How can an incoming government make best use of NLs?

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UK National Measurement System

An essential part of the UK's research, development and innovation (RDI) infrastructure – critical for science, innovation and trade

The NMS develops and maintains internationally recognised measurement capability, standards and practices to:

- Ensure confidence and trust in measurements across the UK
- Support innovation from fundamental research to operational use of technology by our stakeholders
- Provide advice to UK Government, regulatory agencies and private sector
- Underpin key policies, regulations and operational requirements across government

Often not considered during early/mid stage innovation or post-market authorization and lacking in emerging technologies

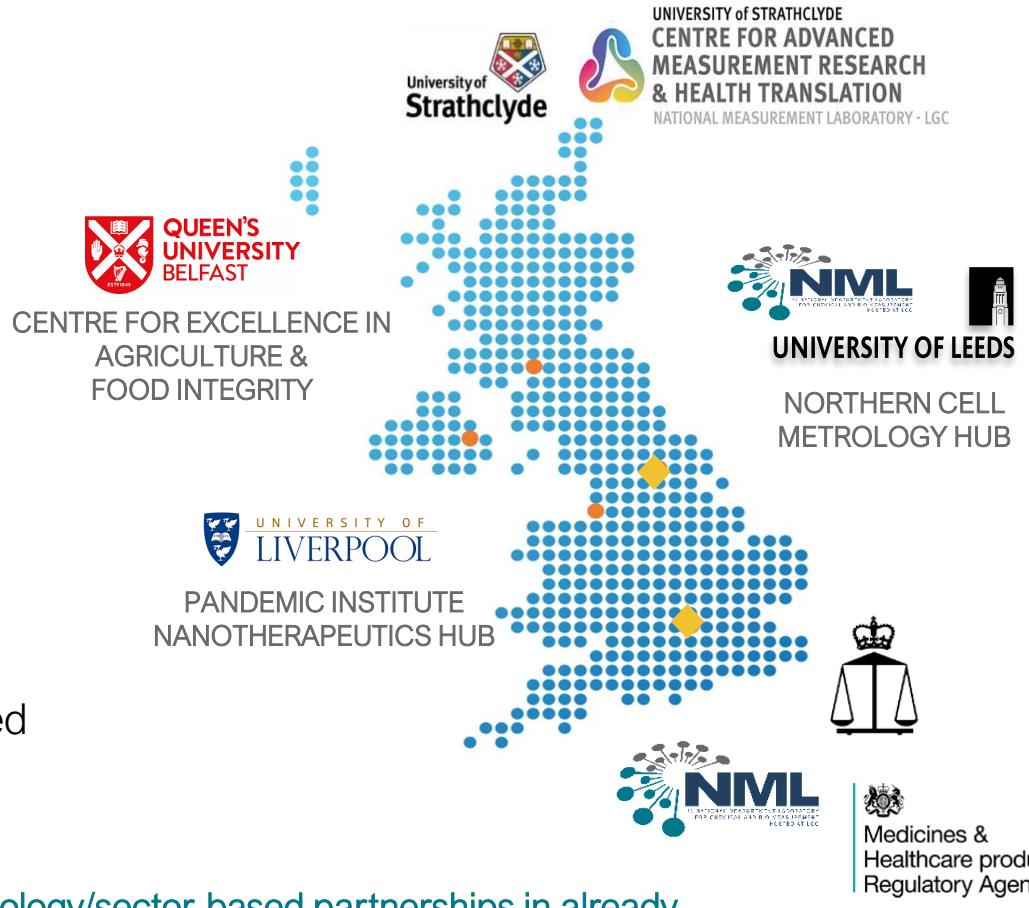
Our national roles

National Measurement Laboratory (NML)

- Designated for chemical and biological measurement
  - Internationally-leading measurement science
  - Sovereign measurement traceability for nucleic acid quantitation, nanoparticle number concentration and chemical purity
  - Reference measurement methods and materials addressing challenges identified by industry, academia, clinicians and government
- Recognised as a PSRE and a “strategic national asset” (International Science Review, 2023)

Other roles

- UK Government Chemist – statutory referee & advisory functions
- Managed MHRA Laboratories – UK’s Official Medicines Control Laboratory (OMCL) for chemical testing & British Pharmacopoeia (BP) Commission Laboratory
- National Reference Laboratory – food/feed additives; GMOs in food/feed
- GMO Authorisations (GB) Services – food/feed



Agility through core platform analytical technologies supplemented by strategic technology/sector-based partnerships in already-identified innovation districts throughout UK, enabling local application and impact of measurement capabilities & skills development

Our activities

NML
UK NATIONAL MEASUREMENT LABORATORY
FOR CHEMICAL AND BIO-MEASUREMENT
HOSTED AT LGC

- Delivers world-class chemical and bio-measurement science and technology
- Provides traceable and increasingly accurate standards of measurement

Measurement research

Measurement advice

Calibration facilities

Reference materials

Skills

Department for Science, Innovation, & Technology
Food Standards Agency
defra
Department for Environment Food and Rural Affairs
Food Standards Scotland
UK Health Security Agency
Home Office
BIA
UK Bioindustry Association
BIPM
BIVDA
METROLOGY PARTNERSHIP
EURAMET
bsi
ISO
UKRI Innovate UK
UKRI Biotechnology and Biological Sciences Research Council
NHS England
HSC Health and Social Care
Scottish Government
Riaghaltas na h-Alba
GIG CYMRU NHS WALES
Addysg a Gwella Iechyd Cymru (AaGIC)
Health Education and Improvement Wales (HEIW)
airto
driving growth and innovation
THE PANDEMIC INSTITUTE
Food Authenticity Network
CAMS
Community for Analytical Measurement Science
LGC

Supporting pandemic preparedness and UK diagnostics

Robust and reliable diagnostics are crucial to address healthcare challenges from infectious diseases to antimicrobial resistance to precision medicine, all for patient benefit

NML advanced nucleic acid measurement capabilities and expertise support the UK diagnostics industry and lead the development of global framework initiatives for biological measurement quantification

Outcomes to date include:

- Delivery of the international *Roadmap to Metrology Readiness for Infectious Disease Pandemic Response* and resulting Pandemic Task Group to establish measurement comparison studies that standardise molecular diagnostics globally
- Provision of independent validation testing and technical advice that supports method performance assessment of molecular point of care tests and non-molecular serological testing, for improved vaccine and therapeutic development
- Development of decision test criteria and guidance, to deliver novel diagnostics, e.g. Covid-19 and associated VOCs/VOIs
- Value assigned nucleic acid control materials for UKHSA and NHS Laboratories that support clinical adoption of infectious disease tests, e.g. Covid-19, Mpox, avian flu, swine flu
- Development of a complementary technology approach with UKHSA to develop UK nucleic acid synthesis capability for diagnostic control materials, removing reliance on international providers and improving biosecurity

Supporting innovation within the NHS

NHS Healthcare Scientists Knowledge Transfer Programme (HCS KTP), a joint programme between PSREs – NML, MHRA South Mimms (ex-NIBSC) and NPL – with UKAS and healthcare agencies across UK (NHS England, NHS Scotland, NHS Wales, Health and Social Care NI)

We have provided access by NHS healthcare scientists to PSRE capabilities and expertise to help create, expand, test or implement innovative high value approaches into NHS to improve the quality of patient care

Outcomes to date include:

- Better harmonised newborn screening testing programme to allow more analytes to be added with greater detection accuracy, increasing the range of diseases tested for at birth
- Improved best practices for minimal residual disease testing in leukaemia
- Bringing together the Genomic Laboratory Hubs to support standardisation of novel genomic sequencing technologies, enabling their rapid adoption
- Implementation of new audits that assess, and so improve, the accuracy of patient treatment delivery for head and neck, and cervical cancers

Supporting the national vision for engineering biology to revolutionise medicine, food and environmental protection

NML
UK NATIONAL MEASUREMENT LABORATORY FOR CHEMICAL AND BIO-MEASUREMENT HOSTED AT LGC

Metrology (measurement science) and standards are critical to translating new engineering biology technologies from laboratory to market-place – effectively, efficiently and safely – by enabling more reliable production processes, products and services

NML work with the UKRI BBSRC-funded Mission Hubs and Awards is embedding metrology and standards practices into the wider engineering biology community and, with NPL, helping shape future engineering biology regulation through the DSIT Regulatory Horizons Council

Outcomes to date include:

- Bespoke 'Fundamentals in Metrology' training for MSc & PhD students and early career scientists across pilot UK engineering biology centres, being rolled out to the wider community through e-App modules, (up)skilling the next generation of workers/ reducing skills shortages
- A new community-led international documentary draft standard for gene expression analysis of engineered cell systems, providing UK leadership in informing new and emerging standards and regulation for this emerging area
- Working collaboratively within the UKRI £100m Engineering Biology Mission Hubs and Awards to adopt new measurement knowledge/ or develop robust data that best addresses the complex challenges facing them, e.g.
    - developing high accuracy (dPCR) methods to track engineered microbes through the environment (CYBER Mission award)
    - microbial food regulatory hurdles, environmental biotechnology solutions, clean growth (preventing plastic pollution, environmental processing and recovery of metals) and genetic control systems for advanced medical therapies

Suggestions for an incoming government

- Create an environment that encourages long-term commitment, fosters innovation and secures the necessary human resources and infrastructure capacity by national laboratories to stay at the forefront of scientific research and innovation, meeting system needs
- Recognise and champion the value of national laboratories across the RDI system, government & public
  - Area of UK global leadership that is undervalued nationally
  - Delivers public benefit, i.e. contributes to higher productivity and economic growth, and creates good paying, local jobs (increased prosperity and quality of life)
- Remove barriers to cross-government engagement, to increase accessibility and permeability
  - Create a culture that better accesses collaborative RDI undertaken by national laboratories sponsored across government
  - Identify cross-cutting priorities and facilitate co-ordinated delivery across the system
- Learn and capitalise on best practice examples already within system
  - Opportunities for growth based on evidenced successes

WE SOLVE
REAL WORLD PROBLEMS
TO ACHIEVE
IMPACT

WE WORK
GLOBALLY TO
STANDARDISE
MEASUREMENT
SCIENCE

WE PROVIDE THE
MEASUREMENT INFRASTRUCTURE
TO SUPPORT
UK **GROWTH & PRODUCTIVITY**

WE WORK IN
PARTNERSHIP
WITH INDUSTRY,
NHS, GOVERNMENT
AND ACADEMIA

WE PROVIDE
COMPREHENSIVE
TRAINING
FOR OUR
STAKEHOLDERS

Measurement matters