



CCRI President's Report

28th CGPM (2026)

A large, decorative graphic composed of numerous concentric, overlapping arcs in a variety of colors including red, orange, yellow, green, blue, and purple. These arcs are arranged in a circular pattern, creating a sense of depth and movement. In the center of this graphic, the following text is displayed:

Working together to
promote and advance
the global comparability
of measurement

www.bipm.org

Report by the President of the CCRI

Dr Jan-Theodoor Janssen, President of the Consultative Committee for Ionizing Radiation (*Comité consultatif des rayonnements ionisants*, CCRI) presented the report on the activities of the CCRI since the 27th meeting of the CGPM (2022).

CCRI Executive summary

During the period 2023–2026, the CCRI has continued to provide the international framework for the development, comparison and recognition of ionizing radiation measurement standards, underpinning confidence, traceability and global equivalence of measurements across healthcare, industry, research and emerging technologies.

The period has been characterized by the continued development of the international comparison and CMC framework, the emergence of new measurement requirements, stronger engagement with the wider metrology community and the preparation of a new CCRI Strategy 2030+. The CCRI has also adapted its organization to address cross-cutting topics such as digital transformation and nuclear data, while establishing targeted Task Groups for emerging scientific and technological challenges.

By September 2026, 293 comparisons were listed in the KCDB across the three branches of ionizing radiation metrology, comprising 211 Key Comparisons and 82 Supplementary Comparisons. In addition, 194 BIPM comparisons had been conducted over the preceding ten years.

Scientific priorities have evolved significantly since 2022. Advanced radiotherapy, including FLASH radiotherapy, proton and hadron therapy and BNCT, novel radiopharmaceuticals, environmental radioactivity, high-energy neutron measurements and new measurement technologies have become increasingly important areas for the CCRI. Digital transformation, including Digital Calibration Certificates, algorithm benchmarking and digital twins, is also becoming an integral part of ionizing radiation metrology.

The CCRI has substantially increased its engagement with the international community with webinars and workshops.

The work of the CCRI ultimately supports applications with significant societal impact, including safer and more effective cancer treatment and personalized medicine, improved radiation protection for more than 22 million workers, food irradiation affecting more than 3 billion people, and safer and more cost-effective decommissioning of hundreds of nuclear reactors.

Scope of the CCRI

The work of the CCRI is organized through three Sections covering dosimetry, radionuclide metrology and neutron measurements, supported by dedicated Working and Task Groups.

The CCRI coordinates international measurement activities in these fields, including international comparisons, the development and maintenance of CMCs, identification of emerging measurement requirements and cooperation with Regional Metrology Organizations and international organizations.

The Committee also provides a forum for identifying future scientific and technical challenges and for coordinating activities that extend across the three Sections.

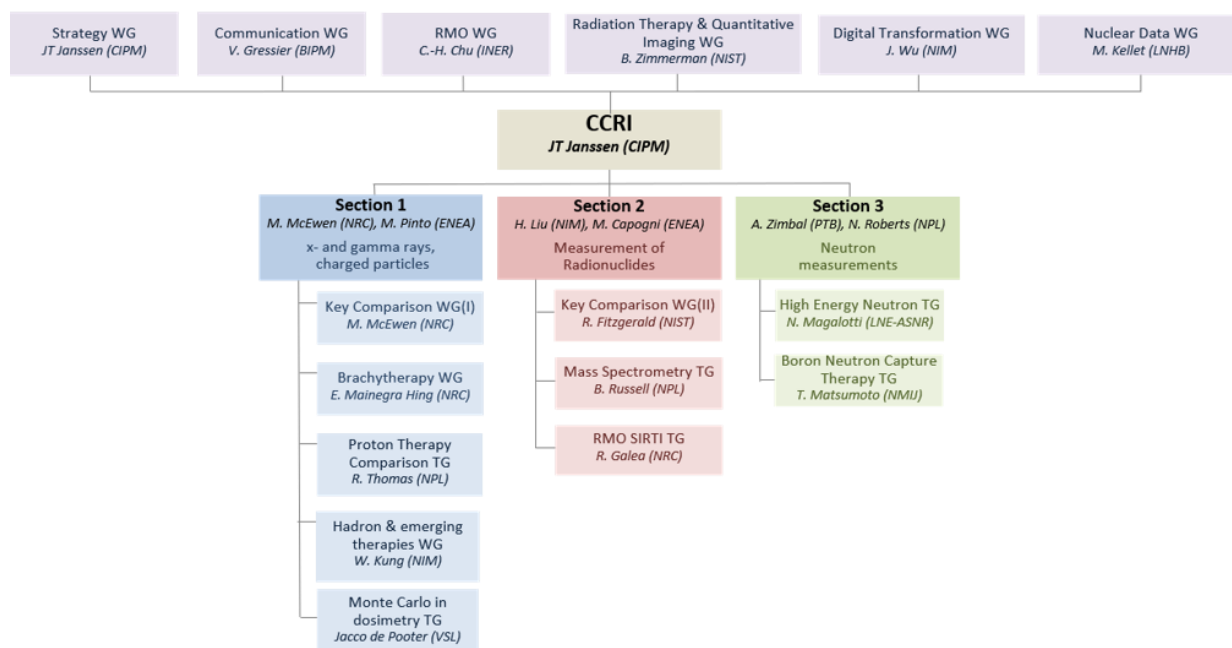


Figure 1 – Structure of the CCRI

Strategy

The CCRI Strategy was revised during the reporting period and the fourth edition of the CCRI Strategy 2030+ was issued in August 2026. The revision incorporated the outcomes of the consultations, webinars and workshops organized in 2025 to develop a vision for the future of ionizing radiation metrology.

The strategy aims to establish an inclusive international measurement system for ionizing radiation. Its principal aims are to improve global comparability, build capabilities at smaller NMIs/DIs, address issues identified by stakeholders, identify emerging trends, expand the coverage of services supported by CMCs and coordinate the implementation of the SI Digital Framework in ionizing radiation metrology.

The strategic roadmap responds to a broad range of scientific, economic and societal challenges, including health and life sciences, climate and the environment, food safety, energy, advanced manufacturing, digital transformation and the development of new metrology.

An important evolution of the strategy is the greater emphasis on accessibility and efficiency of comparisons. The CCRI intends to use an appropriate combination of BIPM, bilateral, regional and supplementary comparisons, while considering risk-based approaches and reducing unnecessary logistical burdens.

The strategy also emphasizes knowledge transfer, capacity building and stronger cooperation with RMOs and international organizations, in particular the International Atomic Energy Agency (IAEA).

Activities and achievements since the last meeting of the CGPM

International comparisons and CMCs

The CCRI has continued to maintain the international comparison framework supporting global equivalence of measurements. The RMO Working Group has supported laboratories in the preparation, review and maintenance of CMCs and has developed and updated guidance covering CMC rules, service categories and review procedures.

During the reporting period, the CCRI also supported the use of the unique and persistent identifiers associated with CMCs in the KCDB and the development of training material for NMIs/DIs.

The comparison programme has continued to evolve towards approaches that are better adapted to emerging needs and to

the practical constraints faced by participating laboratories. In neutron metrology, for example, the CCRI has specifically considered ways of reducing the duration of comparisons, as the transport of radioactive sources and transfer devices can result in substantial delays.

Main activities and achievements

During the reporting period, the CCRI continued to strengthen international comparability while adapting its programme to emerging measurement needs in healthcare, environmental monitoring, nuclear medicine and advanced radiation technologies.

1. CCRI(I) – Dosimetry

CCRI(I) continued its comparison programme and addressed emerging requirements in dosimetry, with particular attention to brachytherapy, proton and hadron therapy, diagnostic radiology, FLASH radiotherapy and Monte Carlo-based dosimetry. The Section established new work on proton dosimetry and on traceability and uncertainty estimation for Monte Carlo radiation transport systems and relaunched the Brachytherapy Standards Working Group.

At the BIPM, the new medium-energy x-ray facility was brought into operation, while further developments concerned low-energy X-rays and calibration services using the IAEA Cs-137 facility. The future of the BIPM therapy-level Co-60 reference source was also considered. Following consultation within the CCRI and discussions with several NMIs, different options were presented to the CIPM. Renewal of the source was identified as the preferred option, subject to the future financial position of the BIPM.

2. CCRI(II) – Radionuclide metrology

CCRI(II) continued to support the SIR, ESIR and SIRTl programmes and updated its comparison programme to address emerging radionuclides and applications. New comparison activities included Cr-51, Am-241 and Ac-225.

The Section also strengthened its work on environmental radioactivity, nuclear medicine and quantitative imaging. The Mass Spectrometry Task Group continued its activities on traceable measurements for environmental, decommissioning and emergency-response applications, while digital data-analysis algorithms and emerging technologies such as cryogenic detectors were identified as areas for further development.

3. CCRI(III) – Neutron metrology

CCRI(III) continued its international comparison programme and identified high-energy neutron metrology as a strategic priority. A dedicated Task Group was established to prepare future comparison activities in this field.

The Section also responded to the growing metrological needs associated with Boron Neutron Capture Therapy (BNCT) through the establishment of a dedicated Task Group. Existing comparison results, including K9.Cf and K11, were reviewed and their validity extended.

4. Cross-cutting activities

The CCRI strengthened its cross-cutting activities through Working Groups and Task Groups addressing digital transformation, nuclear data, communication, CMCs and emerging technologies. The Digital Transformation Task Group successfully supported the introduction of digital identifiers for KCDB service categories, and its activities are now being continued through a permanent Working Group.

The CCRI also substantially increased its outreach and knowledge-sharing activities. Since 2022, 30 webinars and 10 workshops have involved more than 4 800 participants across more than 40 countries, generating more than 8 700 YouTube views and expanded the total number of subscribers to more than 2 300, supporting wider participation and knowledge transfer across the international ionizing radiation metrology community.

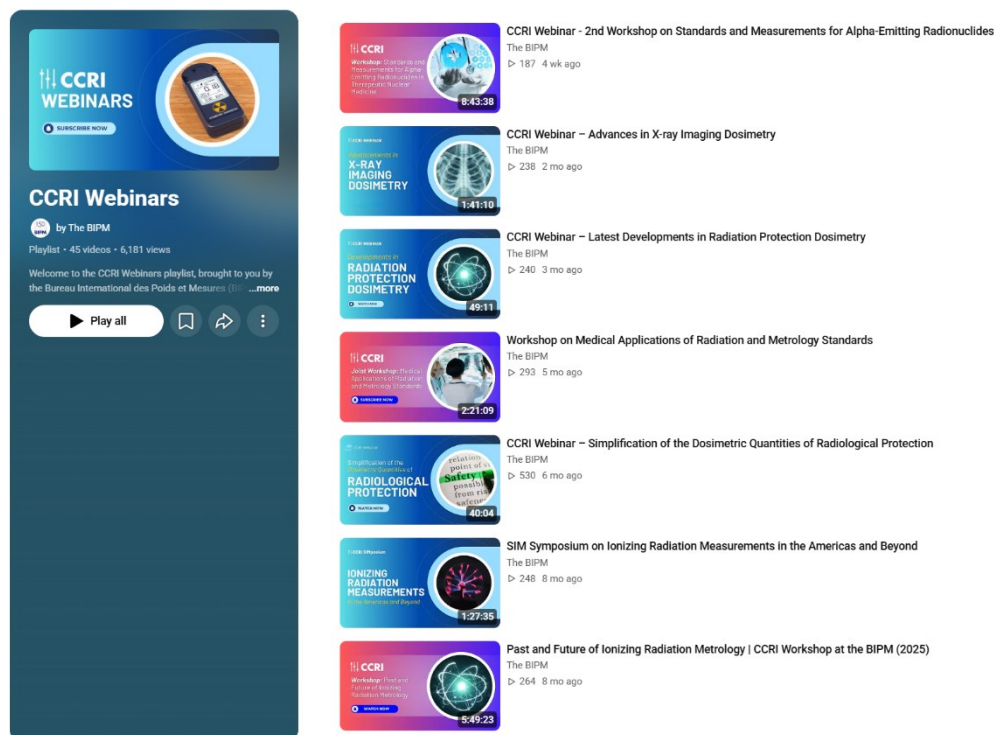


Figure 2: Webinars and Workshops available at CCRI YouTube List

Challenges and difficulties

The CCRI has identified a number of challenges that will require continued attention.

Sustainability and access to infrastructure and radioactive sources remain major concerns. Maintaining specialized facilities and ensuring the continuity of scientific capabilities require long-term planning, while transport, security, regulatory requirements, source availability and replacement costs can significantly affect international comparison programmes. The future of major reference facilities, including the BIPM therapy-level Co-60 source, is an important consideration in this context, together with the need for effective knowledge transfer.

Emerging applications require new measurement capabilities while maintaining the existing international infrastructure. This includes new radiotherapy modalities, novel radionuclides, environmental measurements and high-energy radiation fields.

Digital transformation creates new metrological challenges concerning data integrity, traceability, uncertainty evaluation and the validation of algorithms and computational methods. Monte Carlo calculations are increasingly becoming an integral part of measurement systems, making the validation of the associated algorithms and implementations increasingly important.

Finally, capacity building and inclusivity remain important for extending the benefits of the international measurement system to emerging NMIs/DIs and for ensuring continued participation in international comparisons and CCRI activities.

Outlook in the short and long term

The main priority for the coming years will be the implementation of the CCRI Strategy 2030+ and the translation of its strategic roadmap into concrete programmes of work.

The CCRI will continue to strengthen global comparability while making comparisons more accessible and efficient. The Committee will seek an appropriate balance between BIPM comparisons, bilateral comparisons, regional activities and

Supplementary Comparisons.

In dosimetry, work will focus on emerging medical applications, including FLASH radiotherapy, proton and hadron therapy and brachytherapy, together with the development of appropriate approaches to Monte Carlo-based measurements and new radiation fields.

In radionuclide metrology, the priorities will include the continued development of SIR, SIRT and ESIR, emerging radionuclides and radiopharmaceuticals, quantitative imaging, environmental radioactivity and the application of new measurement technologies.

In neutron metrology, high-energy neutron measurements and BNCT will remain major priorities, supported by dedicated Task Groups and future comparison activities.

The CCRI will also continue the development of digital metrology, including Digital Calibration Certificates, digital identifiers, machine-readable data, algorithm benchmarking and digital twins. The new Digital Transformation Working Group will provide a permanent framework for coordinating these activities.

The CCRI will strengthen knowledge transfer and capacity building through workshops, webinars, e-learning, secondments and cooperation with RMOs and the IAEA.

The Committee will also continue to monitor the sustainability of the BIPM Ionizing Radiation Department, including its infrastructure and expertise, and will provide guidance on priorities for maintaining the international measurement system.

CCRI Data

CCRI set up in 1958 (From 1958 to 1999 the committee was under the name CCEMRI.)

President: J.-T. Janssen

Executive secretary: V. Gressier

Membership: 16 members, 4 liaison organizations and 13 observers

List of CCRI members and observers:

<https://www.bipm.org/en/committees/cc/ccri/members>

Meetings since the 27th CGPM meeting:

Full reports of the CCRI

meetings:

<https://www.bipm.org/en/committees/cc/ccri/publications>

The work of the main CC is supported by three “Sections” focused on metrology for the particular aspects of ionizing radiation:

- CCRI Section I X- and gamma rays, charged particles
- CCRI Section II Measurement of radionuclides
- CCRI Section III Neutron Measurements

Six CCRI Working Groups:

<https://www.bipm.org/en/committees/cc/ccri>

- Strategy Working Group (CCRI-SWG)
- Communication Working Group (CCRI-COMWG)
- RMO Working Group on IR CMCs (CCRI-RMOWG)
- Radionuclide Therapy and Quantitative Imaging Working Group (CCRI-RTWG)
- Digital Transformation Working Group (CCRI-DTWG)
- Nuclear Data Working Group (CCRI-NDWG)

Five Section 1 Groups:

<https://www.bipm.org/en/committees/cc/ccri-i>

- Key Comparisons Working Group (CCRI-KCWG(I))
- Brachytherapy Standards Working Group (CCRI-BSWG(I))
- Proton Therapy Task Group (CCRI(I)-PTTG)
- Hadron and Emerging Therapies Working Group (CCRI(I)-HETWG)
- Monte Carlo Task Group (CCRI(I)-MCTG)

Three Section 2 Groups:

<https://www.bipm.org/en/committees/cc/ccri-ii>

- Key Comparisons Working Group (CCRI-KCWG(II))
- Mass Spectrometry Task Group (CCRI(II)-MS-TG)
- RMO SIRT Working Group (CCRI(II)-RMO_SIRT-WG)

Two Section 3 Groups:

<https://www.bipm.org/en/committees/cc/ccri-iii>

- High-energy neutrons Task Group (CCRI(III)-HE-TG)
- Boron Neutron Capture Therapy (CCRI(III)-BNCT-TG)

CCRI Comparison activity	Completed	In progress	Planned
CCRI key comparisons (and supplementary comparisons)	5	9	1
RMO key comparisons (and supplementary comparisons)	11	15	0
BIPM comparisons	48	13 open comparison services	13 open comparison services
CC pilot studies	0	0	0
CMCs	3 673 CMCs in IR service categories registered in the KCDB		