LabMedNews

Association for Laboratory Medicine

Welcome to Birmingham!

JUNE 2026

- LabMed – your trade union
- 2025 Annual Report now available
- LabMed joins the UK Health Alliance on Climate Change
- Member spotlight: Larissa Pais
- Setting up a hospital-wide green laboratory network
- Rethinking clinical microbiology and laboratory preparedness for high-consequence pathogens
- The digital landscape in laboratory medicine

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Association for Laboratory Medicine

LabMed News ISSN 3033-3814

MESSAGE FROM THE PRESIDENT

IAN GODBER

President

It's going to be fantastic to see so many members at LabMedUK26 in Birmingham and I look forward to welcoming those attending to The Eastside Rooms. The meeting has certainly evolved over the last few years and is becoming established as a premier event in the UK Laboratory Medicine calendar, allowing for valuable discussion and an exchange of ideas under the watchful eye of Sarah Robinson as director of conferences and events. After the meeting, we'll turn our attention to EuroMedLab in London in 2027 when it's hoped that over 8,000 delegates from across the world will meet at the Excel Conference Centre in East London in what I'm sure will be the most successful EuroMedLab to date. The scientific programme is currently being compiled and we can expect the preliminary programme to be released around October.

In the meantime, we have several one-day and multi-day meetings coming up. In April, we hosted a very successful Digital Landscape event in Leeds, a report of which can be found in this issue. We now plan to build on this within our educational programme and expand this area further. Under Katie Hadfield and Emma Stevenson's stewardship, we've taken time to review our training and educational opportunities, and details of more meetings and training courses will be released very soon.

We've recently also been working with the Scientific and Clinical Practice Committee to review the timing of the Research and Innovation grant cycle. Currently, applications open in June with the award committee meeting face-to-face in September. Going forward, the application window will open in September, giving members the opportunity to apply after the summer break when it is easier to focus on submissions.

Finally, I'd also like to take the opportunity to once again thank Kath Hayden for all her hard work and dedication to the association as she steps down from her role as past-president, thank you Kath.

LABMED – YOUR TRADE UNION

It never hurts to remind everyone of a few key facts about the association and our status as a trade union. As both a professional body and certified trade union this puts us in a unique and powerful position locally and nationally.

All fee-paying members of the Association for Laboratory Medicine (LabMed) based in the UK get trade union representation at no extra cost.

We operate as both a professional body and trade union. LabMed are responsible for the collective negotiating and representation of individual members in the NHS at local, Trust and National levels and with the UK Health Security Agency (UKHSA) and NHS Blood and Transplant.

We are responsible to our membership for all matters involving industrial relations and conditions of employment, and use professional legal support services with a proven track record in handling complex cases up to Employment Tribunal level.

All our Trade Union officers are practising scientists; this unique commitment to clinical science benefits the industrial relations process immensely by bringing scientists' rigour and need for hard evidence to discussions.

Any member in the UK can become a trade union rep and take advantage of the universally recognised arrangement that provides reps with dedicated time each week to carry out Trade Union responsibilities within working hours. During this time you will be able to pick up invaluable communication, problem solving and leadership skills that will benefit your career as well as helping you and your colleagues in laboratory medicine.

What's new in 2026

We're focusing on building local support by recruiting new reps regionally and locally. We're working with a bigger Trade Union, The Chartered Society of Physiotherapy who help us develop training materials to make it easier for you to support each other.

This year's training series will include the following webinars. These are open to all of our fee-paying members and are structured to include plenty of time for Q&A.

- **Friday 17 July, 1300-1400**: 'The Equality Act'
- **Monday 5 October, 1100-1200**: 'Your Trade Union and You'
- **Monday 9 November 1400-1500**: 'The Employment Rights Act'

We very much look forward to seeing you online then!

Interested in learning more? – visit Trade Union

I'll also be very happy to talk with anyone who comes and sees me at our stand at LabMedUK26 in Birmingham next week.

Mike Lester

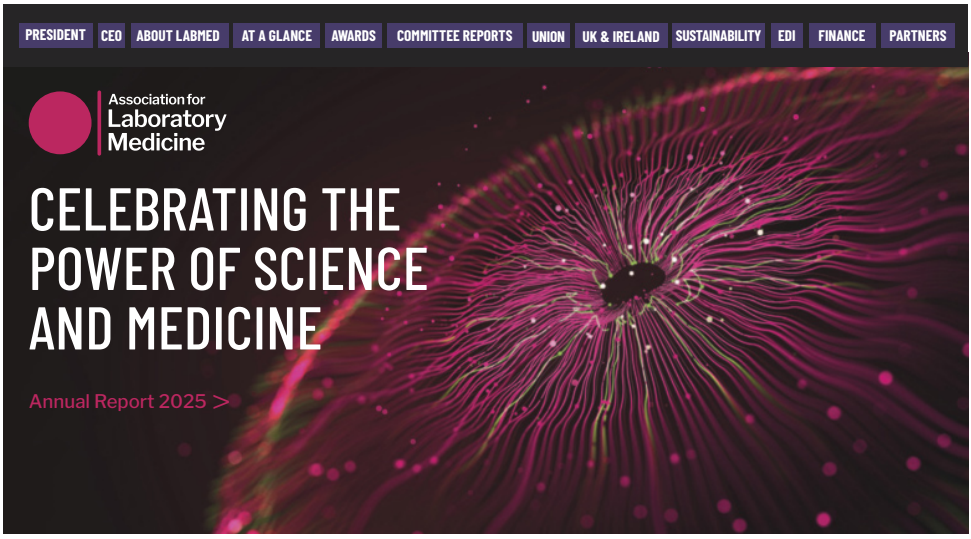
OUR 2025 ANNUAL REPORT IS NOW AVAILABLE

We're pleased to share that the Association for Laboratory Medicine's Annual Report 2025 is now published. This year's report reflects big changes – changes that broaden our reach, strengthen our voice and reflect the evolving role of our profession.

Key highlights from the report include:

- **Continued membership growth –** Fee-paying membership increased by 3.4% in 2025, representing nearly 14% growth since 2020, reflecting strong engagement and the ongoing value of LabMed membership.
- **Expansion of education and digital learning –** The Learning Academy significantly expanded its content and transitioned to a new platform offering improved functionality, lower operating costs and greater accessibility for members.
- **Successful delivery of national events and conferences –** LabMedUK25, National Audit Day, spotlight meetings and webinar programmes attracted strong attendance and engagement.
- **Strengthening LabMed's national professional influence –** LabMed contributed to major national initiatives and guidance, including the independent review of the National School of Healthcare Science and workforce guidance for consultant clinical scientists.
- **Major redevelopment of Lab Tests Online UK –** A full redesign and content refresh of Lab Tests Online UK progressed towards launch, modernising one of the profession's most important public-facing resources.
- **Preparations for EuroMedLab 2027 in London** – Planning continued for hosting EuroMedLab 2027, providing a major opportunity to raise the profile of UK laboratory medicine and support the Association's future financial sustainability.

You can read the full report here.



CHANGES TO THE RESEARCH AND INNOVATION GRANT CYCLE

We are pleased to announce some upcoming changes to the timing of the Research and Innovation grant cycle. Currently, applications open in June with the award committee meeting face to face in September. Going forward, the application window will open in September, giving members the opportunity to apply after the summer break when it is easier to focus on submissions.

The judging committee will then meet in person at the December Scientific Affairs and Clinical Practice meeting to review applications and make the awards, with successful applicants receiving payment from January 2027. We are currently updating the guidance and applications will be open from Tuesday 1 September closing Friday 2 November.

LABMED JOINS THE UK HEALTH ALLIANCE ON CLIMATE CHANGE

LabMed has joined the UK Health Alliance on Climate Change (UKHACC), adding the voice of laboratory medicine to this growing movement. Climate change is increasingly recognised as a major health challenge, affecting everything from infectious disease patterns and air quality to healthcare resilience and health inequalities. Laboratory medicine professionals have an important role to play in supporting sustainable healthcare and helping services adapt to future challenges.

The Alliance brings together health organisations from across the UK to raise awareness of the links between climate change and health, support health professionals to advocate for change, and influence policies that protect public health. Its members include royal colleges, specialist societies, journals and professional bodies representing hundreds of thousands of healthcare professionals.

This reflects LabMed's wider commitment to sustainability. Through the Alliance, we will have opportunities to contribute to campaigns and policy work focused on creating a healthier and more sustainable future for patients and healthcare services.

This also builds on the work already being carried out by our Green Champions Group and ongoing conversations around sustainable laboratory practice.

BOOK NOW FOR UPCOMING EVENTS

Enabling patient-centred sampling: Total laboratory automation

Liverpool | 30 September 2026

Explore pre-analytical sample quality, patient acceptability of collection devices through real world use-case scenarios, total laboratory automation and innovations in capillary collection device design

Association for Laboratory Medicine

BOOK NOW

Leadership and management residential course

Ashford | 12-16 October 2026

Developed by and for laboratory professionals

- preparing for consultant-level responsibilities
- navigating NHS structures
- managing people and budgets

Association for Laboratory Medicine

AI and informatics course

Online | August — December 2026

Trainer-led modules

- Career paths in informatics
- Extracting and analysing data
- Clinical communication
- Responsible use of AI and Machine Learning

Association for Laboratory Medicine

Microbiology training webinar series

Last Wednesday of each month 4 - 5pm
Online

From trainee perspective to doctorate and research experience

Led by microbiology experts

Association for Laboratory Medicine

MEMBER SPOTLIGHT

RISING TO THE CHALLENGE

When someone with drive, vision and care was needed to influence national training in laboratory medicine, Larissa Pais, a trainee at Royal Marsden, rose to the challenge. Here's her story.

What (or who) inspired you to choose this career path?

I was drawn to clinical science because it combines problem-solving, innovation and directly impacts patient care. I was intrigued by the idea of working in a profession where laboratory science genuinely influences clinical decisions every day. I was also inspired by the dedication of my work colleagues and seeing the commitment they brought to their work.

As I progressed through training, I also became increasingly aware of how my trainee experience is helping shape the future of the (clinical scientist) profession. This was my inspiration and that's what motivated me to become more involved in LabMed and trainee representation alongside my scientific training.

What does your role involve on a day-to-day basis?

As a second-year trainee clinical scientist in biochemistry, my days involve a mix of laboratory work, clinical learning, completing the portfolio requirements, result interpretation and understanding how biochemistry supports patient management.

Alongside training, I am currently vice-chair of the LabMed Trainee Committee. A large part of that role is making sure trainees feel represented and heard across all stages of training, from STP trainees through to HSSTs, as well as medics pursuing chemical pathology through biochemistry pathways.

The role involves listening to trainee concerns across regions, contributing to discussions around training and professional development, helping organise trainee engagement activities and encouraging more trainees to get involved in the wider profession beyond their day-to-day jobs.

One thing I have learned is that laboratory medicine is not just about science – it is also about people, collaborations and building a professional community.

What is the most rewarding part of your job?

The most rewarding part is feeling that I can contribute to something bigger than myself.

Of course, the scientific and clinical side of the role is incredibly fulfilling, especially knowing the work we do supports patient care. But being involved in trainee representation has added another dimension to my career. Supporting trainees, advocating for their perspectives and helping create opportunities for engagement has been hugely rewarding.

Sometimes trainees underestimate the value of their voice early in their career. One of the best parts of this role has been helping people realise that their ideas and experiences matter.

What is one project or achievement of which you are most proud?

Becoming vice-chair of the LabMed Trainee Committee is definitely one of the achievements I'm most proud of so far.

I joined the committee because I wanted trainees to feel that there was someone advocating for them and encouraging them to engage with the profession beyond training requirements alone. Laboratory medicine has so many opportunities in leadership, education, research and professional development, but trainees do not always realise how accessible those opportunities can be.

I'm particularly proud of helping strengthen trainee engagement and promoting conversations between trainees at different stages of their careers. Creating networks and making trainees feel included can have a lasting impact.

What challenges have you faced in your career progression and how did you overcome them?

One challenge has been balancing training with additional leadership responsibilities. Clinical science training is already demanding, and committee work requires time, organisation, and commitment outside of normal responsibilities.

Initially, I sometimes questioned whether I was experienced enough to contribute meaningfully in leadership spaces. Over time, I realised that fresh perspectives are valuable and trainees bring important insight into how the profession can continue improving.

I've learned that growth often comes from stepping outside your comfort zone and getting involved before you feel completely ready.

What skills do you think everyone should develop?

Communication and engagement.

Technical expertise is essential in laboratory medicine, but being able to communicate effectively, collaborate with others, and contribute to the wider profession is equally important.

I would also encourage trainees to develop confidence in putting themselves forward for opportunities. You do not need to wait until you feel like the "perfect candidate" to contribute.

I also think adaptability is becoming increasingly important. Healthcare and diagnostics evolve quickly, and being open to change is a valuable skill.

What motivates you every day?

What motivates me is the opportunity to keep learning while also helping shape the future of the profession in some way.

This field is evolving rapidly and trainees have an important role in that future. I'm motivated by the idea that today's trainees will become tomorrow's scientific leaders, educators, consultants and innovators.

I also genuinely enjoy encouraging others to get involved. Professional organisations and trainee committees can sometimes feel intimidating from the outside, but they are incredibly valuable spaces for networking, learning and creating change.

If you could give your younger self one piece of advice, what would it be?

Say yes to opportunities earlier.

You do not need to have everything figured out before getting involved. Some of the best experiences come from taking chances, meeting new people and being willing to contribute even when you are still learning.

I would also remind myself that your career is not defined only by exams

or the progress bar on OneFile i.e. your competencies. The relationships you build, the people you support and the wider contributions you make matter too.

What's your favourite way to unwind after work?

I like switching off by spending time with friends, family and my two fur babies. I also enjoy Pilates and travelling around the world. Having balance outside of work is important, especially during demanding periods of training.

What is your professional vision?

My vision is to continue developing as a clinical scientist while remaining actively involved in trainee development, leadership and professional engagement within laboratory medicine.

I want to help create a culture where trainees feel empowered to contribute ideas, pursue opportunities and see themselves as active members of the profession from the beginning of their careers.

I would encourage any trainee considering getting involved with LabMed to go for it. You gain far more than you expect – whether that's confidence, connections, leadership experience, or simply the reassurance that your voice can make a difference.

WELCOME TO OUR NEW MEMBERS

The Association is proud to introduce the following new members who have joined us since the last edition of *LabMed News*. Please extend a warm welcome to:

Rukayat Adenusi, Specialty trainee, NHS Grampian, Aberdeen

Amna Al Balushi, Resident, Oman Medical Specialty board, Muscat, Oman

Walaa Al Iawati, Doctor, Oman Medical Specialty Board, Muscat, Oman

Aoife Conry, General practitioner, Berkshire Healthcare NHS Foundation Trust, Bracknell

Kirsty Dolphin, Chemical pathology SpR, Bristol Royal Infirmary, Bristol

Radwa El bon, Associate professor, Kasr Alainy Hospital Cairo university, Cairo

Rebecca Gorton, Principal clinical scientist, HSL (FM) LLP, London

Joe Grabauskas, Trainee clinical scientist, Royal Surrey NHS Foundation Trust, Cranleigh

Tegan Lawrence, Trainee clinical scientist, SYNNOVIS, London

Kerry-Anne Revie, Trainee clinical scientist, York and Scarborough Teaching Hospitals NHS Foundation Trust, Hull

Thomas Walton, Chemistry network lead, South West London Pathology, London

Erin Wearmouth, Trainee clinical scientist, Royal Sussex County Hospital, Brighton

Thomas Wynn, Trainee clinical scientist, Manchester Foundation Trust, NHS England, Manchester

Student

Muhammad Zeeshan Arshad, University of Faisalabad, Faisalabad, Punjab, Pakistan

Farah Bukhmseen, King Saud University, Riyadh, Kingdom of Saudi Arabia

Giulia Cavallo, University of Westminster, London

Amisha Raikar, Newcastle University, Newcastle-upon-Tyne

Faizan Rasool, University of Faisalabad, Faisalabad, Punjab, Pakistan

Sara Tiwari, Imperial College London, London

CONDOLENCES

It is with regret that we inform you of the sad news that Professor Robert (Bob) Flanagan has died. He joined the Association in 1979 and was awarded Honorary membership in 2018. Bob was a member of the Education Committee for many years and was awarded the President's Shield in 2007 for his development of Analytical Toxicology training. Bob was an internationally recognised figure who advised international bodies and was the author of many scientific papers and books.

ANNALS OF CLINICAL BIOCHEMISTRY LATEST RESEARCH ARTICLES

Check out these interesting new articles recommended for reading by the editors-in-chief of the *Annals of Clinical Biochemistry*:

Clinical impact of current evidence on cardiac troponin structure, function and release mechanisms – an up-to-date review

J Hatherley, P Collinson, E Shantsila, D Gaze, A Khand

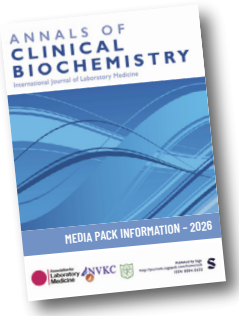
Environmental sustainability of clinical laboratories: a scoping review

R J Shorten, A Sanders, M Farley, S Josse, S Shafiq, C Harris, A Clegg, and J Hill

Thank you to our reviewers

The journal sincerely thanks the following individuals who reviewed one or more manuscripts during 2025:
https://journals.sagepub.com/doi/full/10.1177/00045632261431214

Click here to submit your work to the *Annals of Clinical Biochemistry.*



ADVERTISING IN ANNALS OF CLINICAL BIOCHEMISTRY

Promote your brand to a highly engaged audience of laboratory medicine professionals – advertising is now available in both the *Annals of Clinical Biochemistry* online journal and our member-wide emails. To find out more, contact Jason Brown, Advertising Manager, at jason@labmed.org.uk

PUBLICATION DATES

LabMed News is published on the 15th of the month. To guarantee publication, please submit your article by the 15th of the preceding month (i.e. 15th July for the August 2026 issue) to: editor@labmed.org.uk We aim to be as flexible as possible and will try to accept articles up to the 1st of the month to be published if space allows. Otherwise they will be held over to the next issue. If we are aware that articles are imminent, this gives us more flexibility and we can reserve space in anticipation. If in doubt, please contact: Gina Frederick, lead editor, via the above e-mail.

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LabMedUK26
Birmingham 8-10 June

HEAR THE LATEST FROM INDUSTRY AT LABMEDUK26

We look forward to seeing many of you at conference this year. Full programme can be found here.

Tuesday 9 June

12.00pm – 1pm

BD

Small drop, big impact: launching the capillary blood sampling recommendations

Karen Perkins and Sophie Hepburn

BD Advancing the world of health™

Capillary sampling with back-to-laboratory analysis can enable the NHS strategic shift from hospital to community and treatment to prevention by providing a patient-centric alternative to traditional venepuncture.

The newly formed Patient-Centred Testing and Sampling (PaCTS) Group invite you to join them in launching the UK recommendations for capillary blood sampling. As the first published capillary sampling guidelines globally, this marks an important milestone in how laboratories can enable a shift to more patient-centric care.

Hear from Karen Perkins and Sophie Hepburn on ways to navigate this rapidly evolving field whilst keeping safety and quality paramount.

Binding Site

12.00pm – 12.30pm

Multiple sclerosis: what it is and how it's diagnosed

Nehir Banaz, PhD – Medical science liaison

Binding Site part of Thermo Fisher Scientific

Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease of of the central nervous system affecting 2.9 million people worldwide. This presentation reviews MS disease courses and focuses on the 2024 revisions of the McDonald diagnostic criteria (Montalban *et al, Lancet Neurol* 2025). New topographical inclusion of the optic nerve and incorporation of paraclinical biomarkers (central vein sign, paramagnetic rim lesions and cerebrospinal fluid (CSF) positivity) enable earlier diagnosis. Notably, the κ free light chain index (≥6.1) is considered interchangeable with oligoclonal bands for defining positive CSF, providing alternatives for demonstrating dissemination in time.

SNIBE

12.00pm – 12.30pm

Shifting UK chronic disease prevention forward: clinical practice and cooperation prospects of Chinese innovative solutions

Carol Chen, marketing and product manager

In the UK, there are over 15 million hypertensive patients. Chronic disease prevention and control urgently needs to shift from passive treatment to early screening and accurate identification, to reduce the burden on the medical system and improve patients' quality of life.

With the precise screening of secondary hypertension as the starting point, we will explain the breakthrough progress of Snibe's original technology in the detection of markers such as aldosterone, and bring new perspectives and solutions for UK hypertension prevention and control through the practical experience of Chinese multi-centre clinical studies; we will also focus on multiple chronic disease scenarios such as osteoporosis prediction and treatment monitoring, endocrine and metabolic system toxicity prediction during tumour treatment, and the application practice of the GADA algorithm model aimed at hepatic cancer screening developed based on 30,000 samples from the Chinese hepatitis B population, sharing future innovative solutions for disease prevention and control from the perspective of an *in vitro* diagnostic enterprise.

12.30pm – 1pm

Abbott

Automating clinical diagnostic pathways with clinical decision support – outcomes from a CKD use case

Gemma Quinney, digital health consultant (Abbott), Anna Barton, principal clinical biochemist, Royal Cornwall Hospital

AlinIQ Clinical Decision Support (CDS) automates diagnostic pathways by intelligently integrating evidence-based guidelines and laboratory medicine algorithms with patient data such as LIS and electronic health record systems (EHRs), to guide clinicians toward accurate diagnoses and appropriate testing. This digital tool enhances diagnostic accuracy, reduces errors and streamlines work flows by providing real-time recommendations.

In this 30-minute session, Abbott presents a description of what makes a strong candidate diagnostic pathway for application of AlinIQ CDS and our guest presenter, Anna Barton, principal clinical biochemist at Royal Cornwall Hospital, will share how AlinIQ CDS has helped to improve early diagnosis, screening and prevention of chronic kidney disease across Cornwall.

Roche

Beyond the launch: real-world performance and integration of the cobas® Mass Spec solution

Tiago Sousa, South West London Pathology

For years, the potential of fully automated mass spectrometry has been a topic of anticipation. Following the 2025 launch of the cobas® Mass Spec solution, we are moving beyond theory to proven performance. This session reveals real-world metrics and firsthand insights from a UK early adopter on the installation, validation and the reality of transitioning complex mass spectrometry work flows onto an automated platform.

Wednesday 10 June

1.30pm-2pm

Siemens

Early identification and proactive prevention – the impact of diagnostics on patient liver pathways

James Dowd, scientific marketing manager, Northwest Europe

The NHS is shifting from treating illness to preventing it, with strong emphasis on obesity, cardiovascular disease and smoking. Early detection of chronic liver disease remains challenging, as routine tests provide limited insight into fibrosis risk. Using advanced biomarkers, risk scoring tools can improve triage, streamline referrals and ensure patients receive appropriate care sooner. This approach reduces late stage diagnoses and supports better outcomes.

Key takeaways:

- Prevention is now a core NHS priority, with ambitious population health targets.
- Advanced liver fibrosis diagnostics and digital tools can strengthen triage and care pathways.
- More efficient referral decisions can reduce late-stage diagnosis and support timely treatment.

Biohit

BIOHIT: diagnosing and monitoring of EoE including CEST

Sonja Bastian and Joseph Cooney

EUROMEDLAB LONDON2027

ifcc International Federation of Clinical Chemistry and Laboratory Medicine

EFLM EUROPEAN FEDERATION OF CLINICAL CHEMISTRY AND LABORATORY MEDICINE

Association for Laboratory Medicine

Dates to remember

15 December 2026
deadline for abstracts submission

15 March 2027
end of reduced registration fees

16-20 May 2027 | Excel London

27th Congress of Clinical Chemistry and Laboratory Medicine
LABMEDUK27 of the Association for Laboratory Medicine

SETTING UP A HOSPITAL-WIDE GREEN LABORATORY NETWORK

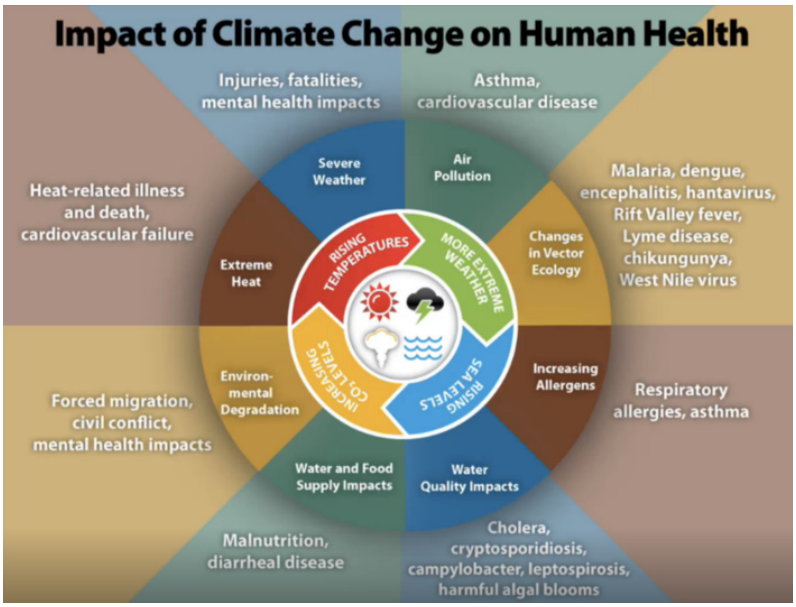
CERYS MARCH

Principal clinical scientist – biochemistry, The Royal Marsden NHS Foundation Trust

When I started a new job as a principal clinical scientist at The Royal Marsden Hospital (RMH) in September 2023 I was determined to bring my green values to the fore. I had long been reducing, reusing and recycling at home and had bought my first electric car in 2016, but bringing this to work felt like a big, difficult problem. I decided to be brave in my new role and try to make a difference.

My first action was to appoint myself sustainability champion in my laboratory and set up a green forum to discuss ideas there. As a result, we successfully achieved EFLM Green and Sustainable Laboratories Accreditation and started to work with our suppliers on green issues. However, we were beginning to ask questions that involved other departments and I knew communication was key.

The Royal Marsden have a network of green champions across all areas of the hospital, and I met Julie Codet-Boisse there. She is on the transformation team and was currently managing a digital pathology project. She asked how many pathology members we had in the green champions and I realised I was the only one.



The effects of climate change (CDC)

Laboratories use so much plastic and energy, we knew we could make a difference to the hospital's green plan if we got them onboard. Julie and I decided to try and set up a green laboratory group across RMH. Importantly, she had access to the pathology managers group and managed to get us a space in their meeting to make our case.

We gave our pitch:

- The NHS is directly contributing to climate change and therefore making people ill
- This goes against 'do no harm'
- The NHS has pledged to be net zero by 2040
- Laboratories need to be part of that
- Small changes make a big difference
- Turning off computers and lights when not in use can save energy and money
- The International Freezer Challenge is a great place to start – check it out
- Introduce procurement to the MyGreenLab ACT label
- We wanted a green champion in every lab
- We wanted them to have protected time – one day a month
- We would meet quarterly to discuss ideas and I would support them if I could.

So, the green pathology network was born.

We have 10 laboratories at RMH; seven NHS and three research. We've now met six times since March 2025 and discussed topics such as Innovation Den funding and use/disposal of dry ice and energy monitoring. Our achievements include having automatic sensor lighting installed in many labs, switching to pipette tip suppliers who offer take-back schemes and six labs completing the Freezer Challenge in 2025.

In order to recognise this accomplishment my boss nominated me for the Trust Staff Achievement Green Award. Not expecting anything except good food and dancing, we both dressed up for a glamorous night in Battersea Power Station.

To our great surprise I won!

Just a little bit more motivation to keep up the green work.

Cery March with RMH chief executive, Dame Cally Palmer, and chief medical officer, Nick van As

RETHINKING CINICAL MICROBIOLOGY AND LABORATORY PREPAREDNESS FOR HIGH-CONSEQUENCE PATHOGENS

IJEOMA OKOLIEGBE

Clinical scientist, Department of Infection Prevention and Control, Aberdeen Royal Infirmary, Aberdeen

Recent outbreaks of Andes Hantavirus associated with international travel and Ebolavirus disease in Central Africa highlight persistent and evolving challenges in clinical microbiology laboratory preparedness for high-consequence infectious diseases. Although these pathogens differ in epidemiology, transmission dynamics and geographical context, both events expose recurring systemic vulnerabilities that extend beyond the pathogens themselves. These outbreaks demonstrate that preparedness is not solely defined by technical capability or pathogen-specific protocols, but by the strength of diagnostic pathways, biosafety practices, workforce resilience and the integration of laboratory services within wider clinical and public health systems. In an environment shaped by post-pandemic pressures, increasing diagnostic demand and the growing influence of ecological change on disease emergence, there is a need to critically examine how laboratory systems can transition from reactive responses to sustained and adaptable preparedness.

Diagnostic uncertainty: a system level

A central and unifying issue across these outbreaks is the challenge of diagnostic uncertainty, which has direct implications for patient outcomes. High-consequence infectious diseases frequently present with non-specific symptoms such as fever, malaise and generalised systemic features that overlap substantially with common conditions including influenza, sepsis, malaria and other viral infections. This overlap delays recognition of epidemiological risk and may result in inappropriate initial clinical management, delayed isolation and missed opportunities for early intervention. From a patient perspective, delayed diagnosis is associated with increased morbidity, inappropriate empirical therapy, and, in some cases, a higher risk of onward transmission before infection prevention measures are implemented. The persistence of diagnostic uncertainty reflects limitations not only in clinical recognition but also in how

laboratory systems capture and act on risk-related information.

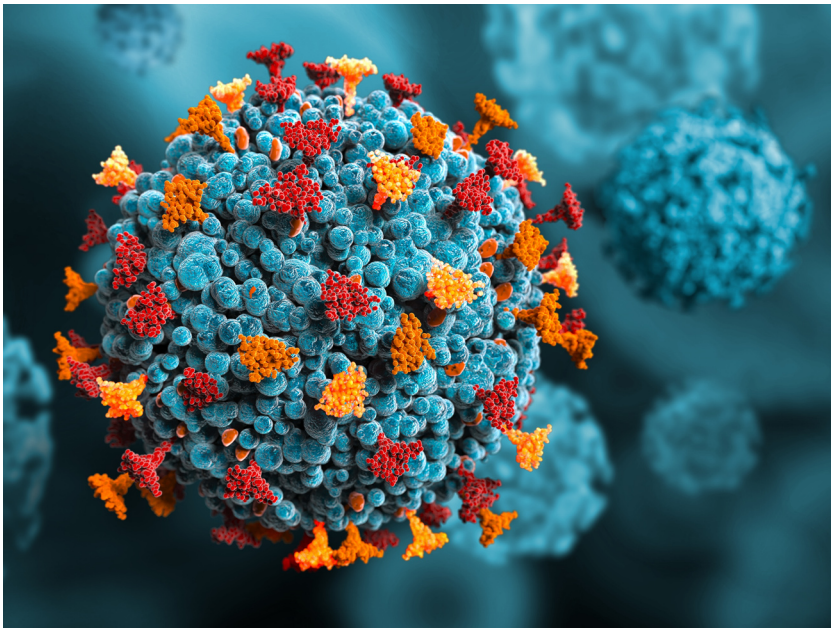
Strengthening early risk identification and clinical-laboratory interface

Addressing this requires a more structured approach to early risk identification. Embedding mandatory epidemiological prompts within electronic requesting systems can ensure that key information, such as travel history and exposure risk, is consistently captured. The addition of automated alerts within laboratory information management systems can further strengthen this process by flagging high-risk combinations of symptoms and epidemiological data, prompting early microbiology review before samples enter routine workflows. Clinician and laboratory communication also plays a critical role, particularly in ensuring that microbiology expertise is readily accessible in acute clinical settings. Mechanisms such as on call consultation and participation in multidisciplinary safety huddles can facilitate earlier recognition of atypical cases and support timely diagnostic escalation. This is especially important in environments characterised by high staff turnover, rotating junior workforce and shift-based working patterns, where individuals responsible for initial sample collection may change frequently. Scheduling safety huddles to coincide with clinical handovers or shift transitions can therefore help ensure that key messages regarding high-risk presentations, specimen handling and escalation pathways reach the staff most likely to be obtaining and submitting samples. Embedding laboratory input into these handover points reinforces familiarity with risk indicators and promotes consistency in practice, even where workforce continuity is limited.

These relatively simple interventions have the potential to reduce time to appropriate testing and improve both clinical outcomes and infection prevention measures.

Biosafety and workflow vulnerabilities

Closely linked to the challenge of diagnostic uncertainty is the issue of biosafety, which primarily affects laboratory staff rather than patients. A key lesson from both Hantavirus and Ebola outbreaks is that the greatest biosafety risk arises not after a pathogen is identified, but during the early stages of



Hantavirus under the microscope

disease when it is not suspected. Specimens from patients with undifferentiated febrile illness may be handled within routine laboratory workflows before enhanced precautions are implemented. This creates a situation in which laboratory personnel may be inadvertently exposed to high-consequence pathogens through aerosol generation during centrifugation, contact with contaminated surfaces, or inappropriate handling of specimens. Addressing biosafety within this context requires a shift away from purely reactive models towards the incorporation of risk-based precautions within routine practice. Rather than depending solely on confirmed diagnosis, laboratories can adopt safer default approaches for certain clinical presentations, particularly undifferentiated febrile illness with no clear alternative diagnosis. The routine use of sealed centrifuge rotors, minimisation of open handling steps, and the selective application of enhanced personal protective equipment can reduce exposure risk without significantly affecting workflow efficiency. In addition, the introduction of early assessment processes at specimen reception where samples flagged through clinical or electronic systems are reviewed before full processing provides an additional safeguard against unrecognised high-risk specimens entering standard workflows.

Another important component of biosafety is recognising how events arising from diagnostic uncertainty are captured within existing laboratory quality management systems. While most laboratories have established incident reporting processes, these systems are often better suited to documenting confirmed breaches or adverse events than subtle near-miss scenarios involving unrecognised high-risk specimens. For example, samples from patients later identified as having epidemiological risk factors may initially be processed under routine conditions without triggering formal incident reporting, particularly if no exposure is identified. However, these events represent critical indicators of system vulnerability at the interface between diagnostic uncertainty and biosafety. Strengthening the use of existing quality systems to explicitly capture such near-misses, for example through targeted prompts, enhanced categorisation, or periodic focused review of high-risk specimen pathways, can provide valuable insight into recurrent weaknesses in pre-analytical processes and communication. In doing so, laboratories can move beyond reactive reporting towards a more proactive understanding of how unrecognised risk enters routine workflows, reinforcing biosafety as a continuous process rather than one activated only following confirmed high-consequence pathogens.

The interrelationship between diagnostic uncertainty and biosafety highlights the need for alignment between patient-centred and staff-centred risk management. Improving early recognition of high-consequence infections enhances patient care, while embedding precautionary practices within routine workflows, protects staff during periods of uncertainty. Together, these strategies address the initial stages of the diagnostic pathway, where both clinical and laboratory risks are greatest.

Systems approaches to preparedness

Beyond this early phase, the organisation of diagnostic systems plays a crucial role in determining overall preparedness. The expansion of molecular diagnostics, particularly real-time RT-PCR, has significantly enhanced the ability to detect emerging infections. However, many healthcare systems continue to rely on centralised reference laboratories for high-consequence pathogens. While this model ensures technical expertise and quality assurance, it introduces delays associated with specimen transport, regulatory processes and capacity limitations. These delays can affect both

clinical decision-making and infection prevention measures, particularly when testing demand increases during an outbreak. A more flexible approach involves the development of tiered diagnostic systems, where selected regional laboratories are equipped to perform initial screening under defined conditions. Such laboratories would not replace reference centres but would function as part of an integrated network, providing early testing capacity and supporting timely escalation. The establishment of pre-validated assay repositories at national or regional level would enable rapid implementation of testing without requiring local assay development under time pressure. Practical improvements in specimen transport, including standardised packaging systems and pre-arranged courier pathways, can further reduce delays and variability. Regular system testing through simulation or mock referral exercises can ensure that these processes function effectively when required.

As diagnostic capacity evolves, the increasing role of genomic sequencing introduces new opportunities and challenges. Sequencing provides detailed insights into pathogen evolution and transmission, supporting outbreak investigation and public health response. However, the full value of sequencing depends on its integration into operational workflows. In many laboratory settings, sequencing capability has expanded more rapidly than the infrastructure required to interpret and apply results, creating a gap between data generation and practical impact. To address this, laboratories may need to prioritise collaborative and integrated approaches. Regional bioinformatics support networks can provide access to specialist expertise without requiring each laboratory to maintain its own capacity. Ensuring that sequencing outputs are directly linked to public health systems and incident management structures can facilitate timely interpretation and application. Training laboratory staff in basic genomic concepts can also improve understanding and communication of results, ensuring that sequencing contributes meaningfully to decision-making rather than remaining a specialised or isolated activity.

Maintaining the effectiveness of these systems over time is challenged by preparedness fatigue. As the interval between high-profile incidents increases, familiarity with escalation procedures and high-risk workflows can decline. Routine operational pressures often limit opportunities for training and reinforcement, leading to a gradual erosion of readiness that may go unnoticed until an incident occurs. Addressing preparedness fatigue requires embedding readiness within routine laboratory culture. Short, frequent simulation exercises, integrated into existing workflows, can help maintain familiarity without placing excessive demand on resources. Incorporating scenarios involving high-consequence pathogens into routine competency assessments ensures that all staff, including new or rotating personnel, maintain awareness of escalation pathways. Leadership plays a crucial role in reinforcing the importance of preparedness, particularly when supported by designated roles responsible for coordinating training and maintaining visibility of key processes. By normalising these activities within everyday practice, laboratories can sustain readiness over time.

The sustainability of preparedness is closely linked to workforce resilience. Clinical microbiology services are increasingly affected by staffing shortages, recruitment challenges and the loss of experienced personnel. These issues are exacerbated during outbreaks, when additional demands are placed on laboratory teams for diagnostic testing, communication and biosafety oversight. The expertise required for effective outbreak response, including risk assessment and decision-making under uncertainty, cannot be rapidly developed during a crisis, making workforce capacity a critical determinant of preparedness. Addressing workforce challenges requires both strategic planning and operational flexibility. Cross-training staff across different areas of diagnostic practice can improve adaptability, enabling laboratories to respond to fluctuations in demand. Ensuring that preparedness activities are formally recognised within job plans helps protect time for training and simulation. At the same time, structured debrief processes following incidents or exercises provide an opportunity to capture lessons learned and preserve institutional knowledge. These measures help maintain both the capacity and capability required for effective response.

In addition to internal functions, clinical microbiology laboratories play an increasingly important role in communication and public health engagement. During outbreaks, laboratories provide guidance on testing strategies, interpret complex or uncertain results and contribute to broader clinical and policy decision-making. The rapid dissemination of information, including through informal channels, increases the risk of misinformation and inconsistent messaging, which can influence clinical behaviour and public perception. Effective communication requires structured and coordinated approaches. Standardised guidance for clinicians, delivered through electronic reporting systems or established communication channels, can ensure consistency and clarity. Close collaboration with public health authorities supports alignment of messaging across the healthcare system. Within laboratories, regular updates and transparent communication help maintain staff confidence and ensure that changes in guidance are implemented effectively. These approaches support both operational efficiency and workforce reassurance during periods of uncertainty.

Sustaining preparedness in a changing global landscape

The broader context of emerging infectious diseases also highlights the influence of

Ebola virus under the microscope

environmental and ecological factors. Changes in climate, land use and human interaction with animal reservoirs are increasing the likelihood of zoonotic spillover events. This creates a need for laboratory preparedness to incorporate elements of environmental awareness and interdisciplinary collaboration. Laboratories can contribute to this by engaging with surveillance systems that provide information on environmental and veterinary health trends, enabling earlier recognition of emerging risks. Participation in multidisciplinary networks that integrate human, animal and environmental health perspectives supports a more comprehensive understanding of disease emergence. Adapting diagnostic pathways to reflect changing epidemiology, particularly for undifferentiated clinical presentations, further strengthens preparedness. These approaches align with a broader One Health framework, recognising that laboratory systems are part of a wider ecosystem of health surveillance and response.

Despite the range of strategies available to improve preparedness, a recurring observation across successive outbreaks is the persistence of familiar vulnerabilities. Diagnostic delays, biosafety risks, workforce challenges and system constraints are repeatedly identified, suggesting that lessons are not consistently translated into long-term improvements. This reflects a gap between recognising issues and implementing sustained change within laboratory and healthcare systems. Bridging this gap requires structured mechanisms for translating lessons into action. Establishing formal processes for reviewing incidents, assigning responsibility for implementing recommendations, and monitoring outcomes can support sustained improvement. Incorporating preparedness into organisational governance structures, including risk management frameworks and strategic planning, ensures that it remains a priority beyond the immediate context of an outbreak. Regular evaluation of key indicators, such as escalation timelines and training engagement, provides an opportunity to assess readiness and drive continuous improvement.

In conclusion, recent Hantavirus and Ebola outbreaks illustrate that laboratory preparedness for high-consequence infectious pathogens depends on the integration of diagnostic systems, biosafety practices, workforce resilience, communication structures and environmental awareness. Diagnostic uncertainty affects patients through delayed recognition and management, while biosafety risks primarily affect laboratory staff during the early, unrecognised stages of disease. Addressing these interconnected challenges requires a shift towards proactive, system-wide approaches that embed preparedness within routine operations. As emerging infections become more frequent and complex, the ability of clinical microbiology laboratories to function effectively under uncertainty will be a defining feature of health system resilience. Ensuring that lessons from successive outbreaks result in sustained improvements will be essential to meeting this challenge.

MEETING REPORT

THE DIGITAL LANDSCAPE IN LABORATORY MEDICINE: 'HOW TO GET THE MOST OUT OF YOUR LIMS'

In April I was fortunate to be awarded a regional education bursary to attend 'The digital landscape in laboratory medicine' conference in Leeds. It was a very interesting day and all of the speakers were very knowledgeable. Modern clinical laboratories cannot function without IT systems and this conference explored innovative projects that have benefited the clinical service and patient care.

EMMA HENLY

Senior clinical scientist, Warrington and Halton Teaching Hospitals NHS Foundation Trust

"The only product of the clinical laboratory is information"

The first presentation from University Hospitals Birmingham was based on this quote by William Dito (1979). The generation of information is the end product of appropriate test selection, specimen collection, analysis, reporting and interpretation. How do we ensure all of this? How do we make sure that the patient gets the right result, at the right time?

The presentation discussed how integrating clinical systems to produce a networked information system that is all linked together reduces duplicate testing, enables faster decision making, leads to better patient pathways and increases user satisfaction.

Delegates at the conference

LIMS projects

Northumbria Healthcare NHS Foundation Trust shared their experience of their new LIMS system project. They were able to implement measures such as paperless requesting, labelling at source, sample tracking, discipline-specific requesting pages in ICE to optimise requesting and capture data e.g. thyroxine dose at request.

A talk from Cheshire and Merseyside collaborative gave useful insights into how to build your LIMS. Why do you want a result to trap? Is it because you want to perform an action (e.g. phone or add a comment), review the quality of the result, or to learn/maintain competency? Is there anything that can have automated coded comments – look for high volume, low complexity to see a benefit on your queues!

Patient care

Big data that is generated from your LIMS can be used to improve patient care. A study presented by Royal Wolverhampton NHS trust found that serum amylase results were significantly higher for Black and Asian patients compared to White patients, resulting in the verification of new reference intervals for these ethnic groups. Data from 176,555 individuals were included in the study, highlighting how the information in our LIMS is a vast resource that can be used for the benefit of all patients.

Karen Mitchell and Lorenz Becker

Conclusion

Thank you to the Association for Laboratory Medicine for awarding me the bursary to attend the meeting. I really enjoyed the day, it was well organised and the venue was ideal. It was a very well attended conference and I would definitely encourage anyone with an interest in digital pathology to attend further conferences like this.

Chris Duff

THE DIGGLE MICROBIOLOGY CHALLENGE

These questions, set by Mathew Diggle, are designed with trainees in mind and will help with preparation for the microbiology part 1 FRCPath exam.

Question 53 from the April issue

In early 2026, a 63-year-old man is admitted to an intensive care unit in London following emergency laparotomy for perforated sigmoid diverticulitis. He has a background of type 2 diabetes, obesity and chronic kidney disease. He spends 10 days in ICU, receiving piperacillin–tazobactam, and requires a femoral central venous catheter.

On day 11, he becomes febrile and hypotensive with rising inflammatory markers. Two sets of blood cultures are taken. At 24 hours, the aerobic bottle from one set flags positive; Gram stain shows yeast-like cells. MALDI-TOF MS on subculture gives an identification of *Candida auris* with a high confidence score.

Which of the following is the most appropriate initial antifungal management?

A) Liposomal amphotericin B monotherapy

B) Fluconazole monotherapy

C) Echinocandin (e.g. micafungin) as first-line therapy

D) Voriconazole monotherapy

E) No systemic antifungal; remove central line and repeat blood cultures only.

Answer

C) Echinocandin (e.g. micafungin) as first-line therapy

Explanation of options

C) Echinocandin (e.g. micafungin) – correct

- Current guidance for *Candida auris* bloodstream infection recommends an echinocandin as first-line therapy, given frequent reduced susceptibility or resistance to fluconazole and, in some strains, to other azoles.
- Echinocandins have good activity against most *C. auris* isolates and are preferred initial treatment pending full susceptibility testing, especially in critically ill patients.
- In this septic ICU patient with confirmed *C. auris* candidaemia, prompt initiation of an echinocandin plus source control (line removal, attention to any deep foci) is standard of care.

A) Liposomal amphotericin B – incorrect (not best initial choice)

- Liposomal amphotericin B is active against many *Candida* species and is an alternative for *C. auris,* particularly where echinocandin resistance is confirmed or strongly suspected, or in treatment failure.
- However, it carries a higher risk of nephrotoxicity, which is relevant in this patient with chronic kidney disease, and is generally reserved for second-line or salvage therapy in *C. auris* infection.

- As most C. *auris* isolates in the UK remain echinocandin-susceptible, an echinocandin is the preferred initial agent rather than immediate amphotericin B.

B) Fluconazole – incorrect

- Candida auris shows high rates of fluconazole resistance globally; empirical fluconazole monotherapy is inappropriate for *C. auris candidaemia* unless susceptibility is proven.
- In a haemodynamically unstable ICU patient, fluconazole would be an unsafe initial choice due to the risk of inadequate therapy and associated mortality.

D) Voriconazole – incorrect

- Voriconazole and other triazoles may have variable activity against *C. auris* and resistance is increasingly reported; they are not recommended as first-line monotherapy for *C. auris* candidaemia.
- Voriconazole is more appropriate for mould infections (e.g. aspergillosis) or selected non-*auris* candidaemia when susceptibilities permit, rather than empirical therapy for *C. auris.*

E) No systemic antifungal; remove line and observe – incorrect

- *Candida* in blood cultures is never a contaminant; *C. auris* candidaemia requires **systemic antifungal therapy** in addition to line removal and investigation for deep-seated foci.
- Observation alone after line removal risks persistent or disseminated infection, especially in a critically ill, septic patient.

Question 54

In Spring 2026, a cruise ship in the Atlantic reports an outbreak of severe respiratory illness with several deaths. A passenger evacuated to a local teaching hospital is confirmed to have a novel hantavirus infection. Most affected patients have acute fever, myalgia, cough and rapidly progressive respiratory failure; at this stage there is no clear evidence of sustained human transmission.

Which of the following statements regarding hantavirus infection is most accurate?

A) Human-to-human transmission via respiratory droplets is the predominant route of spread for all hantaviruses causing hantavirus pulmonary syndrome (HPS).

B) Hantaviruses are negative-sense, segmented RNA viruses primarily transmitted to humans via inhalation of aerosolised rodent excreta.

C) Effective licensed vaccines are widely available and recommended for travellers to endemic areas.

D) Ribavirin is the established standard of care that clearly reduces mortality in hantavirus pulmonary syndrome.

E) Hantavirus infections typically present with chronic, indolent hepatitis rather than acute respiratory or renal disease.

The answer to this question will appear in the next issue of *LabMed News*.

DEACON'S CHALLENGE REVISITED

NO 43. ANSWER

The older literature is full of enzyme data expressed in units other than international units per litre (U/L). For example , King-Armstrong (KA) units were used for many years to report alkaline phosphatase activity. One KA unit is the amount of enzyme in 100 mL of serum that will split 1 mg of phenol from phenylphosphate in one hour.

Convert 200 KA units to U/L.

Since one KA unit is the amount of enzyme in 100 mL of serum that will split 1 mg of phenol from phenylphosphate in 1 hour:

1 KA unit = 1 mg phenol/h/100 mL serum

To convert to activity expressed as international units (U/L) it is necessary to determine the number of µmol of phenol formed in 1 min by 1L of serum. The following steps are involved:

1. Multiply by 1,000 to convert mg to µg
2. Divide by the molecular weight of phenol (94) to convert from µg to µmol
3. Divide by 60 to convert reaction period from h to min
4. Multiply by 10 to convert from 100 mL serum to 1L serum

The final result is: $1 \text{ KA unit} = \frac{1{,}000 \times 10}{94 \times 60} = 1.77 \text{ U/L}$

Therefore:

Alk phos (U/L) = Alk phos (KA units) x 1.77

Substituting for 200 KA units:

Alk phos (U/L) = 200 x 1.77 = **354 IU/L**

It is important to remember that even after converting enzyme activity from one unit to another, the numerical result will still depend on the reactions conditions used.

Question 44

A laboratory using a method with an analytical coefficient of variation of 5% at a concentration of 100 mmol/L for a serum constituent examined samples from a healthy population and found a Gaussian distribution with a 95% reference range of 74-126 mmol/L. If the method coefficient of variation had been 22%, what reference range would the laboratory have found?

The answer to this question will appear in the next issue of *LabMed News*.

SUSSEX CHALLENGES

On the next few pages, you will find the latest Sussex Challenge and commentary. You may find that discussing as a group activity is beneficial.

Challenge 6

Parents awoke with severe headache and nausea to find their four-year-old son semi-comatose. He was transferred to ED by ambulance receiving oxygen en route. On arrival his Glasgow Coma Scale was 10/15 and simple pulse oximetry showed 99% oxygen saturation.

Analyte	Admission	Unit	Reference interval
Serum sodium	141	mmol/L	136-145
Serum potassium	4.8	mmol/L	3.5-5.1
Serum urea	4.6	mmol/L	2.8-8.1
Serum creatinine	32	umol/L	23-37
Plasma glucose	7.2	mmol/L	
Serum CRP	6	mg/L	<5
Serum paracetamol	ND		
Serum salicylate	ND		
Blood pH	7.2	pH	7.35-7.45
Blood pO_2	20.4	kPa	11.1-14.4
Blood pCO_2	4.4	kPa	4.3-6.4
Blood standard bicarbonate	19	mmol/L	22-26
Blood base excess	-9	mmol/L	-4 - +2
Plasma lactate	7.8	mmol/L	0.5-2.2
Hb	12.8	g/L	11.5-14.0
WBC	16.8	10*9/L	5.0-17.0
Blood oximetry COHb*	35	% <1	

*Carbon monoxide haemoglobin

1. **What do you think are the key findings?**
2. **What do you think is the source of endogenous COHb production?**
3. **What do you think is the mechanism through which carbon monoxide causes poisoning?**
4. **How do you think the COHb% correlates with clinical and biochemical findings?**
5. **Why do you think the blood pO2 was elevated?**
6. **Why do you think the simple pulse oximetry showed a high saturation?**

Commentary

1. What do you think are the key findings?

- Raised blood pO_2 kPa
- Metabolic acidosis with a raised plasma lactate concentration
- Elevated COHb on blood oximetry (blood gas analyser)

2. What do you think is the source of endogenous COHb production?

Endogenous COHb is due to the action of haem oxygenase-1, a stress-response protein found in many tissues. The enzyme activity cleaves haem to form biliverdin-IXα, carbon monoxide (CO) and iron. Increased values are found in pregnancy and in severe illness due to enhanced activity of this enzyme.

3. What do you think is the mechanism through which carbon monoxide causes poisoning?

The affinity of haemoglobin for carbon monoxide is approximately 240 times stronger than that for oxygen. High concentrations of COHb diminishes oxygen delivery to the tissues. CO also binds to other haemoproteins, including myoglobin, cytochrome P450, and cytochrome c oxidase thus inhibiting mitochondrial metabolism and ATP production. Both factors lead to a hypoxic state in the tissues leading to a metabolic acidosis with accumulation of lactate.

4. How do you think the COHb% correlates with clinical and biochemical findings?

COHb%	Cause/Clinical effects
<1	Non-smokers
Up to 9	Heavy smokers >40/day
20	Shortness of breath on moderate exercise
30	Headache, irritation, fatigue
40-50	Severe headache, confusion, collapse

The long-term sequalae of CO poisoning relate not just percentage of COHb but also the duration of exposure. In addition, the long term neurological effects of CO poisoning tend to be greater in children. COHb concentrations correlate with plasma lactate concentrations.

5. Why do you think the blood pO_2 was elevated?

The partial pressure of oxygen in the blood is not influenced by the oxygen saturation of haemoglobin. The elevated blood pO_2 in this child is due to the administration of oxygen – in general the PaO_2 is about 10 kPa less than the percentage inspired oxygen concentration.

6. Why do you think the simple pulse oximetry showed a high saturation?

Simple pulse oximeters measure a number of forms of haemoglobin in addition to oxyhaemoglobin including COHb, methaemoglobin and sulphaemoglobin.

Pulse oximeters work by emitting light at two wavelengths (red 660 nm and near infrared 940 nm) from one arm of the oximeter that is then transmitted through the finger to a photodiode on the opposite arm. Oxyhaemoglobin absorbs more of the IR light and less of red light than does deoxyhaemoglobin. The measurement of oxygen saturation is based on the principle that the amount of red and IR light absorbed fluctuates with the cardiac cycle – increasing during systole and decreasing during diastole. COHb absorbs light at both red and infrared wavelengths, but the pulse oximeter interprets this as oxyhaemoglobin giving a falsely high result.

NB – there are CO-oximeters that use multiple wavelengths to differentiate between different forms of haemoglobin, including methaemoglobin.

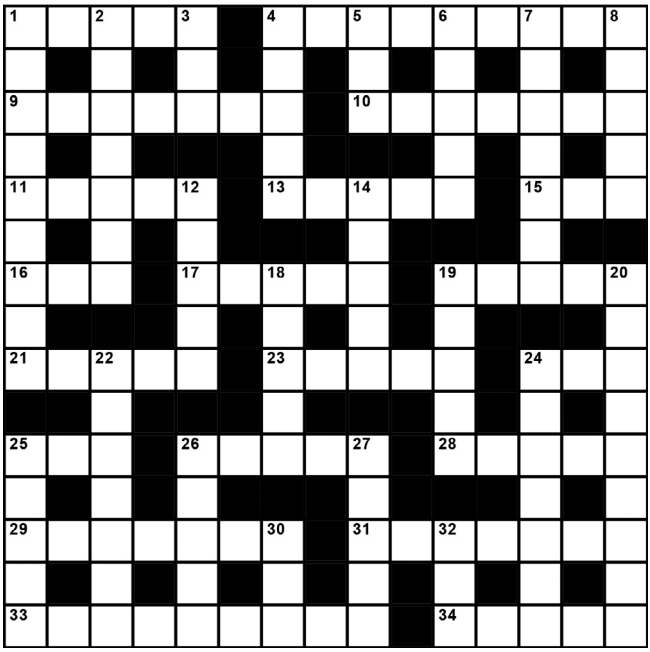
THE CROSSWORD BY RUGOSA

Across

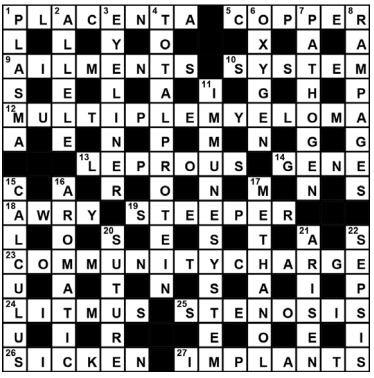
1 Desist out of disinterest, becoming inactive (5)
4 Expert manipulation of simple fracture – priceless! (9)
9 Male HRT used to describe 24 down (7)
10 Psychiatric treatment of exceptional humility not unknown (7)
11 Customarily retains opening made by surgeon (5)
13 Infected person returns reject (5)
15 Exhibition includes one of 14 (3)
16 Sweet is more pleasant in the centre (3)
17 Submit first half of written recommendations (5)
19 Persuasion could start return of ruminants (5)
21 Kind of alcohol concoction they love opening (5)
23 Backing lab admitted as fundamental (5)
24 Partially dissociated federal bureau (3)
25 Unwell, spoiled rotten (3)
26 Disturbance near a stadium (5)
28 Content of protocol oncologist often used before a list (5)
29 Ruler holds a constituent for reaction (7)
31 Organs love changes (7)
33 Conductor led coterie carelessly; one is missing (9)
34 Expedites comforts (5)

Down

1 No minute sent in time about food processor (9)
2 Something unpleasant rose up in view (7)
3 Male turns up to give car test (3)
4 Leading man overacts laziness and lack of concentration (5)
5 Partial dissolution of colloid (3)
6 Record content of parenteral infusion (5)
7 Opt out of profitable organisation that is easily broken up (7)
8 End control (5)
12 Dissonant unsalaried, snide out of hearing (5)
14 Separates elements (5)
18 Untruth about strength of character (5)
19 Pain that could make parent narcoleptic (5)
20 Doctor, Welshman, finds nothing in new signs to form an opinion (9)
22 Supply water at the ready made tea bar (7)
24 Clue point is about a scale description (7)
25 Endured broken collarbone without local (5)
26 Quick warning (5)
27 A rejection of French one of 33 (5)
30 Platoon has no plan to boot (3)
32 Capital enzyme (3)



SOLUTION FOR APRIL'S CROSSWORD



SUDOKU ... THIS MONTH'S PUZZLE

		R	Y	S	M	H	C	
	C	S					E	
I								
E					T	S		
M				E				H
		H	C					R
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	S						I	
		T	R	C	E	M		

SOLUTION FOR APRIL

I	S	C	H	E	T	R	M	Y
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T	R	H	Y	S	M	C	I	E
R	Y	T	C	H	E	I	S	M
H	C	E	M	I	S	T	Y	R
M	I	S	T	R	Y	E	H	C
Y	H	M	E	T	C	S	R	I
S	E	I	R	Y	H	M	C	T
C	T	R	S	M	I	Y	E	H

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