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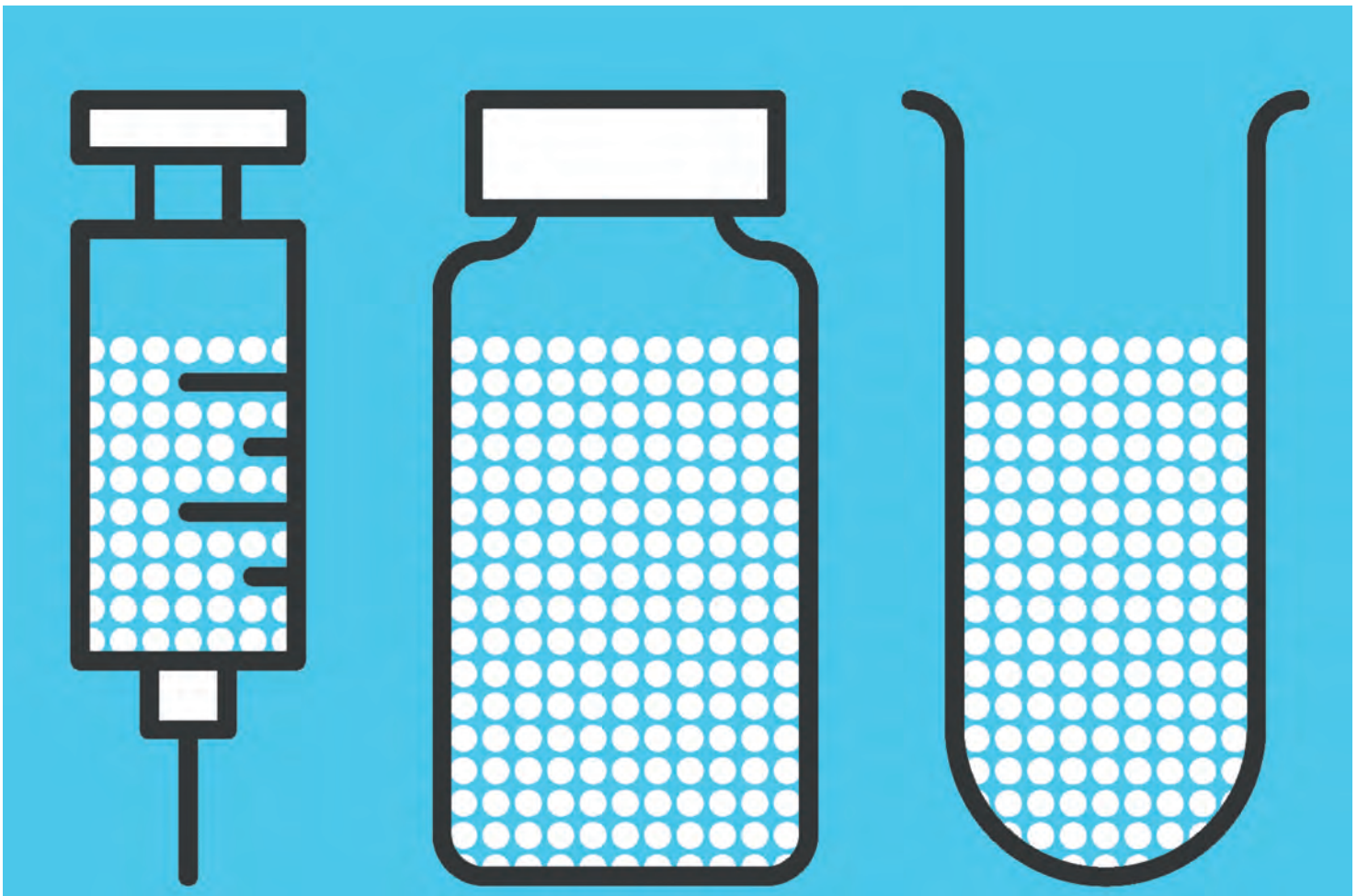
PATHOLOGY IN PRACTICE

2024

UK NEQAS: DELIVERING FAR MORE THAN EXTERNAL QUALITY ASSESSMENT



UK NEQAS
More than just EQA

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ARTICLES

How innovation and science drive the development of EQA

EQA scheme directors Chantell Hodgson and Becky Treacy explain the complex and rigorous process that demands experience and in-depth clinical and laboratory knowledge to produce purposeful external quality assessment.

With over 400 ISO17043 accredited EQA programmes, including interpretive EQA, pre- and post-analytical surveillance and EQA for Point-of-Care Testing (POCT) as well as individual competency assessments, UK NEQAS is firmly at the forefront of developing EQA for the UK and internationally. Yet we know that many people are unaware of the process for developing new EQA, what triggers a new EQA, and who is involved.

Articulating the benefits

Great EQA takes a huge investment of time and knowledge to develop, so the benefits of a new EQA have to be clearly articulated before a new scheme is created. We collaborate and engage with a suite of expert advisors, including clinical staff, advisory board members, scientists and other stakeholders to determine when new EQA is required. Like us, these experts are at the forefront of their work and are aware of what is happening across their specialism. We continuously reflect on potential changes on the horizon such as soon-to-be-approved drugs, new technology, or new guidelines that may necessitate new or modified EQA. This is underpinned by reviewing scientific literature, participating in and delivering conferences and continually observing practices worldwide. Feedback from current users and professional bodies drive continuous improvement and best practice, to assure the development of quality improvement for new processes or practices. Some EQA development is driven by the centres themselves as they see the benefit of introducing a new scheme or reformatting an existing scheme before the users can themselves.

In many cases there is an important regulatory and/or diagnostic requirement for EQA, supporting continuous improvement and adherence to best practices. However, EQA has a practical role in identifying poor performance enabling laboratories to investigate the root cause.

It's important to reiterate that EQA is a vital tool for delivering independent assurance that laboratories return the correct results and the correct interpretation of results. It assures the reliability, consistency and reproducibility of laboratory internal practices including their methodology, materials and equipment, and it ensures that processes and practices meet established standards and regulatory requirements. EQA

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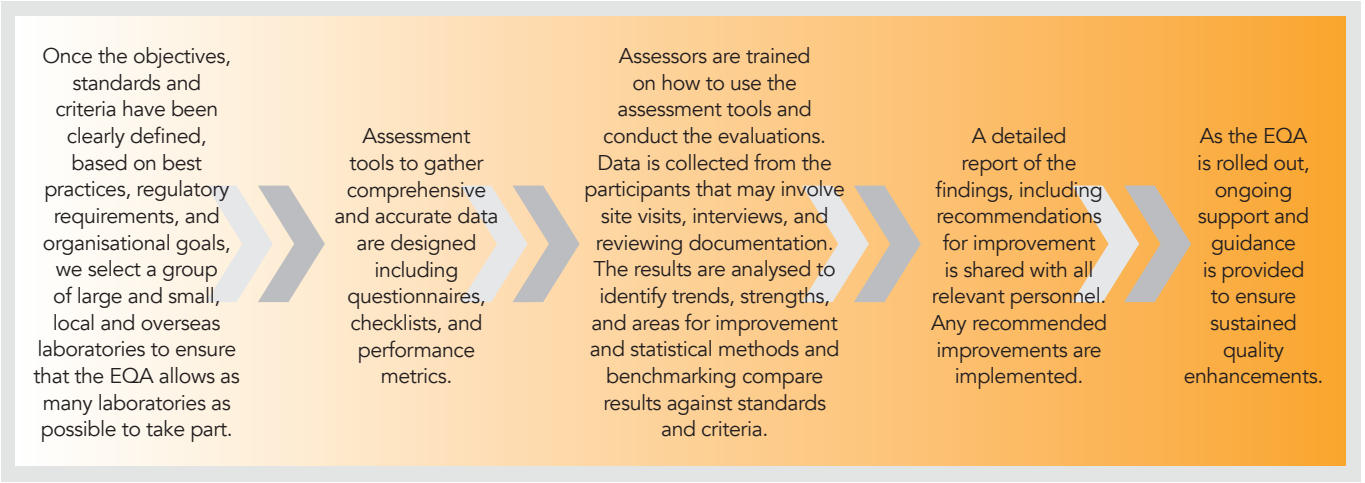
Input from advisory boards, expert advisors and laboratory staff ensures that a new EQA programme is practical, can be implemented, and serves the appropriate value.



An overview – how an EQA is implemented.

allows organisations to compare their performance against best practices, recommended guidelines and associated standards, and quantifiable EQA will enhance the reputation and credibility of a laboratory.

Balancing innovation, technology and practicality

Determining the need is just the first part of the process; the practicalities of developing and implementing the programme also have to be addressed. Once the potential for a new EQA has been identified, the information gathered is sifted, analysed and discussed at length to weigh the benefits against both the initial and future suitability and running costs. As a not-for-profit, financial considerations are not high on our list; however, the benefits of the programme still have to be qualified and quantified. We work with advisory boards, the expert advisors and the people on the ground in the laboratory. Their input is key as all the experts in the world may think a new EQA programme is great but unless it's practical, can be implemented, and serves the appropriate value, it may never be fit for purpose. This is why we analyse elements such as the number of laboratories that the EQA will support, the availability of technology to run the required tests in a wide number of laboratories, and whether there is a tangible way to assess the results. In some cases, an EQA may be provided jointly by two UK NEQAS centres and/or other EQA providers to ensure a diagnostic pathway is supported by the highest quality EQA.

We design our EQA to be accessible to as many laboratories as possible, no matter their size, location or commercial basis; so we review elements such as the technology needed, and the frequency of testing and the number of samples required. It may be difficult to source samples for rare disorders, although where appropriate UK NEQAS is supported by laboratories and patient groups providing samples directly for EQA purposes. We are also aware that EQA samples are a small but important aspect of the workload of a laboratory, so the samples/cases are designed to fit into the standard workflows and routine working practices of all other samples received.

Technology is another consideration. As we are proudly independent, we do not favour a particular methodology, preferring to be as inclusive and non-directional as possible. Where possible, we work to support the laboratory with increasing skill levels through education and training, ensuring that their results are as reliable and consistent as possible. We have shared our commitment to education extensively in previous articles and are always happy to expand on this further as it is at the very heart of UK NEQAS.

In Cellular Pathology EQA we are not able to be prescriptive about how a laboratory processes a sample to get the correct diagnostic result, as the processes and procedures vary in laboratories all around the world. There is little standardisation as many commercial companies supply equipment, consumables and reagents to be able to reach the same gold standard result. However, we can share information about what constitutes that gold standard both for laboratories and individuals, what they should be aiming for – and how they achieve that correct result whatever equipment, consumables or reagents they utilise.

Neither are EQA schemes directive. Our role is to feedback results in a concise

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UK NEQAS's new Digital Pathology EQA is essential to ensure that the digital representation of the physical slide is the same as the image of the physical slide viewed through a microscope.

but explanatory way, that they are able to utilise to identify, correct and/or mitigate errors to ensure an accurate result. We also may provide information on best techniques or methodologies that other laboratories are using to support review of their internal processes to enhance their quality. We support and educate the laboratories, using the appropriate specialist experts in that field, to get them back on track or to ensure they start off in the best possible place.

Periodically, there may be a clear need for EQA but the practicalities of delivering it are greater than first realised. Chantell is leading the team that is delivering a Digital Pathology EQA. This pioneering new way to deliver EQA utilises the whole-slide images (WSI) which are digitally captured in each laboratory. The EQA is essential to ensure that the digital representation of the physical slide is the same as the image of the physical slide viewed through a microscope, to ensure accurate diagnosis. The benefits are clear, but the delivery of the Digital Pathology EQA has taken time to work through. Issues such as governance, data collection and confidentiality, need to be considered and resolved, as well as the technology needed to handle the EQA requirements. Even something seemingly as simple as file formats have generated much discussion as different laboratories utilising different equipment from differing manufacturers globally, are saved in different file formats. An EQA scheme needs to be able to 'assess' each image in its original format, as any conversion could, in itself, alter the digital representation of that physical slide, therefore any feedback from the EQA could be inaccurate. We are pleased to report that solutions have been found for many of these elements and the Digital Pathology EQA will be launched in the near future. It is a great example of how the skills and knowledge of a wide range of experts are needed to develop a pragmatic and beneficial EQA.

Testing, testing!

Prior to launching a new EQA, we survey the laboratories to ascertain the benefits to their participants, to discover how they will use it, and what percentage of a particular population they will be testing. We also ask what type of samples they need and/or utilise – particularly for pharma genomic testing for drug reactivity, where we work with laboratories around the world. Different environmental factors can affect the test results and different laboratories use different sample types – we need to be aware of this if we are to run successful EQA.

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Running a pilot before a new EQA is available to a wider audience ensures that it meets the same standards of an accredited EQA, as well as allowing time for review and revision.

The survey is repeated after the first year to see how the EQA may be improved or further tailored to meet their needs.

In addition, we always run a pilot before a new EQA is available to a wider audience. This ensures that the new EQA meets the same standards of an accredited EQA and gives us time to review and revise the EQA to ensure it is fit-for-purpose. The outcome of the pilot may mean that the EQA is revised, it proceeds, or it may be withdrawn.

Once launched, the EQA process does not stop there. All UK NEQAS EQA are constantly monitored and extensively reviewed as guidelines, technology and knowledge changes. For example additional genes or variants may now be recommended for a particular genetic test, so the EQA will be updated to reflect these changes. As processes and knowledge changes, we need to flex the EQA to reflect this and as much as we can, future proof the EQA to ensure it keeps abreast of working practices.

Developing EQA is a complex process but one that a broad range of experts take time over to ensure that the work will support laboratories, the diagnostic process, and patients.

Innovative EQA to deliver better outcomes for patients

We spend an often-unquantifiable amount of time discussing, developing and revising programmes to ensure that we deliver the very best EQA possible. We are conscious that sometimes laboratories believe that the EQA is designed to catch them out and no matter how clearly we believe we have articulated the EQA criteria, it can be misinterpreted. This is where education goes hand-in-hand with developing EQA. Whether it's just guidance and support through results, or expert webinars, masterclasses, e-learning… this list goes on.

We work hard to deliver the optimum, clearest EQA that guides laboratories to always deliver the right test results for each patient, in a timely manner. This is why we regularly monitor our EQA and develop new EQA. It's for the patients. Purely and simply, so that all centres globally are consistently providing the highest quality tests meeting patient needs.

Becky Treacy, Deputy Director for Genomics Quality Assessment (GenQA)
Chantell Hodgson, Scheme Director for UK NEQAS Cellular Pathology Technique (CPT)

About UK NEQAS

UK NEQAS is a charitable consortium of external quality assessment providers. It aims to improve patient care through monitoring the quality of tests and their reporting, in an independent manner and on a not-for-profit basis. The primary role of UK NEQAS is educational. It is committed to supporting a culture of continuous quality improvement within UK NEQAS and among its partners and participants. UK NEQAS provides an appropriate, responsive and high standard of EQA to clinical laboratories.

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Why UK NEQAS is here – education, education, education!

Sharing knowledge is the key to more accurate laboratory testing, and also for longer-term, better patient outcomes. Scheme Directors Melody Tabiner and Richard Haggas reveal the many and varied ways in which UK NEQAS shares its expert knowledge.

From supporting research by global health organisations, to producing guidelines for institutions, UK NEQAS is improving the accuracy of diagnostic testing by putting education at the heart of EQA services. Operating in over 175 countries, we are unashamedly proud of our EQA programmes. So proud that we want to share our expertise and findings widely; so that collaboratively, every laboratory, every centre, every clinician, and every scientist can work better for the benefit of patients.

External quality assessment is a means of assessing the effectiveness of laboratory quality assurance procedures by distributing known but undisclosed specimens or specifically designed online case scenarios, and assessing the results benchmarked against equivalent laboratories and methodologies. It is an efficient, external, unbiased and independent assessment of laboratory processes at a single moment in time that delivers assurance to clinicians and patients that the information they receive is as accurate as it can be.

The EQA programmes operated by UK NEQAS are a mixture of qualitative, quantitative and interpretative programmes that are open to all laboratory types: clinical, research and industrial, and they are available worldwide, encompassing what is probably the biggest EQA network in the world. As a registered charity, all programmes are operated on a not-for-profit basis, are designed by experts in the relevant clinical field, and are created to educate participants rather than be punitive.

The role of UK NEQAS in EQA appears to be clear but you may be surprised by the scope of EQA material available, the value and volume of support delivered time and time again to participants, and the variety of opportunities that are in place to help scientists, clinicians and sometimes the patients themselves to broaden their understanding.

Constructive guidance

Laboratories around the world use EQA to evidence the accuracy of their testing and assure clinicians and patients that they are receiving the correct information to inform diagnosis and clinical management. To ensure the provision of high quality EQA and delivery of appropriate scientific support in each specialist area of clinical laboratory testing, each UK NEQAS service is

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UK NEQAS teams are able to create bespoke online learning resources, including a 'virtual lab' to evaluate knowledge of testing and documentation required for blood samples.

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UK NEQAS schemes can also offer a personal touch, helping member laboratories to understand their tests, tweak internal processes and improve results.

operated from a dedicated expert centre. These 20 centres are in 11 cities around the UK. Each member centre operates on a strict not-for-profit basis, has no commercial interests, and is accredited to ISO 17043. Together, they deliver over 500 different EQA programmes and a dedicated Pre- and Post- Analytical Quality Monitoring service which has been designed to allow participating laboratories to monitor their pre- and post-analytical issues.

When a centre identifies potential issues with a particular test, the UK NEQAS team swings into action to deliver proactive support to enable the laboratory to improve its processes or analysis. Sometimes issues are found with the calibration of testing equipment or the reagents used, other times interpretation may be inappropriate due to training or knowledge gaps. This is where our bespoke constructive guidance makes a real difference.

Richard explains: "UK NEQAS is unique in providing education on an individual and collective basis. In my specialism, for example, when a scientist does not fully understand the results delivered by the testing apparatus or does not have the specialist transfusion knowledge to know the effect of results on the selection of blood for transfusion, we are able to contact laboratories directly to discuss the cause of incorrect results and include that information in reports to all laboratories. This is where an open conversation with a member of the UK NEQAS Blood Transfusion team can add real value. In one case, a laboratory performing red-cell genotyping was unaware that one particular blood group is affected by a variant, which may be present on the same strand of DNA that stops the blood group being expressed on the red cells. By discussing this in our reports, we closed a knowledge gap and shared the information with other laboratories. This information ensures that the patients have appropriate blood selected should they need a transfusion.

"To support this education, the Blood Transfusion team developed a 'virtual lab' that allows an individual to view a sample and complete the relevant testing and documentation. It's not a competency assessment but it does allow individuals to ensure that their answers are correct as per current UK guidelines. Incorrect answers can be reviewed by managers and additional training provided when required."

It's this combination of proactive and transparent support delivered in ways that make tangible differences that builds trust and a solid working relationship between UK NEQAS, participants, and the laboratory teams. It means that laboratories proactively contact UK NEQAS when they become aware of issues and often ahead of them receiving a borderline or unsatisfactory UK NEQAS report. This allows the EQA experts to deliver tailored feedback to participants: subjective guidance that constructively supports the laboratories to deliver improvements.

Richard shares another great example regarding a laboratory offering flow cytometry testing in cases of feto-maternal haemorrhage. "The laboratory completed three EQA exercises, delivering results that meant that it was likely to be labelled 'unsatisfactory'. Naturally, the laboratory team was concerned as it did not understand why the results were incorrect. Thanks to our assistance, the Chair of the relevant Scientific Advisory Group personally contacted the team to deliver guidance and even offered to visit to review the processes in place. This personal touch enabled them to better understand the sensitivity of the test, tweak their internal processes and improve their score. Today, this laboratory is one of the best performing laboratories in this particular UK NEQAS programme."

Sharing specialist knowledge

UK NEQAS demonstrates a real commitment to participants needing extra support – and our offer is far wider than this. The identifying factors associated with satisfactory or unsatisfactory performance are shared with participants, by regularly publishing in peer-reviewed journals, by hosting scientific meetings, posting videos on YouTube and running educational webinars.

Melody expands in relation to genomic testing. "Our aim is to disseminate information as widely as possible. Although robust results can be obtained from genomic testing, there is often variation in their interpretation, within prescribed parameters. This can cause potential issues, so we pull together a panel of volunteer expert advisors so that each report is read and assessed by multiple experts. We see a diverse range of reporting styles and tailor the feedback provided to each individual participant. We have seen centres implement an overall summary statement at the start of each report and produce clearer reports to reduce ambiguity for the clinicians.

"We give participants access to our past EQA Summary reports, including new participants, so they can read the previous feedback for themselves and start learning straight away. Our online case scenarios are often used as training resources and completed by multiple staff members within a laboratory.

"Subjective interpretation also requires the need for consensus professional guidelines, so the UK NEQAS experts are often part of the groups creating these. Not only do we help create the guidelines we support the enabling of access so that they are freely available to as many people as possible."

Widening participation

Whilst we are naturally specialists in our own field, increasing awareness through widening participation can only help patients no matter where they are in the world. It also broadens perspectives. We are fortunate that we are based in a country with strong research and high

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As well as helping to create guidelines, UK NEQAS is able to give support in enabling access, so that they are freely available to as many people as possible.

levels of knowledge. Where possible, we want to share our learnings with developing countries so that their patients will also benefit from our work.

Melody explains more: "The Genomics Quality Assessment centre (GenQA), part of UK NEQAS, offers many different genomic tests from laboratory assessments to individual competency assessments. We have developed a bespoke online training platform known as GENie – Genomic Online Individual Education – that is available to anyone to use, any scientist, clinician or trainee. GENie offers a comprehensive suite of training modules tailored to a wide range of specialties and skills, and today over 50,000 participants worldwide have used GENie, working through the modules and increasing their personal competency in genomics. It's a unique way to offer education and assessment world-wide and is a great example of how UK NEQAS shares specialist knowledge. We envisage that over time, a wider range of people will use GENie including clinical geneticists and genetic counsellors, and potentially other healthcare professionals who are interested in learning more about genomics as it becomes embedded within mainstream medicine.

"As well as personal education and competency, we also share knowledge about new tests and technology that become available. We provide neutral feedback on the performance of these tests and tech, analysing potential benefits – or issues – and share our findings. This assures clinicians and reference laboratories that they are fit for purpose and ultimately, help to define their benefit to patients. UK NEQAS operates in over 175 countries, attending and hosting seminars and workshops around the world, all designed to ensure the best patient outcomes."

Promoting debate

As all UK NEQAS's Directors are renowned experts, their association with the relevant specialist institute enables difficult conversations with peers, within the parameters of continuous improvement. Richard, for example, works closely with the British Society for Haematology on testing guidelines and also provides information to SHOT on laboratory errors for inclusion in its annual report.

SHOT is the UK's independent, professionally led haemovigilance scheme that collects and analyses anonymised information on adverse events and reactions in blood transfusion from healthcare organisations in the UK. Serious Hazards of Transfusion (SHOT) has been in place since 1996, recommending ways to improve patient safety when risks and problems are identified.

Richard explains: "We have shared data and input into various recommendations over the years, particularly for patients who have received transfusions or organ donations, after which it may be difficult to determine their natural blood group. It is not always comfortable raising issues or challenging convention, but being recognised by a professional institute, and backing our proposals and questions with data, we can work together with other professionals to accurately improve guidelines and ultimately, fulfil our common goal of better support for clinicians and patients."

Improving service by cooperation

UK NEQAS recognises that multi-disciplinary team (MDT) meetings are crucial settings to pool knowledge and determine the most appropriate pathway for clinical teams to deliver the optimum treatment and support. Many of the centres support these MDTs, for example, a haemato-oncology MDT will rely on results from laboratories participating in EQAs offered by the Haematology, Cellular Pathology, Genomics, and Leucocyte Immunophenotyping teams, amongst others. Participation in these EQAs strengthens the overall output of the MDT and, therefore, the care provided for each patient. Melody says: "GenQA pride ourselves as being the sole genomics EQA provider to cover the entire clinical genomics service but until recently this was delivered in separate EQA programmes. In response to participant demand we are unique in providing EQA for the genomics MDT as a single functional unit. We now hope to take this one step further and offer a pilot EQA for the genomic molecular tumour board (MTB) for lung cancer."

The proactive approach to education and sharing expertise both nationally and internationally, across the scientific community and within a clinical setting - and even into the public domain where relevant – is what sets UK NEQAS apart. It is why testing results from UK NEQAS participants are trusted both by clinicians and patients, and why a multitude of experts come together to facilitate better patient outcomes wherever and however possible.

Melody Tabiner, Deputy Director, GenQA (Genomics Quality Assessment)
Richard Haggas, Director, UK NEQAS Blood Transfusion Laboratory Practice

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Why UK NEQAS does what it does: it's all about the patients

Dr Deborah Pritchard and Dr Gwen Wark, members of the UK NEQAS Board, explain how UK NEQAS gives users the confidence that they are providing the best results for their assays, and clinical teams and patients the reassurance that they are receiving the correct information to manage health conditions and treatment.

Everything that UK NEQAS does is for the benefit of patients. All the impartial advice delivered, the challenging samples sent to laboratories, the webinars and conferences hosted, and the data shared – everything is done to try to improve the potential outcomes of the patients.

With 70% of diagnoses relying on pathology results, patients are the reason why EQA exists and why it's imperative that we always keep them in mind when delivering EQA. These are real people, going through a very challenging time in their lives, and despite us not being physically alongside them, our work impacts their treatment and prognosis. We have to ensure that every single test result is right the first time.

With 8,000 biochemistry samples analysed on average, every day in just one hospital – thousands of patients are relying on the outcome of laboratory tests, putting the importance of EQA into sharp focus.

Some 8000 biochemistry samples are analysed on average, every day in just one hospital – that means thousands of patients are relying on the outcome of laboratory tests either for diagnosing a new condition or for monitoring chronic disease. It puts the importance of EQA into sharp focus.

Personalised medicine

Take genetic testing, for example, we know some individuals will react adversely to certain medications, which can be predicted by testing for specific genetic markers. It is, therefore, imperative that patients have accurate results for these gene tests as this determines if it is safe for the patient to take that medication, or not – a personalised medicine approach to healthcare. Laboratories have one opportunity to get it right to prevent a potentially life-threatening hypersensitivity reaction to a drug. Regular EQA samples to laboratories providing these tests help ensure these genetic test results are correct.

This is also true when testing for insulin levels. UK NEQAS supplies samples from clinical material to laboratories from our centre in Guildford, delivering EQA for laboratories to accurately determine whether their method can detect insulin preparations prescribed to diabetic patients. If EQA results are incorrect we work with laboratories providing education and advice to ensure they determine where errors occurred to prevent similar errors in patient samples that could put patient health at risk. EQA is critical to help reduce the risk of misdiagnosis from inaccurate test results and in worst case scenarios, to prevent

With many of its EQA schemes run by individuals who also lead clinical laboratories, UK NEQAS has the ability to reinforce the understanding that the clinical samples belong to real people.

the risk of an incorrect cause of death, which may have legal implications for the healthcare sector, the family, and individuals involved.

Because many of our EQA schemes are run by individuals who also lead clinical laboratories, UK NEQAS has the ability to reinforce the understanding that the clinical samples belong to real people. Deborah, for example, is part of a multidisciplinary team (MDT) working throughout the end-to-end transplant process and the regular biomarker testing in relation to transplants are obviously attached to specific patients. As Deborah explains: "Over this long period of time, we feel like we get to know our patients – we have no idea what they look like, but we know their results probably better than they do and we genuinely care that they continue to make a good recovery."

Determining optimum testing regimes

Being a fully independent, not-for-profit organisation enables UK NEQAS to deliver more than EQA. With access to clinical teams and patient outcomes, we are in a unique position to gather data and take a holistic view of testing. This enables us to determine, for example, the optimum testing levels needed to generate the right information for clinicians, so that they can deliver the best diagnosis.

Gwen explains what this means in relation to her work. "As a biochemist working with centres all over the UK, I'm interested in how EQA can be deployed to deliver both a clinical and an analytical benefit to healthcare. This not only enhances clinical diagnosis, ultimately benefiting the patient, it can help the NHS to deliver a cost-effective service."

Another great example is in relation to creatinine. Creatinine is the waste product of muscle turnover that is removed by kidney filtration and raised levels are a marker for renal failure. By identifying changes in creatinine levels at an early stage, laboratories can flag to clinical teams when patients are at risk of developing acute kidney injury and enable early treatment protocols to be implemented to support kidney function – potentially preventing the patient from needing extensive treatment or ending up in ITU. Obviously, this is beneficial for the patient but it also reduces the cost implications for the NHS. The EQA work done by the UK NEQAS team in Birmingham is essential to ensure that laboratories are correctly identifying accurate creatinine levels.

The same is true regarding the testing for troponin I or T and NT-proB-type naturietic peptide (BNP) markers that indicate the risk of acute coronary syndromes and heart failure respectively. The data from the UK NEQAS team in Glasgow has helped to determine new testing regimes to improve clinical support and patient outcomes. Originally clinical testing for troponin I or T was at 0 hours and 12 hours with monitoring ongoing as determined by the medical team. With the current shortages of hospital beds and the strain on A&E services, it is advantageous to be able to determine much more quickly whether someone is having a heart attack, but ensuring it is still safe to discharge patients earlier. With the development of more sensitive troponin methods, the team in Glasgow monitor with specific samples that these methods are performing accurately at low levels. This has enabled clinical teams to introduce much shorter testing regimes of 0 and 1 hours or 0 and 3 hours for example. Clinicians are able to deliver accurate diagnoses in a timelier manner, which ultimately means faster treatment and the likelihood of a more positive outcome for patients.

These changes to methodology are possible due to working closely with clinicians and having access to patient outcomes.

Peace of mind

Ensuring that the testing is correct is important from a clinical point of view but how often do we consider the adverse impact of receiving an out-of-the-ordinary result on the patient?

Deborah explains: "When I describe what I do, I share that I am mitigating differences between laboratory testing to ensure that patients receive standardised results no matter which laboratory completes the test. I use the following story about a family member to illustrate what I mean.

"A family member takes the oral anticoagulant, warfarin, so they need regular blood tests to ensure they are taking the correct dosage. They're used to their INR (international normalised ratio) being at a certain level. One time, this person was on an extended holiday in another part of the UK, and their test was done in a different laboratory to normal. The test came back at a different level and despite being within the reference range, caused unnecessary worry, an immediate end to the holiday, and a request for a second test when they arrived home. Of course, this had a cost

If EQA results are incorrect we work with laboratories providing education and advice to ensure they determine where errors occurred to prevent similar errors in patient samples that could put patient health at risk

With community testers not having the same levels of expertise, alongside different report formats used by different methods/analysers, the need for UK NEQAS to monitor and support testing in the community is clear.

implication but even more importantly, it had a detrimental effect on the wellbeing of the patient. In this case, when the test was redone at their regular laboratory, the result range was back to the expected level but it clearly illustrates how patients react to their results.

"It's first-hand proof that patients do not know that different laboratories can use different methodology and analysers which can affect test results, and underlines why EQA has to ensure consistency."

"Everything we do is for the patients"

As we see healthcare moving further towards a 'point-of-care' model, EQA becomes even more important to ensure that community diagnostic hubs deliver similar optimum levels of testing to that delivered by the centralised and established laboratories. Often, community testers do not have the same levels of expertise, alongside which, different report formats are commonly used by different methods/analysers. The need for UK NEQAS to monitor and support, share expertise, and streamline processes, is clear - patients are the reason for EQA, and education is at the heart of EQA. As we all work hard to speed up the flow of patients through the system, the drive for accuracy and continuous improvement is vital.

Gwen explains: "When I discover out of consensus results, for example as I did recently for copper and zinc levels, I write to the laboratories concerned to offer advice based on my experience. We work together to learn what is preventing accurate testing, and I always reiterate that what we are doing is not to criticise the laboratory but to improve patient safety. I know that everyone repeats this but it is our strong partnership with laboratories that is making a tangible difference."

As well as accuracy, UK NEQAS is also focused on the important interpretive comments that accompany the test results. These comments help to ensure that clinical teams interpret the results correctly so that the patient benefits from the correct diagnosis. When these comments differ between laboratories or particularly if they are unclear, there is the risk that they will be misinterpreted and patients wrongly diagnosed or treated

Gwen expands on this: "The Birmingham centre runs an educational interpretive comments programme that assesses comments submitted for a clinical case scenario with laboratory results. Each interpretative comment is scored and the reports contain information on low-, medium- and high-scoring comments, as well as information on the outcome of the case. Other UK NEQAS programmes offer interpretative comments exercises on a more ad hoc basis. This is part of the 'added value' delivered by UK NEQAS but to be honest, interpreting comments should be integral to all EQA."

UK NEQAS' standing worldwide enables its scientists to connect with manufacturers and provide evidence and data when commercial tests may not be working as expected. For example, UK NEQAS for H&I discovered a specific manufacturers' coeliac disease genetic test product instructions were misleading. We were able to contact the manufacturer with the EQA evidence, as well as reporting concerns to the MHRA, which resulted in the instructions being changed. Thanks to the expertise and longevity of data sets, UK NEQAS has also been able to produce guidelines that standardise how coeliac disease genetic test results should be interpreted – almost a beginners guide to reading the results!

Patients are the reason for EQA

UK NEQAS gives users the confidence that they are providing the best results for their assays and clinical teams and patients the reassurance that they are receiving the correct information. Our expert knowledge of new technologies allows the early implementation of EQAs for groundbreaking testing, and we collaborate with manufacturers and regulatory agencies to ensure the effective resolution of problems with assays, analysers and kits.

Sharing our expertise, working closely with laboratories to ensure continuous improvement, and reducing variations between laboratories are all critical activities to ensure that results are trusted by both clinicians and patients. We are unashamedly proud of our EQA and all that it encompasses and at the end of the day, we are all working with the same goal – for the benefit of the patient.

Dr Deborah Pritchard, Director for UK NEQAS for Histocompatibility and Immunogenetics
Dr Gwen Wark, Scheme Director, UK NEQAS Guildford Peptide Hormones and Trace Elements

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From COVID-19 tests to free lessons: how well do you know UK NEQAS?

Barbara De la Salle, President Elect of UK NEQAS and Dina Patel, Scientific Director for UK NEQAS Immunology, Immunochemistry and Allergy offer a look inside UK NEQAS and how it works in practice. They share real-world examples to demonstrate who are UK NEQAS, and how the organisation delivers exceptional value to clinical and scientific stakeholders.

At the start of the global COVID-19 pandemic, there was a rush to ensure a rigorous antibody and antigen testing regime on a national scale. Within just four weeks, UK NEQAS had determined the relevant EQA for the antibody testing, which was accredited just eight weeks later. This was the first ISO17043 accredited antibody programme globally, a perfect showcase for how focused collaboration can deliver a critical programme quickly and efficiently.

UK NEQAS Immunology, Immunochemistry and Allergy (IIA) is one of a network of UK NEQAS centres forming the UK NEQAS Consortium, overseen by the UK NEQAS educational charity. The COVID-19 antibody EQA success was possible thanks to teamwork across the whole UK NEQAS network.

COVID-19 antigen scheme

Dina explains: "As the national EQA provider, Professor Chris Witty contacted UK NEQAS to request attendance at a meeting to discuss the requirements for laboratories to ensure high-quality test results. My task was to lead my team in the rapid development of the COVID-19 antibody EQA programme. In addition, multiple UK NEQAS centres came together to provide support, working together and assisting colleagues in UK NEQAS Microbiology, located within UKHSA, to set up a viable COVID-19 antigen scheme. As an organisation, UK NEQAS created a number of pragmatic EQA programmes that monitored both the testing kits and the interpretation of the results within a fast-paced laboratory testing setting being demanded by scientists, health professionals and the public during a global pandemic. Everyone across UK NEQAS came together to share knowledge and support."

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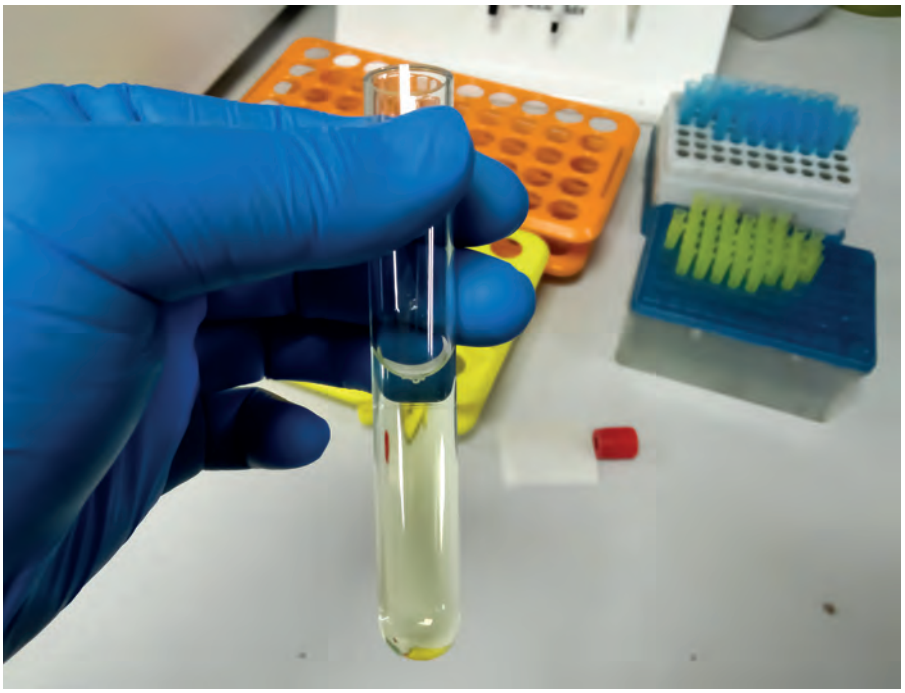
At the start of the COVID-19 pandemic, UK NEQAS worked quickly to determine the relevant EQA for the national scale antibody and antigen testing regime.



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UK NEQAS EQA programmes highlighted the suboptimal – but previously common – practice of inspecting CSF samples by holding them up to the light to determine the presence of bilirubin.

Breadth and depth

Delivering the COVID-19 antibody testing in just four weeks was thanks to the expertise – and of course the dedication – of the UK NEQAS team members, who worked long hours to meet the challenge. Every UK NEQAS programme is designed and run by experts and each has demonstrated their commitment to public service. These world-renowned scientists are at the forefront of their chosen speciality and are committed to sharing their knowledge and experiences.

Barbara explains more: "The strength of UK NEQAS comes from the breadth of our programmes and the depth of our combined knowledge. The diversity of expertise leads to a creative approach to challenges, particularly when we collaborate.

"As Director of UK NEQAS Haematology, I am fortunate to work closely with my colleagues in UK NEQAS Parasitology to offer EQA for the detection and identification of blood parasites to scientists in haematology and microbiology departments. We share cases and collectively review the performance of laboratories for the benefit of all. Our collaboration allows us to provide tailored training to haematology scientists in blood parasite identification. We offer a high frequency of specimens in specialist diagnostic areas, such as the heamoglobinopathies, to ensure that laboratories experience the full range of cases and educational scenarios. Laboratories may be mandated to test in this specialty just four times per year, for example, but we consider that this would not allow us to challenge users adequately or to monitor improvements in practice."

The best EQA provision is a partnership between the laboratory and the EQA provider, working together to improve quality. A common misconception is that we are in place to 'catch people out' but our raison d'être is continuous improvement, cemented in the fact that all UK NEQAS programmes are accredited to ISO17043, which requires that we provide education. This comes in many forms including delivering real-life scenarios, a wide range of cases, and a high frequency of specimen distribution, with detailed interpretation of the exercise results in reports. UK NEQAS gives you an opportunity to get things wrong without compromising patient safety. There must be trust on both sides - trust that both parties are focused on the same end goal of improving patient outcomes - so establishing a strong partnership by talking, learning about each other, and sharing a goal is imperative.

Take the laboratory scientist on the bench who participated in an unusual case presented in a UK NEQAS CPD morphology programme. A few months later, they were working out of hours and encountered a similar case in middle of the night. Their CPD experience gave them the knowledge and confidence to refer the case to medical staff with their opinion of the possible diagnosis, contributing to a more effective commencement of the correct treatment for the patient. This is the value of EQA education in action.

Ensuring patient safety

A large part of our role is troubleshooting, identifying and sharing the source of common issues. When an issue is discovered by one laboratory, the details are shared with all users through comprehensive and detailed educational reports. These 'lessons' are also used to inform best practice guidelines.

Consider the previously common practice of inspecting CSF samples by holding them up to the light to determine the presence of bilirubin in a potential patient with subarachnoid haemorrhage (bleed on the brain). This subjective practice was very common in both UK and overseas laboratories. Our EQA programmes highlighted the suboptimal practice, allowing UK NEQAS the opportunity to educate the scientific teams within laboratories, ultimately ensuring more accurate results, improved diagnosis and patient outcomes. This is now embedded in the relevant best practice guidelines in the UK and in many countries globally.

UK NEQAS uses EQA performance to monitor the adherence to national and international guidance, for example, the English NHS Antenatal Sickle Cell and Thalassaemia Programme advises testing the baby's biological father in any pregnancy resulting from egg donation. UK NEQAS Haematology, through the provision of clinical scenarios as part of the haemoglobinopathy screening programme, has demonstrated an improvement in compliance with this guidance over the past five years, and shared this information at programme training days.

Our integral role throughout the end-to-end testing process enables us to capture, analyse and share data-based insights and ultimately, it is this data that informs the shared knowledge of laboratory medicine

Learning opportunities

We know that people like learning in different ways, so we hold multi-format opportunities for interested parties. Every event is delivered by UK NEQAS team members, advisors and other recognised experts in their field, who share their knowledge at conferences, during webinars, and master classes. We are pleased that our events attract some of the brightest minds and experienced scientists and clinicians in the world, all keen to learn, to network, and invest time in personal and scientific development.

In one year alone, UK NEQAS delivered 103 events - that's 86 online, 15 face-to-face and two hybrid meetings - attracting delegates from around the globe, from the USA and Europe, to Canada, Kuwait and China, to mention but a few

In the words of one laboratory manager: "Another paramount aspect of the UK NEQAS schemes is the teaching and training value, especially for us, a children's hospital, as your schemes are the only opportunity for our scientists to experience adult haematology cases."

The educational impact of EQA extends beyond this to professional bodies that wish to understand the limitations of the methods in use, healthcare funders wanting to obtain the best quality results at the lowest cost, and patients who need to know that their results and interpretations are correct. We also have a strong relationship with the manufacturers of assays, kits and reagents, allowing us to communicate any potential method-related performance concerns identified from EQA results

Guided by experts and data

We're often asked, how do you know where to focus your attention? How do you know when an EQA is required?

The answer is that we are guided by a (very) large number of national and international experts. We meet with them regularly and constantly review the science to understand where new programmes are needed. This real-world insight comes from clinicians, statisticians, scientists and public health experts - all in clinical practice. This is dynamic EQA development that reacts quickly to the changing needs of diagnostic medicine.

Data are powerful, if understood correctly, especially when assessing method-related performance concerns using commutable survey materials. UK NEQAS is in a unique position as we have access to significant data about disease, testing outcomes, and clinical needs, ensuring our advice to participants is evidence-based. Our integral role throughout the end-to-end testing process enables us to capture, analyse and share data-based insights and ultimately, it is this data that informs the shared knowledge of laboratory medicine.

Our independent and impartial advice, our commitment to education, our evidence-based knowledge and our emphasis on collaboration are why UK NEQAS is a world leader in external quality assessment and why we proudly declare that we deliver far more than EQA.

About UK NEQAS

UK NEQAS is a charitable consortium of external quality assessment providers. It aims to improve patient care through monitoring the quality of tests and their reporting, in an independent manner and on a not-for-profit basis. The primary role of UK NEQAS is educational. It is committed to supporting a culture of continuous quality improvement within UK NEQAS and among its partners and participants. UK NEQAS provides an appropriate, responsive and high standard of EQA to clinical laboratories.

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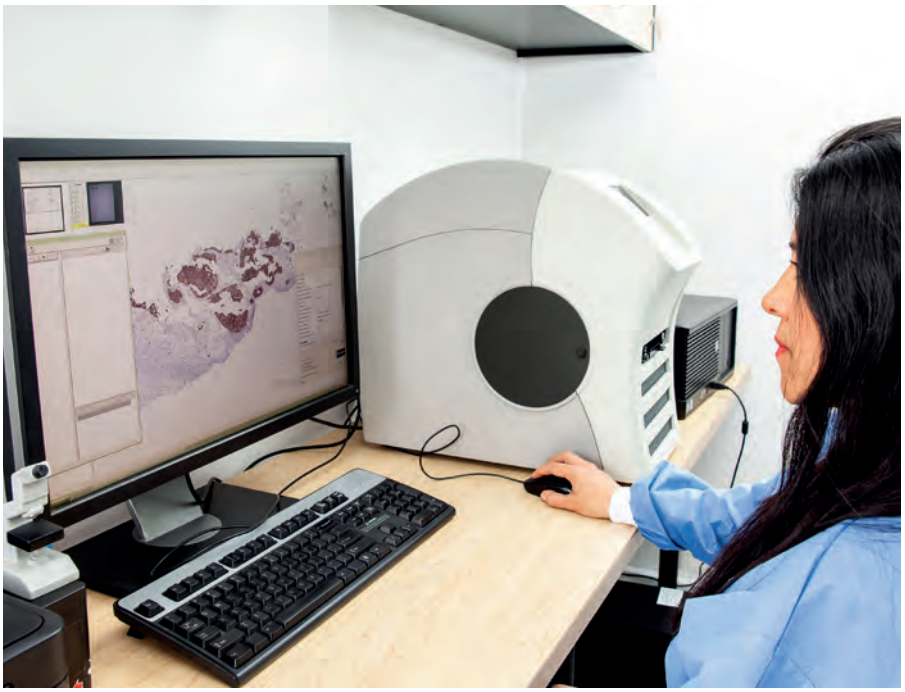
The challenges of creating an EQA scheme for digital pathology

UK NEQAS CPT currently has an EQA scheme for digital pathology in a pre-pilot phase. Here, Scheme Manager Lorren Mitchell details the research and planning required to ensure it will be suitable and effective for this evolving field.

UK NEQAS Cellular Pathology Technique (CPT), global leader and esteemed front-runner in Cellular Pathology External Quality Assessment (EQA) and Proficiency Testing (PT), excels in providing a comprehensive range of schemes, education and guidance on key laboratory processes for continuous improvement – assuring cellular pathology diagnostics. UK NEQAS CPT encompass a first-class, secure and established service to provide international laboratory and personnel monitoring, expertise, and support for clinical and non-clinical laboratories in the UK and across the globe.



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Participants in the new digital pathology scheme will have access to cellular pathology scientists all working together to develop, innovate, and transform expertise and quality across continents.

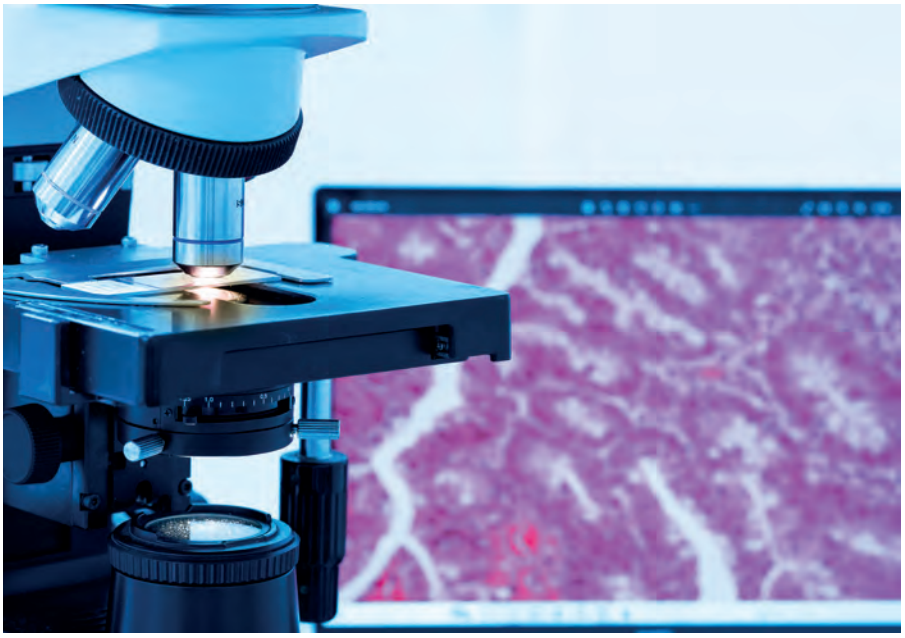
In the realm of modern cellular pathology, the digitisation of glass slides stands as a beacon of innovation. Digital pathology enhances efficiency, accuracy and collaboration among healthcare professionals. To maintain laboratory accreditation to ISO 15189:2022 laboratories must participate in EQA, proficiency testing or interlaboratory comparison for all tests provided by a laboratory, including the use of digital pathology. At present there is no EQA scheme appropriate for digital pathology. However, after extensive research and meticulous planning to ensure its effectiveness and suitability for the evolving field of digital pathology, UK NEQAS CPT currently has a Digital Pathology EQA scheme in its pre-pilot phase.

Drivers for a DP EQA scheme

The implementation of a digital pathology EQA scheme is driven by a convergence of technological advancements, clinical needs, and regulatory imperatives.

- **Ensuring diagnostic accuracy and quality assurance**

  EQA schemes provide a means of external validation and quality assurance and a Digital Pathology EQA scheme, where interpretation relies on digital images rather than physical slides, will contribute to consistent and accurate diagnoses across different laboratories and pathologists, facilitative remote consultations and second opinions. The EQA scheme will promote standardisation and improve the overall quality of the images used for diagnostic purposes by



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Unlike traditional microscopy, digital pathology relies on digital images displayed on computer monitors; variations in image acquisition, processing and display can significantly impact the interpretation of resulting images.

eliminating variability and enhancing reproducibility of results across different laboratories.

- **Identifying performance variability**
  Digital pathology workflows are multi-step processes including the standard pre-analytical histology processing, slide scanning, image analysis and interpretation. Performance variability can occur at each stage due to differences in technical expertise, equipment, software, and settings. The UK NEQAS CPT Digital Pathology EQA scheme will allow participants to identify areas of weakness or inconsistency and implement corrective actions to improve accuracy and reliability. The benefit of being part of this scheme will also mean that participants will have access to the methods used by the highest scoring participants, such as scanning profiles used. There are over 1,500 international participants all with different methodologies and best practice, so being a UK NEQAS CPT participant for this scheme will keep laboratories ahead of the curve by having access to cellular pathology scientists all working together to develop, innovate and transform expertise and quality across continents.

- **Benchmarking and continuous improvement**
  The UK NEQAS CPT Digital Pathology EQA scheme will provide a benchmark for performance comparison and benchmarking against national and international standards. It is encouraged that laboratories use their EQA results to track their performance over time, monitor trends, and benchmark against peer groups. Continuous participation in EQA schemes encourages laboratories to strive for excellence, adopt best practices and continually improve their processes and outcomes.

- **Supporting regulatory compliance**
  Regulatory bodies such as the United Kingdom Accreditation Service (UKAS) require participation in EQA schemes as a part of quality assurance and accreditation processes. EQA data can be used as a crucial tool for benchmarking, education, quality improvement, technique validation, supporting audits, and accreditation assessments. ISO 15189:2022 and associated internal standards and guidance for best practice have a more refined focus on patient risk management, therefore ensuring that digital pathology is covered by an EQA scheme that promotes and assures patient safety.

- **Building trust and confidence**
  EQA participation enhances public trust, confidence and credibility in laboratory testing and diagnostic services. Patients, clinicians and healthcare stakeholders rely on accurate and reliable pathology results. By demonstrating proficiency and consistency through EQA, laboratories instil confidence in their capabilities and contribute to patient safety and quality of care.

- **Fostering collaboration and knowledge sharing**
  EQA schemes facilitate collaboration, knowledge sharing and peer learning amongst laboratories. Participation in EQA encourages networking, exchange of experiences and sharing of best practices across institutions. Collaborative EQA events such as the UK NEQAS CPT Annual Participants Meeting and its extensive educational events promote professional development, standardisation of methodologies and advancement of the field of cellular pathology.

Implementation challenges

As with any groundbreaking technology, its implementation comes with its own set of challenges, particularly concerning the establishment of an EQA scheme. Traditional UK NEQAS CPT EQA schemes have long been established for cellular pathology methods, but implementing a scheme for digital pathology presents unique obstacles. In February 2024 UK NEQAS CPT conducted its first digital pathology pre-pilot.

The concept of the UK NEQAS CPT Digital Pathology EQA scheme is that participants are required to submit one digital image and the corresponding H&E-stained slide for each asset being utilised within the laboratory for the purposes of digital pathology diagnostics. An asset being a single digital slide scanner. This means if a participant has three scanners, they register each of those as part of the scheme, and for each EQA assessment they submit three digital images online and their three corresponding H&E slides. Participants are required to complete an online data entry form as part of their submission which details information that may be relevant to the peer assessment. This

There are over 1,500 international participants all with different methodologies and best practice, so being a UK NEQAS CPT participant for this scheme will keep laboratories ahead of the curve

includes all relevant information from the manufacturer of the digital slide scanner, through to how the slides are coverslipped.

Assessment of the images and slides will include scoring by expert peer assessors utilising the same format as other UKNEQAS CPT schemes employ during assessment sessions, using pre-defined assessment criteria. The main difference is that the image quality is reviewed using software designed for viewing digital pathology images without altering the format in which they are submitted. This main difference is key to ensuring any peer feedback is applicable to the image being viewed within the individual laboratory.

One of the primary challenges that UK NEQAS CPT is facing is the standardisation of digital pathology systems and workflows. Unlike traditional microscopy, digital pathology relies on digital images displayed on computer monitors; variations in image acquisition, processing and display can significantly impact the interpretation of resulting images. Therefore, establishing uniform standards for image quality, resolution, colour representation and file types becomes imperative for effective EQA in digital pathology. UK NEQAS CPT participants currently use seven different manufacturers for their digital slide scanners, 10 different image management system software manufacturers, and eight different file types once exported. During the pre-pilot in February 2024 the software being trialled as the installed image management system was sub-optimal as it did not allow all of the file types to be opened as anticipated. Acquiring software designed for viewing all digital pathology images, and in turn without altering the format in which they were submitted, has proved to be a major challenge and obstacle in developing this scheme.

Variations in image acquisition, processing and display can significantly impact the interpretation of resulting images. Therefore, establishing uniform standards for image quality, resolution, colour representation and file types becomes imperative for effective EQA in digital pathology

Ensuring data security and patient privacy adds a further layer of complexity. Digital pathology involves the storage and transmission of large volumes of sensitive data thus raising concerns about unauthorised access, data breaches and compliance with regulatory requirements such as the General Data Protection Regulation (GDPR). Developing robust encryption protocols, access controls, and secure data transmission mechanisms are essential components of any EQA scheme for digital pathology. During the February pre-pilot it was discussed that NHS trusts may need a Data Protection Impact Assessment (DPIA). This is a mandatory process that identifies potential risks that come with data processing. The metadata that are contained within the digital images does pose a risk and UK NEQAS CPT is currently collating the information needed to help trusts complete this process to achieve approval by the data protection officer (DPO).

A further significant hurdle is the need for scheme assessor training and education in digital pathology. UK NEQAS CPT scheme assessors are chosen for their technical experience and expertise in their specialist field. Seasoned assessors may have years of experience in cellular pathology laboratories as biomedical scientists, biotechnologists, and technical experts

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Transitioning to digital platforms requires proficiency in new technologies; providing comprehensive training programmes will help the digital pathology scheme assessors adapt to this new landscape.

in traditional techniques. However, transitioning to digital platforms requires proficiency in new technologies, software tools and image analysis techniques. Providing comprehensive training programmes and continuous professional development opportunities will help the digital pathology scheme assessors adapt to this new landscape and ensure the accuracy and reliability of diagnostic interpretations. By equipping digital pathology scheme assessors with these skills and knowledge, they become proficient and can confidently lead the adoption and improvement of digital pathology within their institutions. As they disseminate this new knowledge among their colleagues, it ensures that entire departments benefit from the advancements in digital pathology, leading to improved diagnostic accuracy and patient outcomes.

The future

The future of digital pathology is bright, offering a multitude of opportunities to improve patient care and clinical outcomes.

The provision of a UK NEQAS CPT Digital Pathology EQA scheme will add to those opportunities by:

- Enhancing diagnostic accuracy
- Promoting standardisation
- Facilitating continuous improvement
- Supporting professional development
- Enabling efficient data management
- Improving workflow efficiency
- Encouraging innovation
- Enhancing collaboration and knowledge sharing
- Ensuring regulatory compliance
- Boosting patient confidence.

As technology continues to advance, digital pathology platforms are becoming increasingly sophisticated, with features such as artificial intelligence (AI) algorithms for automated image analysis, predictive analytics, and decision support systems. These advancements have the potential to revolutionise pathology practice by streamlining workflow, reducing turnaround times, and enhancing diagnostic accuracy. AI holds tremendous potential to transform the field of pathology by augmenting pathologists' capabilities. There are many key areas emerging where AI could have a transformative effect utilising whole-slide images (WSI) from digital pathology.

Digital pathology involves the storage and transmission of large volumes of sensitive data thus raising concerns about unauthorised access, data breaches and compliance with GDPR

However, it is important to realise that using AI will need to be supported by proficiency testing due to the software being used for diagnostic purposes.

From the currently published data, it is suggested AI works more effectively and efficiently with standardisation, and the provision of an accredited EQA scheme can support that digital standardisation and assure quality improvement for cellular pathology diagnostics.

UK NEQAS CPT is committed to embracing the digital age of EQA, ensuring that amended and improved formats maintain the same opportunity and commitment to quality, education, best practices, and professional development as current EQA schemes. By collaborating with leading experts, these formats will be tailored for the future of fully digitised laboratories. By producing guidelines and educational materials to ensure consistent and reliable digitally driven diagnostic outcomes, UK NEQAS CPT will support the facilitation and transition to digital pathology while upholding rigorous standards of assessment and continuous improvement.

While implementing an EQA scheme for digital pathology presents formidable challenges, it is essential for ensuring the quality, accuracy and reliability of diagnostic testing in the digital era. By addressing the issues related to standardisation, data security, assessor training and education, UK NEQAS CPT can overcome these obstacles and provide a groundbreaking EQA scheme with immense promise for improving patient outcomes and advancing the practice of cellular pathology.

Lorren Mitchell is the Scheme Manager for UK NEQAS Cellular Pathology Technique. She is responsible for the day-to-day operations and long-term strategic management of the service. She has over 15 years' experience in cellular pathology within a diagnostic setting with extensive involvement in the implementation of digital pathology. Lorren is a HCPC-registered Biomedical Scientist, a member of the IBMS, IBMS verifier and examiner.

UK NEQAS CPT's provision of services and educational opportunities is the largest worldwide, offering a rich diversity of options - the only EQA service to develop such an expansive, unique, and accredited portfolio, committed to quality improvement, learning and development in cellular pathology diagnostics. This involves leadership, development and delivery of extended educational provision and additional services for technical and clinical staff, for worldwide quality development.

www.ukneqascpt.org/

UK NEQAS: delivering far more than external quality assessment

Liam Whitby, President of the United Kingdom National External Quality Assessment Service (UK NEQAS) explains the reason why UK NEQAS is a world leader in EQA.

I like to think of the UK NEQAS team as being similar to maths teachers at school. We're not there to catch you out in a test; rather it is our job to share the tools and the knowledge so that you can find the right answer to what can be quite complex problems. Our mission is to improve global diagnostic testing in every way possible.

My greatest pleasure is when we dispatch a clinically challenging test and every laboratory delivers the correct answer.

EQA is exciting

Let's be honest, if we don't have checks then things will go wrong. So not surprisingly, I believe that external quality assessment (EQA) is very important. EQA services are a key stage in the quality matrix that supports physicians in correctly diagnosing a disorder and the ongoing monitoring of that disease. By combining competent laboratory teams and strong internal controls, with external quality assessments; we can gather together all of the evidence to build better diagnostics, and to support clinicians to make informed decisions with confidence.

UK NEQAS encourages critical thinking about internal and external quality assessments, making it an integral part of the laboratory process.

Our role is to improve global diagnostics testing and we do this through quality assessment and education. Why? Because everything we do is for the benefit of patients.

Let's focus on the education part for a moment. Many people do not realise that UK NEQAS is a registered charity – more on the reason why later – and our stated primary role is education.

At UK NEQAS education has a very wide meaning. We pass on relevant information by producing and giving access to EQA summary reports. We teach in person via masterclasses, educational events, e-learning, and interpretative schemes. We open up access to experts in a specific field via webinars and scientific meetings. We embed and inform best practice.

During 2022-2023, UK NEQAS delivered 86 webinars, reaching 8,500 delegates worldwide. These online education sessions covered a range of specialisms in clinical laboratory science and also included pan-disciplinary events. Recordings are always available for later viewing on our website.

We held multiple specialist face-to-face meetings for areas including: genetics, haematology, microbiology, chemistry, blood transfusion, reproductive science, histology, immunology, blood coagulation, histocompatibility and immunogenetics,

> My greatest pleasure is when we dispatch a clinically challenging test and every laboratory delivers the correct answer

and a pan-disciplinary event focused on point-of-care testing delivered further opportunities for collaboration.

Critical thinking

Every single activity we offer is designed to support our participant laboratories and their clinical and laboratory staff. Importantly and alongside all of the above, we encourage critical thinking about internal and external quality assessments, making it an integral part of the laboratory process.

A huge part of what we do is centred around bringing people together. We believe education is a collaborative process; that we can all learn from each other despite working in very different specialisms. So, we facilitate opportunities to exchange knowledge between laboratories about exciting opportunities – such as sharing details of new techniques or new instruments – and provide a safe environment to discuss common challenges.

We know that sometimes a challenge can feel overwhelming. This is when we offer personal support and advice on specific issues or when someone wishes to learn more about a topic. We want to equip them with all the resources, knowledge and guidance they need to optimise their own laboratory testing, and sometimes it's just better to do this one-on-one.

Trusted and independent

A scientist's greatest resource is within UK NEQAS.

A lofty statement but one that I truly believe. Scientists can trust what UK NEQAS says because we are independent and run on a not-for-profit basis – hence our charitable status. This ensures that we can keep patients firmly at the heart of all that we do. Our charitably registered status and commercial neutrality mean that our advice is independent, without fear or favour, which means that scientists receive facts and can make decisions accordingly. We never endorse products, however, via our EQA programmes we can undertake meta-analysis on the performance of kits, techniques and instruments, so if UK NEQAS tells you something about a new test or new machine – either positive or negative – it can be trusted.

Not-for-profit: yes we charge for our services, but the amount payable is set as close to the actual cost of testing as possible. And scientists know that they are not just paying for the test – there is added value in our service through access to our expertise. UK NEQAS team members are healthcare scientists themselves (biomedical scientists and clinical scientists registered with The Health and Care Professions Council), with broad field-based experience, meaning they deliver the optimum, most relevant support and information to EQA centres, as well as to laboratories, medical and scientific staff, and to the public.

Analysis and studies

We've co-authored or supplied data for 86 articles in peer reviewed scientific journals. Our neutrality means that our findings can be trusted too, which is why many technique guidelines are co-authored by UK NEQAS or are underpinned by our data. We have undertaken meta-analysis of thousands of laboratories worldwide, so we have complete datasets and globally comparable data. This allows us to work with, and support the research of national and international organisations such as the World Health Organization (WHO), Breast International Group and North American Breast Cancer Group (BIG-NABCG), European Centre for Disease Prevention and Control (ECDC), European Society for Human Genetics (ESHG), The Joint

Each of UK NEQAS' programmes has a steering committee run by external experts to ensure that its EQA services are delivered on a scientific basis.

Committee for Traceability in Laboratory Medicine (JCTLM), The Royal College of Pathologists of Australasia, and the World Federation of Hemophilia (WFH) amongst many others.

Science at the foundation of our EQA

Science is the foundation of every single one of our accredited EQA programmes. Each programme has a steering committee run by external experts to ensure that our EQA services are delivered on a scientific basis. For example, the frequency of testing is always established to ensure it is clinically relevant and the EQA exercises are designed to be technically challenging. What's the point otherwise? This means that we deliver excellent EQA – and if you have any questions, give us a call. We are always happy to talk things over and explain how we operate.

Diseases don't recognise borders

It's become a common phrase in recent years that, 'global problems need global solutions'. This has been our view for many years, hence our determination to work closely with laboratories around the world. The more data we gather, from laboratories in as many different countries as possible and from as many tests as is practical, the better we are positioned to deliver a comprehensive global picture. This is especially true when clinical trials are implemented that cover multiple countries, or for rare disease diagnosis, or to ensure monitoring of a pandemic – all very real examples of where global EQA is required.

Not only does our global data allow us to better support diagnostics, it enables us to better identify factors that can affect testing. Sometimes those factors can be very unusual and difficult to identify. An example of this would be a few years ago, where an air-conditioned environment affected a methodology and ultimately the test results produced. We knew it was a local issue as neighbouring laboratories had no issues. By working with the laboratory remotely we were able to identify the root cause and support them with correcting it.

The above is also an example of why the UK NEQAS team has become expert in different laboratory conditions and logistics. The staff at UK NEQAS includes not just scientific expertise but logistical experts, who successfully ensure correct sample storage for materials in transit and have determined new ways to deliver samples to laboratories around the world, ensuring that the same quality samples arrive at laboratories in Sheffield, Auckland or Zimbabwe – even after days in transit.

The more data gathered by UK NEQAS, from laboratories around the world, the better it can deliver a comprehensive global picture.

Proud of our unique EQA programmes

Our unparalleled position working with global data and laboratories worldwide delivers statistical benefits unavailable from anywhere else. It allows us to lead the development of new EQA programmes at the cutting edge of diagnostic medicine. We have come a long way from when disorders were diagnosed by eye, with little or no diagnostic support. The molecular-level methodologies now available allow testing with very low levels of disease present, so our EQA programmes have developed to reflect this. All, ultimately, for the benefit of patients.

Yes, we are unashamedly proud of our EQA programmes. So proud that we want to share our expertise and findings widely so that collaboratively, every laboratory, every centre, every clinician, and every scientist and scientific organisation can work for the benefitof patients. It is imperative that we work this way to support healthcare, combat future pandemics, and diagnose and work to overcome now globally prevalent diseases.

At the end of the day, exceptional EQA is good for everyone. Everyone working in healthcare would agree that patients deserve the same high quality diagnostic testing whether they are in Glasgow or in Penzance (or Afghanistan, or Brazil, or China…), and UK NEQAS is keen to ensure that is the case.

Education + quality assessments = better patient outcomes.

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