1. Major achievements in support of standardization in laboratory medicine

Ref4U continues the activities of the former Laboratory for Analytical Chemistry at Ghent University, led by Professor Emeritus Linda Thienpont (see publications). All these activities support the efforts to develop and implement a measurement infrastructure for SI-traceable "measurands" in Laboratory Medicine (EN/ISO 17511).

Ref4U, as a reference laboratory, has expertise in conducting SI-traceable reference measurement procedures, listed in the database of the "Joint Committee for Traceability in Laboratory Medicine (JCTLM)". It offers services to the In Vitro Diagnostic industry, metrological institutes, organizers of external quality assessment and other interested parties. An overview of these services, including the associated reference measurement procedures, is given in the JCTLM database. For these measurement services Ref4U is accredited by BELAC (ISO 17025 and ISO 15195), see also the certificate with accompanying scope.

Additional research activities are focused on developing, validating and applying accuracy-based (SI-traceable) reference measurement procedures with focus on total and free steroid and thyroid hormones and 25 hydroxyvitamin D. All reference measurement procedures are based on isotope dilution – mass spectrometry, in combination with extensive sample preparation procedures.

Ref4U is as reference laboratory very actively involved in the activities of the Committee for Standardization of Thyroid Function Tests (C-STFT). The mission statement of the C-STFT is to document and improve the standardization status and intrinsic quality of current thyroid hormone immunoassays. One of the tasks was to develop reference measurement systems for the most commonly determined thyroid hormones (TT4, TT3, FT4, FT3 and TSH). Activities are now focused on the implementation of these reference measurement systems: (i) by establishing a network of FT4 reference laboratories, (ii) by establishing a new serum panel to support sustainability of TSH harmonization; (iii) by dissemination of the work of the C-STFT so that new research (e.g. in establishing regional reference intervals) will be linked to the standards set by the C-STFT; (iv) supporting IVD-manufacturers in implementing the standardized FT4 and harmonized TSH assays.

2. Planned activities in support of standardization in laboratory medicine

The focus of the activities of Ref4U with regard to standardization in laboratory medicine will be on:
1. A continuation of the previous mentioned activities within the C-STFT. In this regard, the main focus will be on the development of a network of reference laboratories for FT4 (see also under 4).

2. Providing reference measurement services to the in-vitro diagnostic industry.

Ref4U also aims to further develop and validate candidate reference measurement procedures for SI-traceable measurands.

3. Promoting traceability in laboratory medicine

Traceability has been promoted primarily via oral presentations during the last two years.

**Oral presentations**

- Van Uytfanghe K. The evolution of thyroid function tests. Annual Meeting of the Royal Belgian Society of Laboratory Medicine / Joint Meeting with the Belgian Thyroid Club, 16 November 2018, Brussels, Belgium
- Van Uytfanghe K. Standardization of thyroid function test. AACC Annual Scientific Meeting, 29 July–2 August 2018, Chicago, IL, USA
- Van Uytfanghe K. Standardization of free thyroxine immunoassays. 33. Arbeitstagung Experimenteller Schilddrüsenforschung (AESF), 25 – 27 January 2018, Berlin, Germany
- Waters Clinical Diagnostics & Forensics Forum Roadshow! Validation of the MassTrack Vitamin D kit. 10 September 2019, Gent, Belgium
- Van Uytfanghe K. Mass spectrometric determination of (free) thyroid hormones. 4ème Journée de Spectrométrie de Masse en Endocrin-Métabolisme. 29 November, 2019, Paris, France

4. Reference laboratory networks/collaborations focusing on developing/implementing reference measurement systems

Ref4U yearly participates in the IFCC External Quality Assessment Scheme for calibration laboratories in clinical chemistry (RELA). In 2017 we successfully participated for cortisol, TT3 and TT4 and in 2018 for 25-hydroxyvitamin D, estradiol, and TT4. In 2019 we subscribed to participate for progesterone, creatinine TT3 and 25-hydroxyvitamin D. Our aim is to participate for the analytes in our scope, at least once every three years.

Next to that Ref4U takes the lead within the C-STFT with regard to establishing of a network of competent reference laboratories for FT4 in the framework of the activities of the C-STFT. So far we found three laboratories (some with expertise in reference measurement services) to become a partner in the FT4 Reference Laboratory Network (RLN), these are: the Centers for Disease Control and Prevention (CDC, Atlanta, USA), the Reference Material Institute for Clinical Chemistry Standards (ReCCS, Japan) and the Radboud University Medical Center of Nijmegen (Nijmegen, the Netherlands). The network members have
successfully conducted a first method comparison measuring samples from euthyroid donors and are now conducting a second method comparison study covering the entire measurement range.

Ref4U is also a member of the EURAMET’s European Metrology Network (EMN) “Trace Lab Med”, which mission is to provide a coordinated and service-oriented European metrology infrastructure to enhance metrological traceability of in vitro diagnostics (IVDs).

5. Open questions and suggestions to be addressed by JCTLM