CCQM 2030+ STRATEGY: EXECUTIVE SUMMARY

The document sets out the strategy to be followed by the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM) to 2034 and beyond to deliver its mission of advancing the global comparability of chemical and biological measurement standards and capabilities, and thereby enabling Member States and Associates to make measurements with confidence. In so doing, measurement science will also be progressed, and stakeholder engagement strengthened. In developing its strategy, the CCQM expert groups have identified nine key sectors that are expected to influence and drive the development on National Metrology Institutes' (NMI) and Designated Institutes' (DI) services to 2034 and beyond and impact CCQM activities for achieving global comparability of chemical and biological measurements. Scientific, economic and social challenges which can be tackled through metrology at the CCQM level are described for the following sectors: Environment and Climate; Healthcare and Life Sciences; Food safety, trade and authenticity; Energy; Legal Metrology; Fundamental metrology and support of the SI; Forensic Sciences and Anti-doping; Advanced Manufacturing; Biotechnology and Drug Discovery. The document provides a limited revision to the strategy document published in 2021, based on major developments in the period 2021-2025.

The CCQM has set seven strategic aims to be progressed, notably: to contribute to the resolution of global challenges; to promote the uptake of metrologically traceable chemical and biological measurements; to progress the state of the art of chemical and biological measurement science; to improve efficiency and efficacy of the global system of comparisons for chemical and biological measurement standards it conducts; to continue the evolution of Calibration and Measurement Capabilities (CMCs) to meet stakeholders needs; to support the development of capabilities at NMIs and DIs with emerging activities; to maintain organizational vitality, regularly review and, if required, update the CCQM structure for it to be able to undertake its mission.

The strategy foresees contributions to progressing the state of the art in measurement science across all nine technical science areas covered by the Committee including Organic, Inorganic, Gas, Isotope Ratio, Surface, Electrochemical, Protein, Nucleic Acid and Cell analysis areas. Thirty-four activities have been identified where progress is expected, ranging from support for the emerging areas of 'omics', development of new particulate standards, isotope ratio and microplastic standards, to the development of reference measurement systems for biomarkers, surface chemical composition for semiconductor and quantum devices, RNA quantification, food authentication, and cell counting as examples.

A more structured approach to stakeholder engagement is foreseen in the new strategy and considered as a key tool in promoting the activities and impact of the CCQM and of the Chemical and Biological Metrology community in general. The use of task groups is key to the strategy and has already been successfully exploited in the 2021-2024 period in both engaging with outside stakeholders, and to address emerging requirements in CCQM, across sectors and CCs, such as set out in the CIPM 2030+ strategy. This allows the CCQM to rapidly address emerging new areas such as pandemic response and the application of artificial intelligence (AI) to address metrology issues. Extension of the CCQM Liaison Membership, to better represent the expanded technical coverage of the committee, remain a longer term goal.

A core capability/comparison strategy will be continued with the aim of not increasing overall resources required for comparisons for the 71 institutes worldwide maintaining over 6500 CMCs in the chemistry/biology field. The rapid development of AI and moves towards digitalization of reference data to support accurate measurements will be the focus of the Task Group on Data Digitalization, which is expected to increase the efficiency of CCQM and CIPM MRA processes.

Strong interaction will be maintained between the CCQM and RMOs, with continued coordination of linked, satellite and supplementary comparisons, and increased focus on capacity building and knowledge transfer.

The implementation of the strategy is supported by the BIPM Chemistry Department providing the CCQM Executive Secretary Role, coordination of comparisons in technical areas prioritized by the CCQM, laboratory-based knowledge transfer programmes for National Metrology Institutes with emerging metrology systems, the JCTLM database and support for engagement with stakeholder communities.

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