An IVD Sector View of the CIPM-MRA

Prepared By

Gary L. Myers, PhD. VP, Science and Practice Affairs, AACC
Chair, JCTLM Executive Committee
Good laboratory medicine requires:

- Total error of a clinical measurement is small enough that a result reflects a patient’s biological condition

- Comparable results that are independent of
  - where and when a test was performed
  - the measurement procedure used
Why do we need accurate and traceable results

If different measurements give different results for the same patient sample:

- Clinical practice guidelines become less useful
- **Patients may receive incorrect treatment**
- Laboratory results in EHRs are less useful
IVD Companies Develop Clinical Instrumentation for Patient Care

High Sample Throughput Clinical Analyzers

Low Sample Throughput Point-of-Care-Devices
Total IVD Worldwide Revenue

Worldwide revenue for 2014 - $55.8 Billion USD*
Worldwide revenue forecast for 2019 - $68.9 Billion USD*
IVD companies that account for >70% of industry revenue*

- Roche
- Abbott
- Siemens
- Lifescan
- Biomerieux
- Becton Dickinson
- OCD
- Sysmex
- Thermo Fisher
- Bio-Rad

- Alere
- Bayer
- Hologic
- IL
- Diasorin
- Cepheid
- Qiagen
- Grifols
- Immucor
- Diagnostica Stago

* Source - boston biomedical consultants, inc.
Traceability (based on ISO 17511)

The IVD companies and clinical laboratories need

- Reference Measurement Procedures
- Certified Reference Materials
- Reference Measurement Laboratories
JCTLM – What has it provided?

- Coordinates the nomination and review process for database entries

JCTLM database was developed to help the IVD industry meet metrological traceability requirements of the EU IVD Directive

Database Contains:
- 330 Certified Reference Materials
- 170 Reference Measurement Procedures
- 130 Reference Measurement Services
The JCTLM has a vetted, documented review process for assessing which reference materials, reference methods and measurement services meet the criteria for inclusion in the JCTLM Database.

- However, every now and then, a reality-check is needed to check that the “paper review process” is working properly.

  - This has been achieved on a limited basis by having a single laboratory use a JCTLM-listed Reference Measurement Procedure under repeatability conditions to assess for comparability the JCTLM-listed Reference Materials for a specific measurand.
CRM comparability independent of analyte level

The measured/certified ratios for this set of CRMs are:
- ~ normally distributed
- with a standard deviation of ~0.7%
Listed CRMs for Potassium in Human Serum were assessed for comparability by a single laboratory (NIST) using a reference measurement procedure under repeatability conditions:

- **to assess** veracity of the Normative Standards-Based Review Process
- To establish bias that could be introduced by randomly selecting any material from the List

Fig 1: Ratio Display

Fig 2: Scattergram Display

Fig 1: The vertical axis reports the ratio between the measured and certified values of each CRM, $X_i/C_i$. The dark vertical lines represent the approximate 95% CI about the ratios. The light horizontal lines represent the certified 95% CIs. The dotted line represents the expected ratio for the suite of all materials given the observed identity between the measured and certified values. (CI = Confidence Interval)

Fig 2: The data demonstrate that these CRMs are comparable over a wide concentration range. The horizontal axis reports the certified values, $C_i$; the vertical reports the average measured values, $X_i$. Each level of each CRM is displayed as approximate 95% CIs along both axes. The intersection of these intervals is bounded by an open circle to aid visual inspection.
Source (country of origin) of CRMs in JCTLM Database

- Brazil (INMETRO), 1%
- China (NIM), 1%
- Japan (NMIJ, ReCCS), 14%
- Singapore (HSA), 3%
- Australia (NMIA), 4%
- European Union (IRMM), 23%
- United States of America (NIST), 43%
- Mexico (CENAM), 2%
- France (LNE), 2%
- United Kingdom (LGC, NIBSC), 7%
The BIPM Key Comparison Database (KCDB) is a public website containing all results of the principal mechanisms of the CIPM MRA – measurement comparisons and CMC declarations.

The “Quality Behind the Product” JCTLM Database: www.bipm.org/jctlm/

JCTLM database: Laboratory medicine and in vitro diagnostics

- Search Form
- General information
- List of reference materials no longer listed
- Leaflet
- Contact us

- Analyte keyword search for reference materials, measurement methods/procedures and services
  - Type an analyte name in part or full, e.g. cholesterol
  - Refine search by analyte category
  - Refine search by matrix category

Please select your requirement:
- Higher-order reference materials
- Reference measurement methods/procedures
- Reference measurement services

Reset  Search
Summary

• The JCTLM Database provides the products for traceability needed by these IVD Companies and laboratories

• The Key Comparison Database provides “the quality behind the product”