Harmonization through EQA data aggregation

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Learning objectives

- How does EQA support harmonization
- Why commutability matters
- How can we aggregate EQA data

Clinical decisions need equivalent results from different measurement procedures

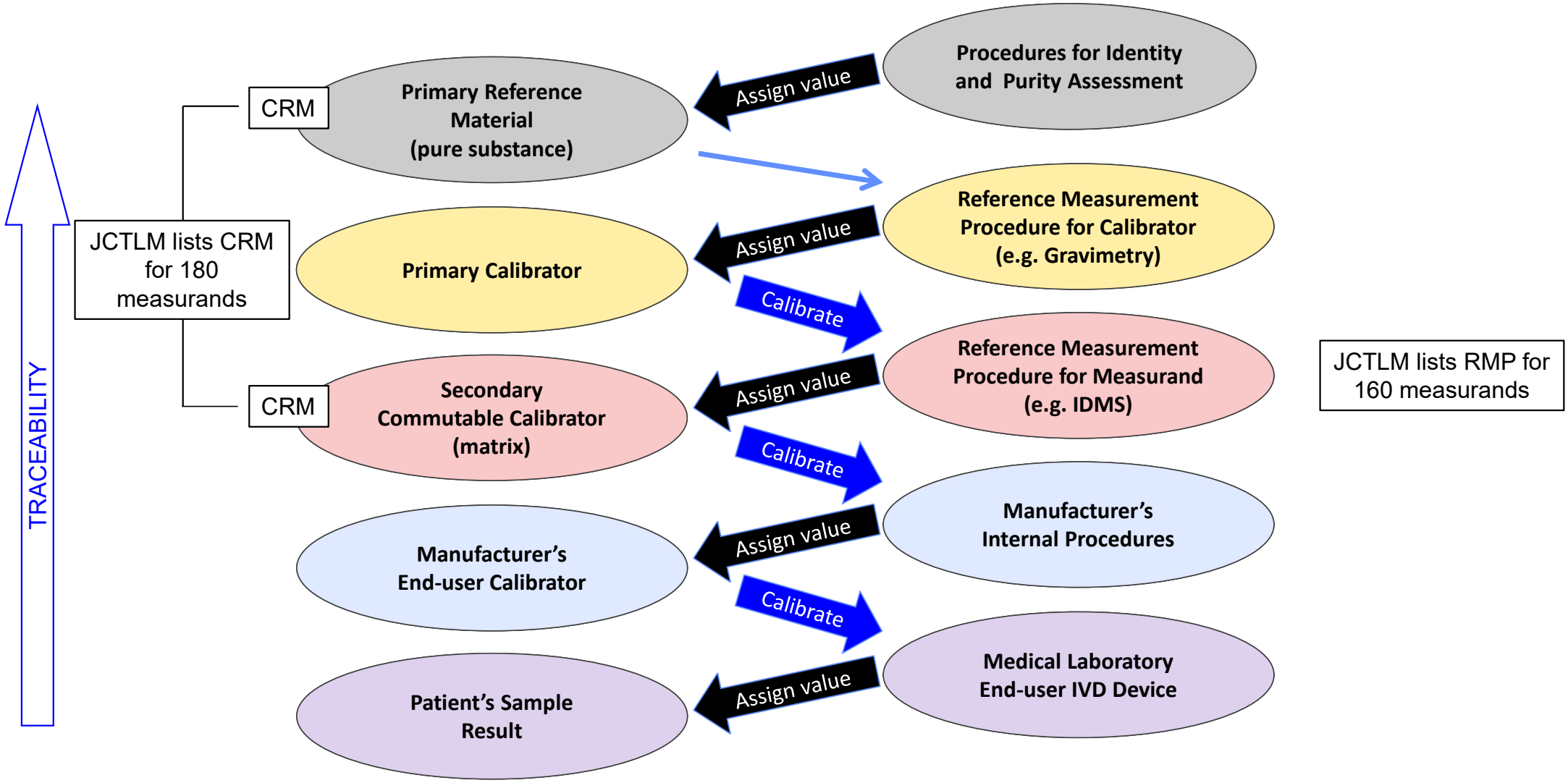
- Equivalent does not mean identical
- Equivalent means within an uncertainty consistent with an acceptable risk of harm from decisions based on a lab test result

How to achieve equivalent results

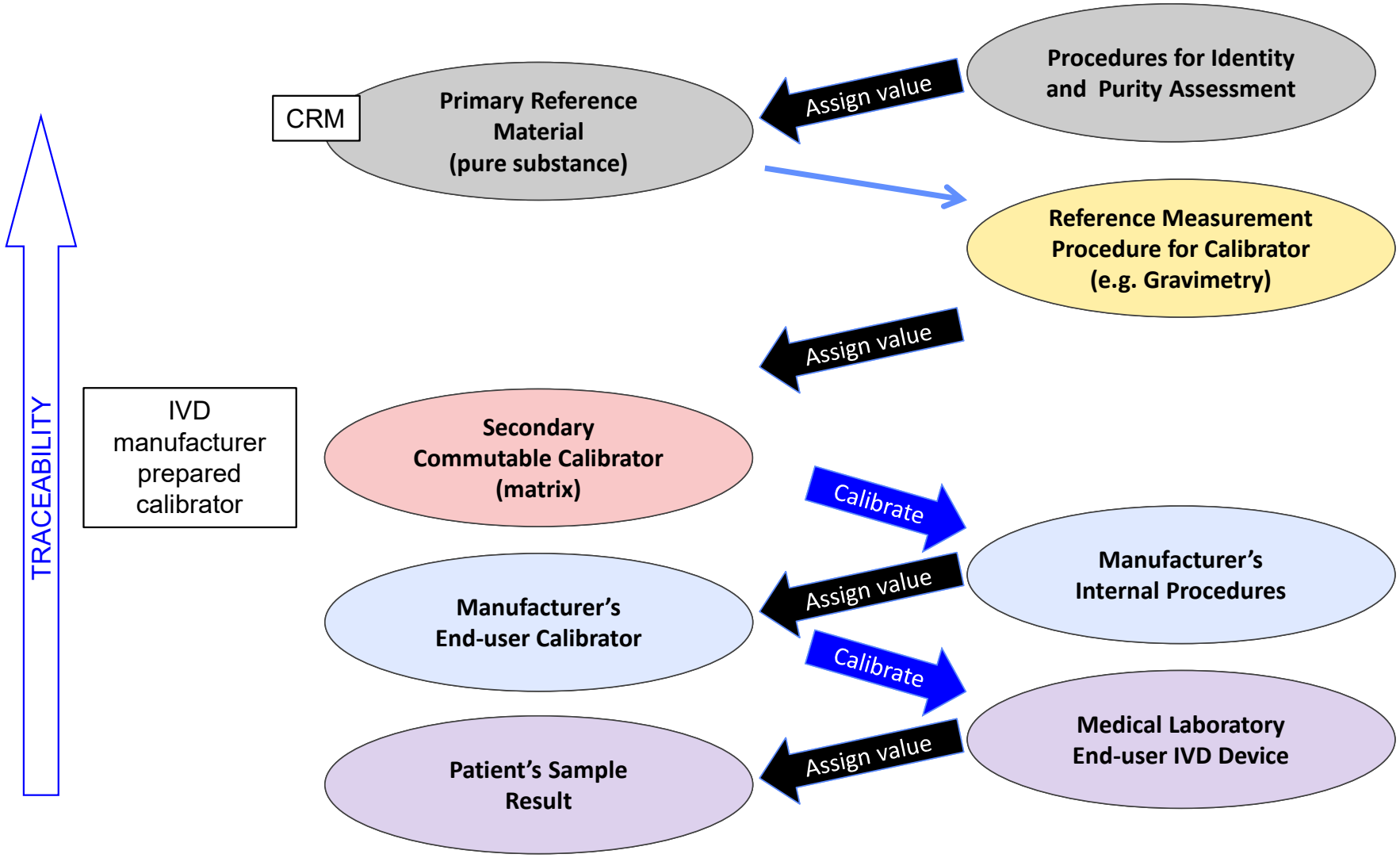
1. **Calibration of all measuring systems is traceable to a common fit-for-purpose reference system**

2. **All measuring systems measure the same measurand**
   - **Acceptable influence by interfering substances, or molecular forms**

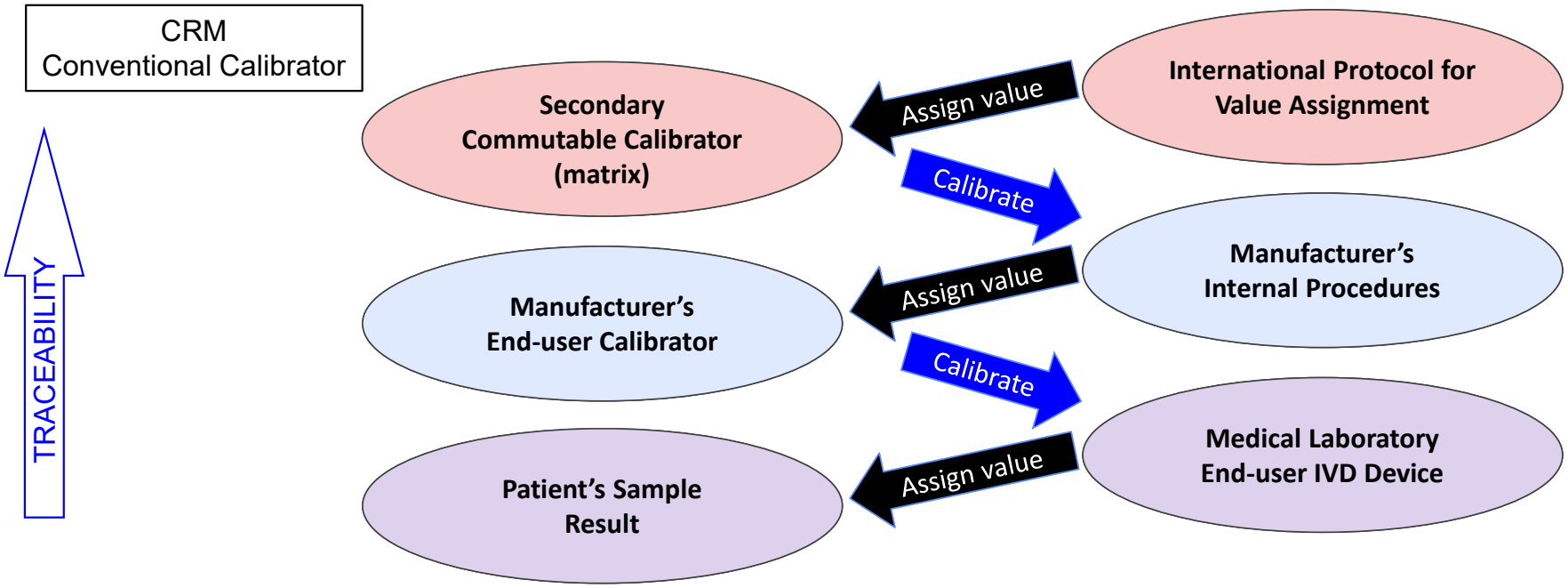
ISO 17511:2020 Metrological Traceability



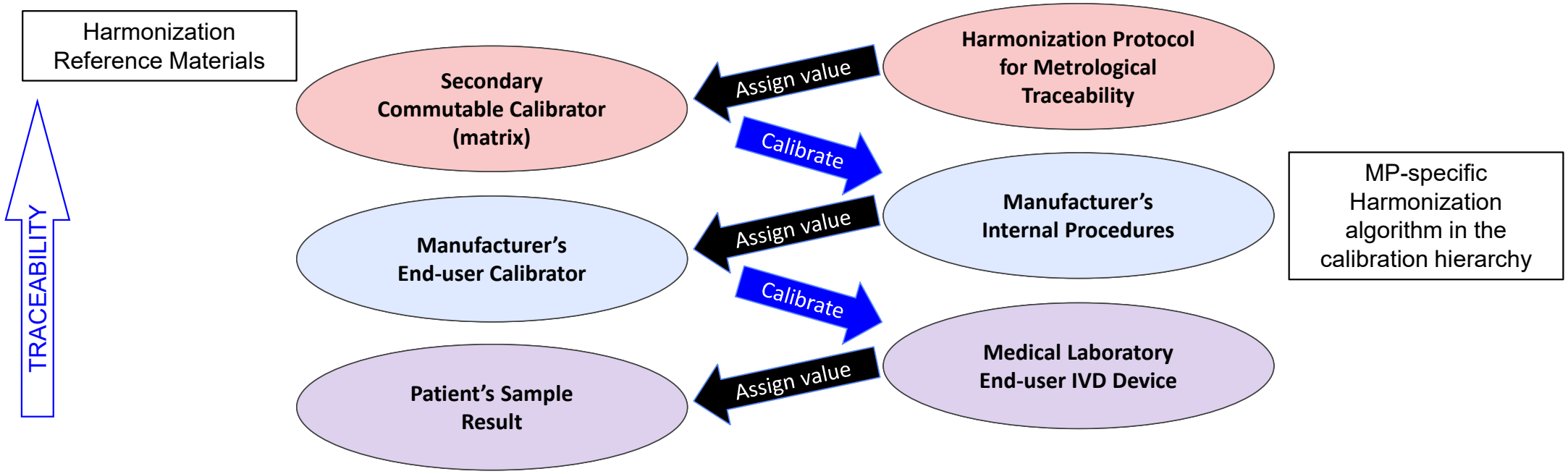
ISO 17511:2020 Metrological Traceability



ISO 17511:2020 Metrological Traceability

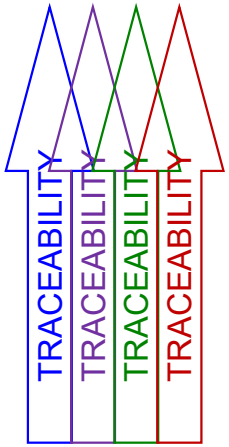


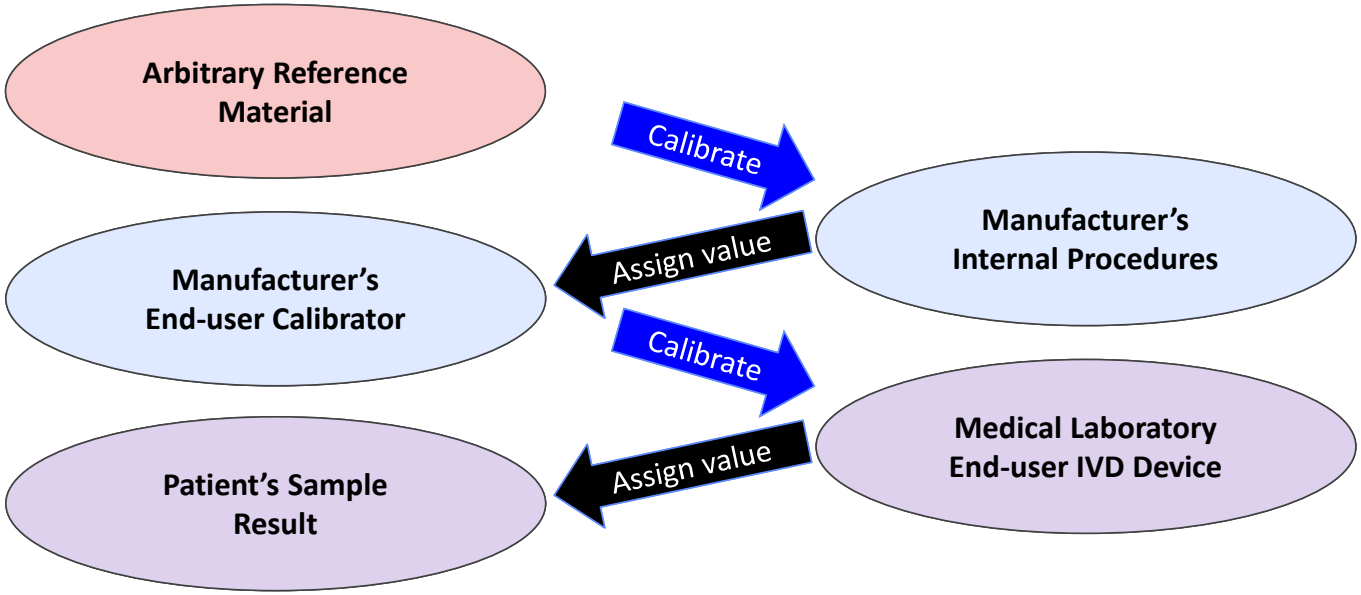
ISO 17511:2020 Metrological Traceability
ISO 21151:2020 Harmonization Protocol for Metrological Traceability



ISO 17511:2020 Metrological Traceability

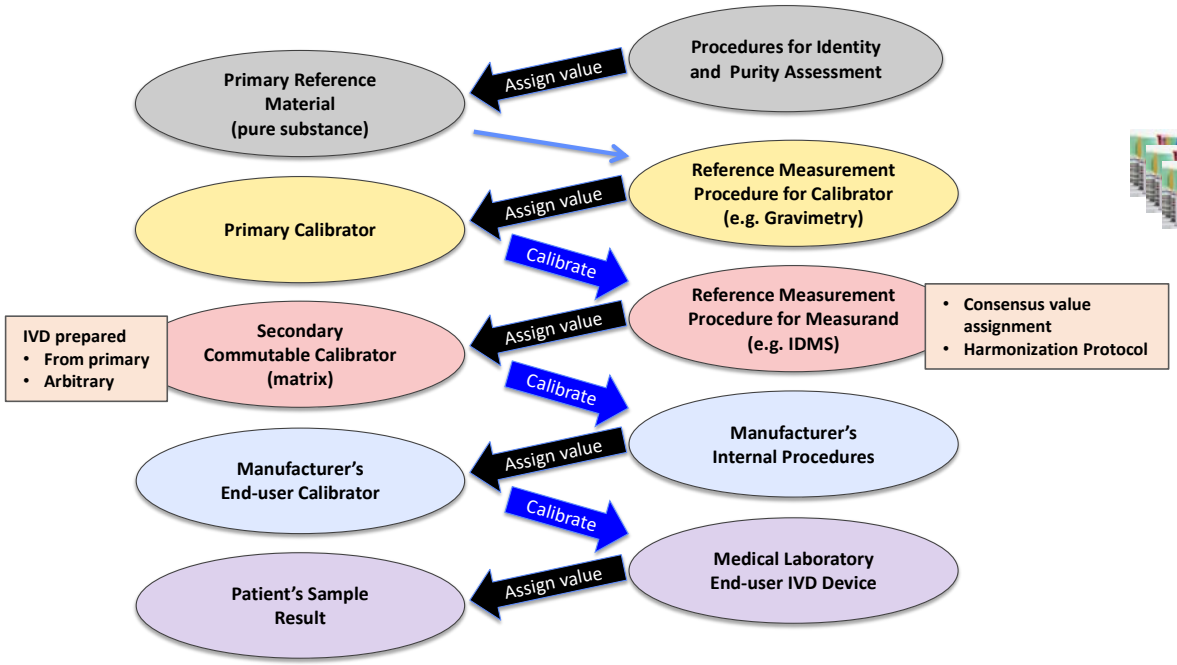
Each is unique
? Harmonization ?





STANDARDIZATION / HARMONIZATION
METROLOGICAL TRACEABILITY

ASSESSMENT
EQA

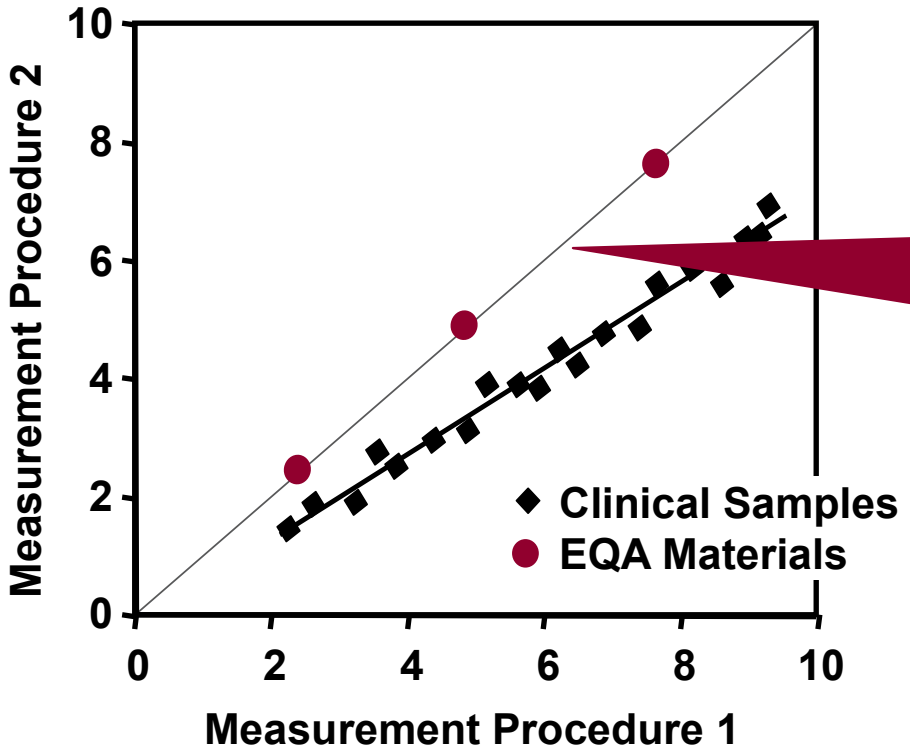


EQA Scheme Design

Sample Characteristics	Value Assign by RMP or CRM	Accuracy of Lab vs. RS	Accuracy of Lab vs. All	Accuracy of Lab vs. Peer Grp	Harmonization of Measurement Procedures vs. RS	Harmonization of Measurement Procedures vs. All
Commutable	X	X	X	X	X	X
Commutable		◌	X	X	◌	X
Non-Commutable				X		

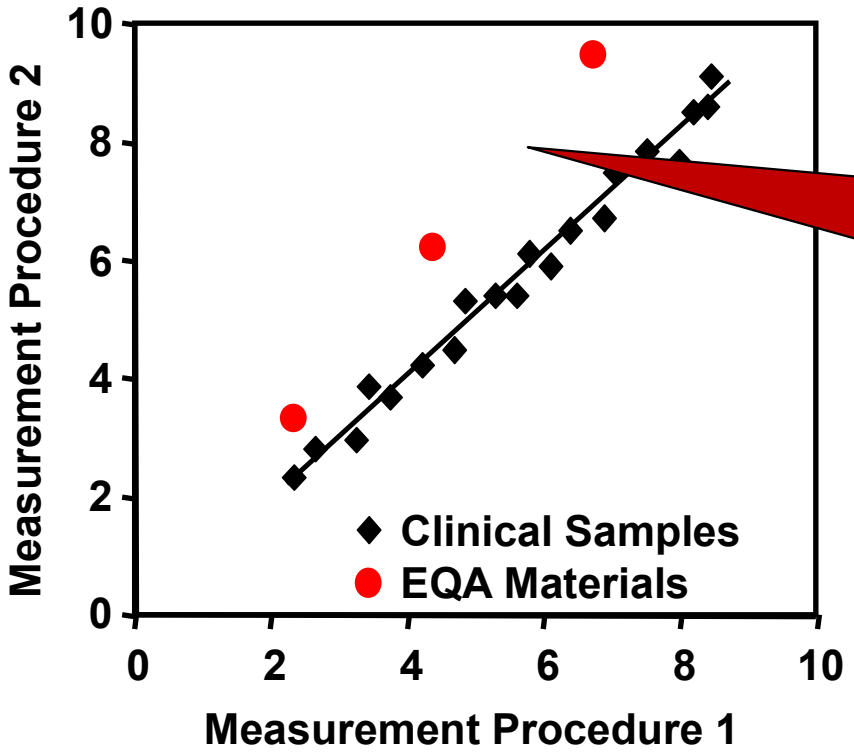
Adapted from Miller, Jones, Horowitz, Weykamp. Clin Chem 2011;57:1670-80

Non-Commutable EQA



Apparent agreement means patient results DO NOT AGREE

Non-Commutable EQA



Disagreement does NOT mean patient results are different

Slide from a presentation at EQALM, Zagreb, 2018

Need EQA feedback to the IVD industry

We need a mechanism for EQA providers to cooperate to:

1. **Cover measurands on an annual or biennial cycle**

2. **Prepare aggregated data summaries among schemes**

An organizing role for EQALM?

Should EQALM become GQALM?

ICHCLR and EQALM conducted a pilot feasibility study

DE GRUYTER

Clin Chem Lab Med 2021; 59(1): 117–125

Eline A. E. van der Hagen, Cas Weykamp, Sverre Sandberg, Anne V. Stavelin, Finlay MacKenzie and W. Greg Miller*

Feasibility for aggregation of commutable external quality assessment results to evaluate metrological traceability and agreement among results

Sandberg and van der Hagen presented findings at EQALM, Ljublijana 2019

- **Creatinine as example measurand**
- **Four EQA providers: CAP, NEQAS(UK), NOKLUS, SKML**
- **Commutable EQA materials**

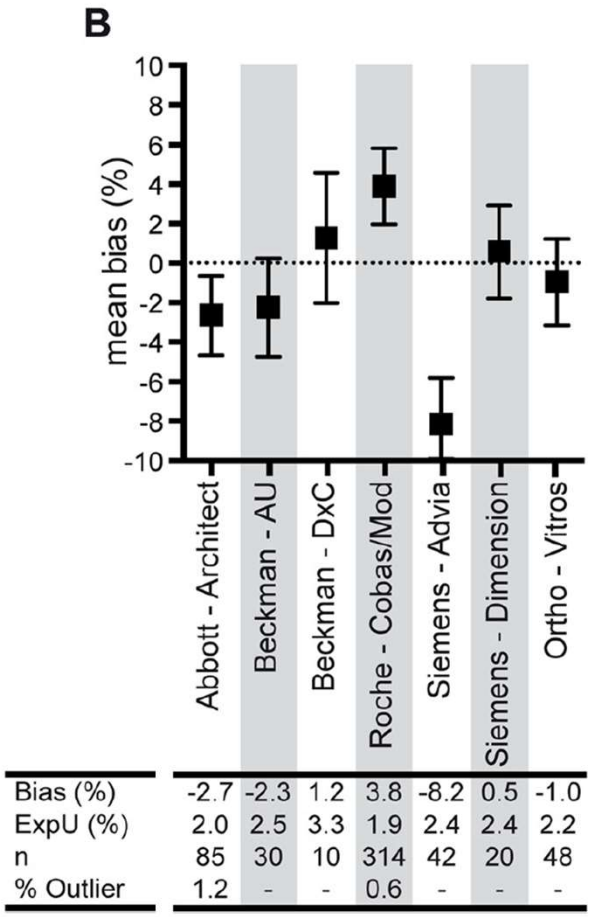
Challenge: how to determine an EQA material is commutable

Common practice is to assume commutability based on how samples are prepared

- **Collected and processed the "same way" as patient samples**
  - ✓ **Freeze thaw influences**
  - ✓ **Pooling influences**
  - ✓ **Supplementation and preservative influences**
- **Not scientifically defensible without evidence**

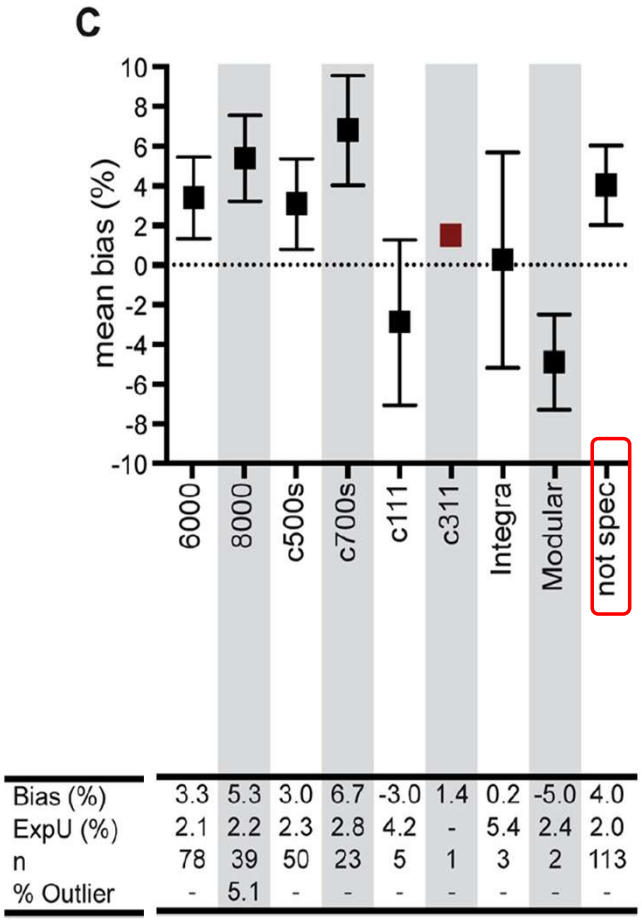
An approach is in development by the IFCC WG-CMT

Aggregated data by instrument, enzymatic methods



Bias (%)	-2.7	-2.3	1.2	3.8	-8.2	0.5	-1.0
ExpU (%)	2.0	2.5	3.3	1.9	2.4	2.4	2.2
n	85	30	10	314	42	20	48
% Outlier	1.2	-	-	0.6	-	-	-

Heterogeneity within a single manufacturer



Bias (%)	3.3	5.3	3.0	6.7	-3.0	1.4	0.2	-5.0	4.0
ExpU (%)	2.1	2.2	2.3	2.8	4.2	-	5.4	2.4	2.0
n	78	39	50	23	5	1	3	2	113
% Outlier	-	5.1	-	-	-	-	-	-	-

Van der Hagen, et al. CCLM 2021; 59:117-25

Challenge: information about the measuring systems

Table 3: Participant information needed for aggregation of results from different EQA providers.

Information	Minimum requirement	Desirable information	Example
Instrument manufacturer	X		Abbott
Instrument name	X		Architect
Instrument measuring system designation	X		C8000
Method type (reagent type)	X		Enzymatic
Reagent manufacturer		X	Abbott
Reagent lot number		X	R49872
Calibrator manufacturer		X	Abbott
Calibrator lot number		X	C43256
Calibration traceability (when applicable)		X	IDMS listed by JCTLM

Van der Hagen, et al. CCLM 2021; 59:117-25

Collaboration between EQALM and ICHCLR

Harmonization of Measurands in Laboratory Medicine through Data Aggregation

The HALMA initiative

http://www.eqalm.org/site/halma/halma.php

International Consortium
for Harmonization of Clinical Laboratory Results

EQALM
European Organisation For External Quality Assurance Providers in Laboratory Medicine

HALMA:

The primary purpose is to assess harmonization of the IVD industry through aggregated EQA data for different measurands on an international basis.

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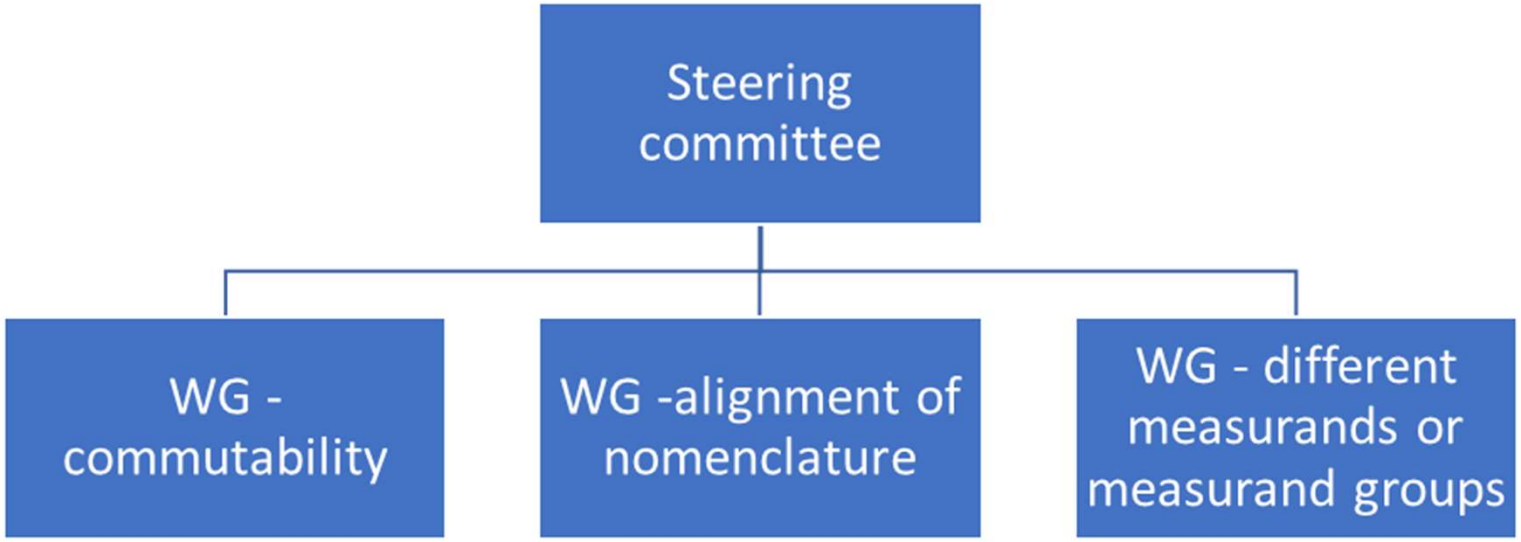

HALMA Steering Committee

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WG - Alignment of Nomenclature

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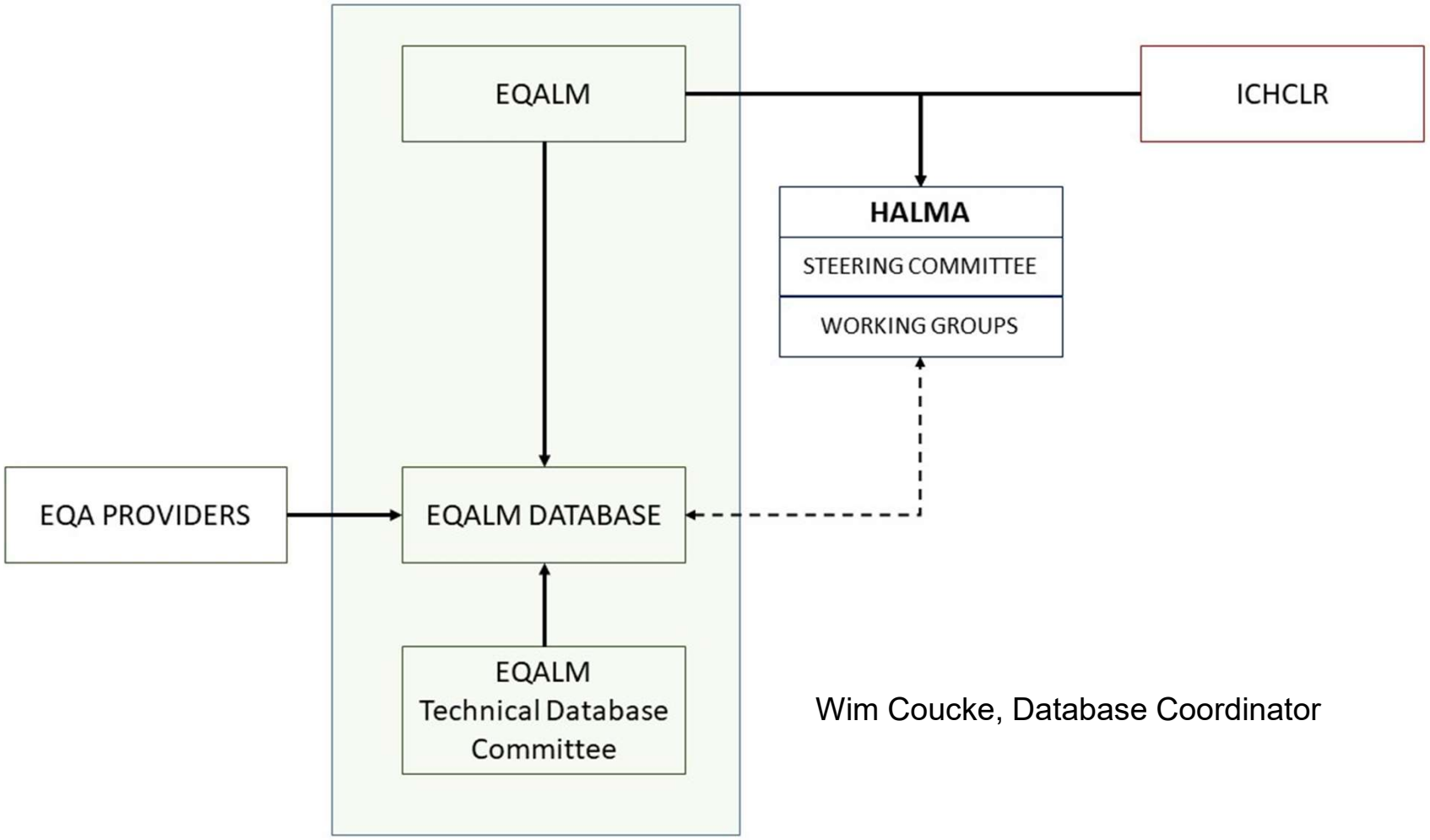
Tony Badrick, Australia (RCPAQAP)
Eline van der Hagen, The Netherlands (SKML)
Gunnar Nordin, Sweden (EQUALIS)
Annette Thomas, UK (WEQAS)

WGs for Measurands

1. Creatinine, Dave Ducroq, UK (chair)
2. TSH and free T4
3. ALT and AST
4. HDL-cholesterol



Wim Coucke, Database Coordinator

Conclusions

- **Harmonization/standardization of results is important to reduce medical errors**
- **EQA with commutable samples has an essential role in the process**
- **EQA data aggregated from different schemes informs IVD manufacturers, clinical laboratories, and regulatory bodies**
- **Global cooperation is needed to support harmonization**