

Precision policy:

Why measurement science deserves a seat at the table

Metrology underpins public safety, innovation and trade. The National Measurement Laboratory (NML) ensures the UK remains at the forefront of reliable, evidence-based policy and practice.

Measurement powers progress in ways many of us never see.

The security of our food system is predicated on our ability to test that what is in our food is as expected, in substance and quality. Consumers trust that food is safe from, for example, pesticide or allergen contaminants, because of their confidence in the enforcement and regulatory system to detect and measure them before food reaches their plate.

In modern medicine we diagnose and treat disease more than ever before, underpinned by our increasing ability to detect diseases and measure the effectiveness of novel treatments. As we transition to a community-based preventative healthcare system, measurement science will be key to giving all healthcare workers access to the same accurate and trustworthy data, helping to ensure equality of health provision across the four nations.

Globalisation, which sees international trade as commonplace, is possible because industries have common agreements for measuring products, ensuring measurements are comparable regardless of when or where they are made.

Metrology, the science of measurement, is a critical underpinning discipline, supporting global trade, ensuring public safety and fostering innovation. Metrology is not just the routine making of measurements, but the infrastructure that ensures we have confidence in their accuracy, precision and repeatability – ensuring common understanding of these measurements, their units and application.

The NML, hosted at LGC, has been the Designated Institute for 'Chemical and Biological Metrology' within the UK, since 1988. We play a leading role internationally to standardise chemical and biological measurements to support global trade in established and emerging sectors. We give stakeholders confidence in chemical and biological data, supporting the innovation pipeline, promoting productivity and economic growth. We enable efficient translation of novel technologies, encouraging and de-risking investment. The NML supports the role of the 'Government Chemist' (GC), which has a statutory function as an independent referee analyst under several Acts of Parliament, particularly for food and feed, and an advisory role to stakeholders, focusing on public protection, value for money and consumer choice.

Through the NML and the GC we make sure the UK is ready to face the chemical and biological measurement challenges of today and tomorrow.

Delivering our core function

We have a strong heritage, delivering high quality measurement science to the UK for over 180 years, since the establishment of the government Excise Laboratory, and are continually developing our capabilities to address current and emerging challenges.

The recent NHS 10-year plan identified genomics and predictive analysis as one of five "big bets to drive healthcare reform". To fully realise this ambition and support the move to community care, it is essential that novel genomic profiling

techniques are accurate and, crucially, comparable across laboratories and regions. High test accuracy and reliability is essential in gaining and maintaining public confidence in the adoption of genomics. Without this, a shift to pre-emptive, personalised care will be unlikely to succeed. Our scientists are at the forefront of addressing this urgent need for standardisation through, for example, leadership in the Horizon Europe-funded GenomeMet project, developing Reference Measurement Systems to support the comparability of genome profiling techniques between laboratories.

Our work provides national resilience not only to the NHS but also in protecting our food and feed system. For example, a recent referee case centred on the disputed level of a toxic substance in a sample of Basmati rice. The substance was found to exceed the maximum permitted level and therefore the consignment was rejected at point of entry into the UK, protecting consumers.

Not only are we protecting consumers today, but we are helping prepare for the future. As the food sector drives towards sustainability, there is a push towards novel foods and away from plastic packaging, in favour of recycled, eco-friendly materials. These new food types and novel materials present currently unmet metrology challenges: on the quantification of unknown risks, development of consistent safety standards and implementation of appropriate regulation. By our working with food providers, testing laboratories and the wider regulatory system, we are helping ensure the continued safety of the UK food system.



Julian Braybrook
Director, National
Laboratories at LGC
and UK Government
Chemist



Caroline Pritchard
Director, Key Accounts
and Government
Relations, NML at LGC



Grace Andrews
Policy Coordinator,
NML at LGC



The NML new purpose-built laboratory on the Surrey Research Park.

The Priestley Centre
10 Priestley Road
Guildford
GU2 7XY

Looking further forward, disruptive technologies such as engineering biology have the potential to impact society greatly but bring potential risks as well as opportunities. Working with UKHSA and other partners we are seeking to improve UK biosecurity, limiting our reliance on international providers and increasing the UK government's resilience in the face of novel biological threats.

Sharing our expertise

As a Public Sector Research Establishment (PSRE) we have a duty to share our capabilities with the wider UK research, development and innovation ecosystem, improving understanding of chemical and biological measurements for the benefit of the UK public.

We have several programmes which facilitate partnerships with innovators, such as the Healthcare Scientist Knowledge Transfer Partnership Programme. Through this we work directly with healthcare scientists to address specific measurement challenges, helping implement innovative approaches into the NHS and improve the quality of patient care.

Recently, we collaborated with the MHRA and clinical scientists at Bart's NHS Trust to support the standardisation of a novel technique for rapidly diagnosing bacterial infections. Serious infections can cause huge risk for patients and it's crucial they have quick access to the right treatment. This innovative approach cuts diagnostic timeframes from seven to two days, helping patients receive treatment sooner and recover faster.

Antimicrobial resistance is a major global health problem with the potential to return healthcare to a pre-antibiotic age, putting patients at risk from drug-resistant infections. We partnered with Microplate Dx Limited through our joint

Centre for Advanced Measurement Science and Health Translation at the University of Strathclyde to support the scaling-up of their innovative point-of-care diagnostic device. This technology will enable clinicians to select with confidence the best choice of antibiotic to treat a patient's infection in minutes.

Within our Northern Cell Metrology Hub in Leeds, we partnered with SME HeartCells to develop their cutting-edge cell therapies used to treat heart failure. Our experts improved their standardisation and quality assurance for regulatory approval, bringing this innovative treatment one step closer to improving patient outcomes.

Beyond healthcare, our work spans many different sectors – collaboration with MDCO, a specialist chemicals company, enabled them to confidently market their cleaning products as environmentally friendly, contributing to safer and greener practices in the nuclear decontamination industry.

Our strategic 'city-region' partnerships, including those mentioned above in Strathclyde and Leeds, support sustained productivity improvements at a local level. Our Centre for Excellence in Agriculture and Food Integrity, based at the ASSET Technology Centre at Queens University Belfast, supports the UK agrifood industry to become more sustainable, reliable, safe and productive. Our partnership with the Liverpool School of Tropical Medicine, The Pandemic Institute and Liverpool City Region will support UK efforts for future nanomedicines and infectious disease diagnostics.

The future of chemical and biological metrology

The NML and GC functions are strategic national assets, central to the UK's

scientific resilience. Our work, its impact and our scientists are recognised as world-leading or internationally competitive in our fields (International Science Review). Through our lead, and active participation, in multiple international research projects and expert standardisation and policy committees, we have positioned the UK as a global leader in chemical and biological metrology.

Sustained public sector investment has provided the base from which to build such nationally – and internationally – recognised capabilities that we can apply flexibly to metrology challenges as they emerge to best benefit wider UK industry. We deliver for the NHS, tackle food security, protect the environment and underpin UK trade. Our strategic regional partnerships are engines of translation and impact helping us build roots in local research ecosystems, developing local talent and driving local economic growth.

With our future in mind and supported by significant investment from our private-sector host organisation, LGC, we relocated this summer to a new purpose-built laboratory on the Surrey Research Park. The facility provides our experts with the infrastructure needed to deliver the UK's next-generation metrology solutions, while continuing to attract top talent to the UK research ecosystem.

Measurement challenges will continue to emerge – from novel medicines and diagnostics, to green technologies, to innovative food products – and our new facilities put us on the front foot to meet them head-on.

Metrology matters. Continued support for measurement science and its role in sound policy making is not just an investment in science – it is an investment in public health, economic growth and national security.