA concentrations observed with different APTT reagents.

Results

The OSA demonstrated acceptable performance across all evaluated parameters and met all predefined validation criteria. Using Dade® Actin® FSL, EFA activity was slightly overestimated, with recovered concentrations ranging between 125%-140% of expected values. Implementation of the EFA-specific calibrator improved recovery with Dade® Actin® FSL and reduced variability between different APTT reagents.

Discussion

Dade® Actin® FSL is suitable for the measurement of EFA; however, recovered factor VIII concentrations may be slightly overestimated. The use of a product-specific calibrator may improve the performance of the OSA for EFA, and allow for a broader range of APTT reagents to be used in clinical laboratories.

No Declarations of Conflicts of Interest declared

In-Silico Peptide-MHC Class II Binding Predicts Reduced Immunogenicity of Efanesoctocog Alfa

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Abstract

Aim

To assess the potential immunogenicity of efanesoctocog alfa using in silico MHC class II peptide-binding analysis.

Methods

Peptide–MHC class II binding affinities of efanesoctocog alfa were assessed in silico using NetMHCIIpan. Novel sequence regions created by the B-domain deletion and XTEN polypeptide insertions were highlighted. Predicted binding affinities were calculated against the 27 most prevalent MHC class II alleles, providing 97% coverage of the global population. Predicted epitope profiles were compared with those of turoctocog alfa to contextualise relative immunogenic potential.

Results

Efanesoctocog alfa and turoctocog alfa demonstrated similar predicted MHCII-binding epitopes within shared sequences. These epitopes are not typically associated with clinically relevant immune responses in the general HA population. Importantly, analysis of the novel sequence regions revealed few predicted strong binding peptides and a lower overall number of potential binding peptides. No significant increase in strong binding peptides was observed for efanesoctocog alfa compared with turoctocog alfa.

Discussion

In silico analysis indicates that efanesoctocog alfa no enhanced immunogenic risk compared with turoctocog alfa. These findings are consistent with the low incidence of inhibitor development reported in patients in the XTEND programme and support a favourable immunogenicity profile for efanesoctocog alfa.

No Declarations of Conflicts of Interest declared

Longitudinal Liquid Biopsy Profiling to Characterise Tumour Evolution, Resistance Mechanisms, and Neoantigen Targets in Oncogene-Driven Non-Small Cell Lung Cancer

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Abstract

Aim

This study aimed to evaluate longitudinal liquid biopsy profiling in oncogene-driven NSCLC to identify resistance mechanisms and explore their translational relevance.

Methods

A cohort of 42 patients with confirmed oncogenic drivers underwent molecular next-generation sequencing (NGS) testing on formalin-fixed paraffin-embedded (FFPE) and serial plasma samples. circulating free total nucleic acid was extracted from serial plasma samples and analysed using the thermofisher 50-gene oncomine precision assay by next-generation sequencing. genomic alterations were tracked over time and correlated with clinical and radiological progression. resistance-associated mutations and recurrent co-variants were evaluated for clinical significance and potential therapeutic applicability.

Results

Forty-two patients were analysed. the most frequently detected driver alterations were EGFR exon 19 deletions, EGFR L858R, and KRAS G12C. TP53 mutations were identified in 21% of patients and commonly co-occurred with established drivers, including EGFR, KRAS, and ALK. emergent resistance-associated alterations, including TP53, CHEK2, and BRAF, coincided with clinical progression in multiple cases. longitudinal profiling demonstrated increasing clonal complexity and additive mutational patterns over time. several recurrent alterations were prioritised for their potential suitability as targets for adoptive T-cell strategies

Discussion

Serial plasma-based genomic profiling provides clinically actionable insight into tumour evolution in NSCLC while offering a translational framework for the development of mutation-informed next-generation therapeutic strategies.

No Declarations of Conflicts of Interest declared

Clinical and Antimicrobial Stewardship Impact of Local Verification of A (1,2)-B-D-Glucan Assay in High-Risk Patients

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Abstract

Aim

To validate the Fungitell® STAT assay for serum BDG testing against the reference laboratory and assess the potential patient impact of faster turnaround time.

Methods

Serum samples were analysed using the Fungitell® STAT assay and results compared with the reference laboratory. Sensitivity, specificity, PPV and NPV were calculated. Patient records were reviewed to assess the impact of current BDG turnaround times on treatment.

Results

The assay was found to have a sensitivity, specificity, PPV and NPV of 100%, 76.3%, 67.9% and 100%, respectively, compared to the reference laboratory standard. It was difficult to establish the correlation between index and titre values due to lack of data. Numerous patients were negatively impacted by the current turnaround times, either by having commencement of their treatment delayed or receiving unnecessary treatment for a prolonged period.

Discussion

Fungitell STAT® offers a great solution to processing BDG requests in-house while offering very similar performance to the original Fungitell® assay used by the reference laboratory and greatly decreasing TATs.

No Declarations of Conflicts of Interest declared

Evaluating the Diagnostic Utility of Extended Neutrophil Parameters (Neut-GI and Neut-RI) in Early Sepsis Detection in Emergency Department Patients (A&E) in University Hospital Limerick (UHL)

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Abstract

Aim

To evaluate the diagnostic performance of extended neutrophil parameters, particularly NEUT-GI and NEUT-RI, for the early detection of sepsis in adult Emergency Department patients.

Methods

This retrospective study analysed laboratory data from adult Emergency Department patients between 01/09/2025 and 30/09/2025. Forty patients with positive blood cultures were compared with 40 non-septic controls. Assessed parameters were white blood cell count, neutrophils, immature granulocytes, NEUT-GI, NEUT-RI, CRP, and lactate. Groups were compared using Mann–Whitney U and Chi-square tests. Diagnostic performance was evaluated using ROC curve analysis with area under the curve (AUC). Optimal cut-offs were determined using the Youden Index. Correlations were assessed using Spearman's rank test ($p < 0.05$).

Results

Septic patients had significantly higher white blood cell count, neutrophils, NEUT-GI, CRP, and lactate. Discriminative ability was modest (AUC 0.563–0.707). NEUT-GI showed high specificity, whereas NEUT-RI showed high sensitivity but low specificity.

Discussion

Extended neutrophil parameters demonstrated similar performance to conventional biomarkers. While NEUT-RI may serve as a sensitive adjunct marker its limited specificity restricts standalone use.

No Declarations of Conflicts of Interest declared

Molecular Epidemiology of Enterovirus Infection in Ireland, 2024-2026

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Abstract

Aim

The National Virus Reference Laboratory (NVRL) performed ongoing genotypic surveillance of EV, to determine the genotypic diversity among EV positive specimens.

Methods

Between January 1st, 2024, and February 17th, 2026, 11,641 specimens were screened for EV RNA. Testing was stratified by sample type: 5,415 homogeneous specimens were analysed via Altona RealStar RT-PCR, and 6,226 non-homogeneous specimens via a laboratory-developed RT-qPCR test. Of these, EV RNA was detected in 1,034 (8.9%) specimens. Subsequently, 371 (35%) of the EV RNA detected specimens underwent genotyping via Sanger sequencing.

Results

Total EV RNA detections (n=1,034) consisted of 269 homogeneous and 765 non-homogeneous specimens. Within the homogeneous specimens, 216 were Cerebrospinal fluid (CSF) samples. Among samples selected for genotyping, Coxsackievirus A6 (16.4%) and Echovirus 9 (11.3%) were the most prevalent genotypes. Within CSF specimens Echovirus 6 was the dominant genotype (20.7%), followed by Coxsackievirus B5 (11.1%).

Discussion

This analysis provides insights into the enteroviral landscape in Ireland, with Echovirus 6 and Coxsackievirus A6 emerging as the most frequent genotypes in this cohort. These findings contribute to the ongoing record of EV epidemiology in the country.

No Declarations of Conflicts of Interest declared

The Development of Trimester-Specific Haemostatic Reference Ranges in Pregnancy and their Correlation with Postpartum Haemorrhage Risk by Maternal Age

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Abstract

Aim

This study aims to establish trimester specific reference ranges for Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT) and fibrinogen (FIB) and evaluates if more appropriate in maternity patients. This study also investigates age-related changes associated with fibrinogen levels and PPH risk.

Methods

Trimester specific reference ranges for PT, APTT and FIB were established using a retrospective analysis from maternity patients in 2025. Excluding non-pregnant patients 737 PT, 754 APTT and 372 FIB were analysed statistically using the Tukey-Fence test to remove outliers and Shapiro-Wilk test for distribution. Where a normal bell curve was observed the reference range were established using mean $\pm$ 2SD. Where a normal bell curve was not observed, 2.5th and 97.5th percentile values were used. Results of this study were compared with similar retrospective data from 2023 (863 PT, 824 APTT, and 519 fibrinogen).

Results

Compared with general population, PT and APTT showed little difference. FIB concentration increased progressively in each trimester consistent with the 2023 study and published literature. Both years data demonstrate prevalence of PPH increases with maternal age, while fibrinogen levels remain unaffected by age.

Discussion

Results of a two-year study at Cork University Hospital shows evidence that trimester specific reference ranges for FIB should be reported. Increased prevalence of PPH in women >35 highlights the importance of these trimester specific reference ranges.

No Declarations of Conflicts of Interest declared

Assessment of Pseudo Thrombocytopaenia: Efficacy of Sodium Citrate Anticoagulation Versus Vortex Mixing in Resolving Platelet Clumping

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Abstract

Aim

This study evaluated vortex mixing as a method for disaggregation of platelet clumps in EDTA samples.

Methods

A total of 120 patient samples flagged for platelet clumping, with platelet counts $<140 \times 10^9/L$, were included. Each sample was vortexed at 2,850 rpm for 120 seconds and re-analysed on the XN analyser. Blood films were prepared before and after vortexing using the Sysmex SP-50 analyser to assess the degree of platelet clumping and evaluate any changes in other haematological parameters. Sodium citrate results were compared with vortexed EDTA results to evaluate their success rates in resolving platelet clumping.

Results

Sodium citrate increased the platelet count in 55% of samples. Vortex mixing the primary EDTA sample brought the platelet count over $140 \times 10^9/L$ in 72.5% of samples. No statistically or clinically significant changes were observed in other FBC parameters.

Discussion

Vortexing the EDTA sample will displace platelet aggregation in over 70% of clumping samples. This allows for the platelet count to be reported on the primary EDTA sample, increasing turnaround time on reporting the FBC. It also avoids the requirement of a second sodium citrate sample.

No Declarations of Conflicts of Interest declared

Examining Gender and Sex Bias in Women's Health and its Implication for AI Healthcare Systems

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Abstract

Aim

To identify sex-related biases and deficiencies in healthcare data and clinical practice that may influence the development and performance of artificial intelligence systems.

Methods

We examine biases and deficiencies in women's health and how they may affect healthcare AI through qualitative interviews with clinicians and quantitative analyses of bloodwork data.

Results

A checklist for collecting/choosing inclusive healthcare data based on clinicians' perceptions of women's health. Development requirements for AI systems based on how clinicians diagnose. Qualitative analysis reveals clinical details with a large sex dominance and the potential for sex based recommendations for blood ordering.

Discussion

Ensuring AI is ethically integrated into healthcare is a complex process, particularly when developing models that accurately serve women. Meaningful collaboration from data scientists, clinicians, and pathologists is essential to build AI systems that equitably represent women.

No Declarations of Conflicts of Interest declared

Defining Essential Clinical Information for Pathology Request Forms, A Descriptive Quality Improvement Analysis

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Abstract

Aim

This study aims to promote consistent and meaningful inclusion of CD by identifying the most commonly reported clinical indications within pathology requests. Findings will inform the development of structured, standardised CD options for potential integration into electronic requesting systems such as MedLIS or other order communication platforms, supporting improved prioritisation, decision-making, and quality of care.

Methods

While working under a clinical audit in SVUH we accessed 3 years (2024, 2018, 2010) of pathology requests. A descriptive-comparative analysis of CD usage in blood ordering forms was conducted. Similar medical terms were grouped to ensure counts accurately reflected the number of pathology reports with those CD.

Results

A list of relevant CDs for both Primary care and hospital settings. With CD such as "Chronic disease management" in the primary care list, "Pre chemotherapy" in the hospital list and "diabetes" being prevalent for both lists.

Discussion

This study identified core CD commonly used in Blood Test requesting. Consistent inclusion of meaningful CD enhances the quality and interpretability of laboratory data, enabling robust downstream analysis. This creates a foundation for service evaluation, research, and population-level insight while minimising clinician time in providing CD.

No Declarations of Conflicts of Interest declared

Optimising Electronic Test Ordering Through Clinical Details: A Descriptive Test Association Analysis

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Abstract

Aim

This study analyses the association between specific clinical details (CD) and commonly requested tests with the objective of informing intelligent test pre-population within electronic ordering platforms.

Methods

While working under a clinical audit in SVUH we accessed 3 years (2024, 2018, 2010) of pathology requests. A descriptive-comparative analysis was conducted on selected CDs and their corresponding ordered tests. Findings were then validated with clinicians.

Results

The selected CD analysis suggests that there are primary tests which almost all orders receive, secondary tests which many orders receive, and tertiary tests which, while prominent in the analysis, do not seem to directly correlate with the CD being analysed. Some of the CD analysed include "Routine Screen", "Fatigue", "Diabetes" and "Hypertension".

Discussion

This study identified clear associations between specific CD and ordered laboratory tests. By mapping these associations, we provide a data-driven foundation for pre-population of blood order forms based on given CD for online ordering systems. Prepopulated blood ordering has the potential to improve test utilisation, enhance workflow efficiency, and support more accurate and timely diagnostics.

No Declarations of Conflicts of Interest declared

An Update from the National Alpha-1 Antitrypsin Deficiency Targeted Detection Programme

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Abstract

Aim

To evaluate the effectiveness of the National Alpha-1 Antitrypsin Deficiency Targeted Detection Programme in identifying alpha-1 antitrypsin deficiency and clinically significant SERPINA1 variants in at-risk individuals in Ireland.

Methods

>26,000 individuals have been tested following WHO, American Thoracic Society (ATS) and European Respiratory Society (ERS) guidelines, in a national targeted detection programme (TDP). AAT quantification is performed by turbidimetry, while phenotyping is by isoelectric focusing. Rare and novel mutations are identified by SERPINA1 gene sequencing.

Results

We have identified 520 ZZ, 644 SZ, 187 SS, 6201 MZ, 2631 MS, and over 300 individuals with rare clinically-significant phenotypes (e.g. IZ, FZ, IS, Z/Mmalton). A total of 25 different SERPINA1 mutations have been detected. A number of novel and ultra-rare SERPINA1 mutations have also been identified, including 5 different Null (Q0) mutations.

Discussion

Our results demonstrate the high prevalence of AATD in Ireland and the efficacy of a TDP. Advantages following a diagnosis include lung and liver surveillance, specific treatments, family screening, rapid smoking cessation, and mitigation of occupational exposures.

No Declarations of Conflicts of Interest declared

Impact of Total Protein Extremes on Serum Sodium Measurement by Direct and Indirect ISE

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Abstract

Aim

To assess the association between serum total protein concentration and sodium bias between indirect and direct ISE measurements.

Methods

A retrospective clinical audit was conducted in Department of Clinical Biochemistry, Cork University Hospital. Paired indirect laboratory sodium and direct POCT sodium results were identified. 5,565 samples were classified by total protein. Low (<62g/L), Normal (62-82g/L), High (>82g/L). Sodium bias calculated as indirect - direct difference.

Results

A slight negative association was observed between total protein and sodium bias. The high total protein group (>82 g/L) demonstrated the greatest divergence, with indirect sodium approximately 2–3 mmol/L lower than direct measurement.

Discussion

Increasing total protein concentration is associated with progressively greater negative bias in indirect ISE sodium measurement. High protein states may lead to clinically relevant sodium underestimation and altered classification.

No Declarations of Conflicts of Interest declared

Establishing a Multidisciplinary Laboratory User Group: Strengthening Collaboration and Education Between Clinical and Laboratory Teams

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Abstract

Aim

To improve clinical-laboratory communication and understanding of laboratory services through a multidisciplinary Laboratory User Group and targeted staff education.

Methods

Baseline surveys were distributed to clinical staff to assess awareness, understanding, and engagement with laboratory services, and to laboratory staff to assess perceptions of clinical knowledge and interprofessional relationships. Following this assessment, a multidisciplinary laboratory user group was established to facilitate communication between clinical teams and laboratory staff. Laboratory user training sessions were also introduced to provide education on laboratory processes, test requesting, and result interpretation. Ongoing evaluation will assess the impact of these interventions.

Results

Baseline survey findings identified gaps in clinical staff awareness of laboratory processes and available services. Initial Laboratory User Group meetings focused on laboratory training initiatives, service updates, and user feedback, with engagement from multiple clinical specialities. Positive early feedback from clinical teams and hospital management was observed.

Discussion

The establishment of a multidisciplinary laboratory user group provides a structured platform for collaboration and education between clinical and laboratory teams. This initiative has the potential to improve understanding of laboratory services and strengthen clinical–laboratory communication, as well as reducing reject rates and consequently, repeat patient sampling and test turnaround times.

No Declarations of Conflicts of Interest declared

Application of Urine C Peptide to Creatinine Ratio for Diabetes Subclassification in an Irish Population

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Abstract

Aim

This study evaluates its diagnostic performance of urine C-peptide-to-creatinine ratio (UCPCR) for DM subclassification in our population.

Methods

Fifty-five subjects and 50 controls were recruited at CUH and Cork University Maternity Hospital (CUMH): 36 Type-1 (T1DM), 12 Type-2 (T2DM), 5 Maturity onset diabetes of the young (MODY), and 2 LADA. Random urine samples were analysed for C-peptide and creatinine using Beckman Coulter platforms. Differences in UCPCR between DM subgroups and controls were assessed using Kruskal–Wallis with Dunn's post hoc testing. Diagnostic performance of locally derived cut-offs (ROC/Youden analysis) was compared with published Exeter laboratory thresholds using confusion matrices

Results

For T1DM patients, 83.3% had UCPCR below the locally derived optimum threshold of 0.23 nmol/mmol, compared with 80.6% below the Exeter threshold of <0.21 nmol/mmol. For T2DM, 11/12 patients (91.7%) had UCPCR >0.47 nmol/mmol, the locally derived cutoff, versus 8/12 (66.7%) using the Exeter cutoff of >0.6 nmol/mmol. In MODY patients, 3/5 (60%) fell into an intermediate range (0.23–0.47 nmol/mmol), and one LADA patient had a UCPCR in each of the T2DM categories and the intermediate range.

Discussion

Locally derived UCPCR cut-offs improved subclassification of T1DM and T2DM compared with published thresholds in this population. Irish laboratories should assess clinical demand and laboratory capacity when considering implementation of UCPCR testing.

No Declarations of Conflicts of Interest declared