# IFCC Scientific Division
# Report to Council, Istanbul, June 2014

Ian S.Young

Queen's University Belfast

Chair, IFCC-SD

| Name | Position | Country | Term | Time in Office |
|---|---|---|---|---|
| I. Young | Chair | UK | 2nd | 2014 01 - 2016 12 |
| P. Gillery | Vice-Chair | FR | 2nd | 2014 01 - 2016 12 |
| G. Myers | Secretary | US | 2nd | 2012 01 - 2014 12 |
| N. Hamasaki | Member | JP | 2nd | 2012 01 - 2014 12 |
| G. Merlini | Member | IT | 2nd | 2014 01 - 2016 12 |
| C.Cobbaert | Member | NE | 1st | 2012 01 - 2014 12 |
| J. Passarelli | Corporate Rep | US | 2nd | 2013 01 – 2015 12 |
| H. Schimmel | IRMM Consultant | BE | | |
| D. Bunk | NIST Consultant | US | | |
| M.Muller | Chair JCTLM | AT | | |

# IFCC SD

- Mission and objectives
- How SD is structured and how it works
- Achievements and work programme
- Future work programme

# IFCC SD

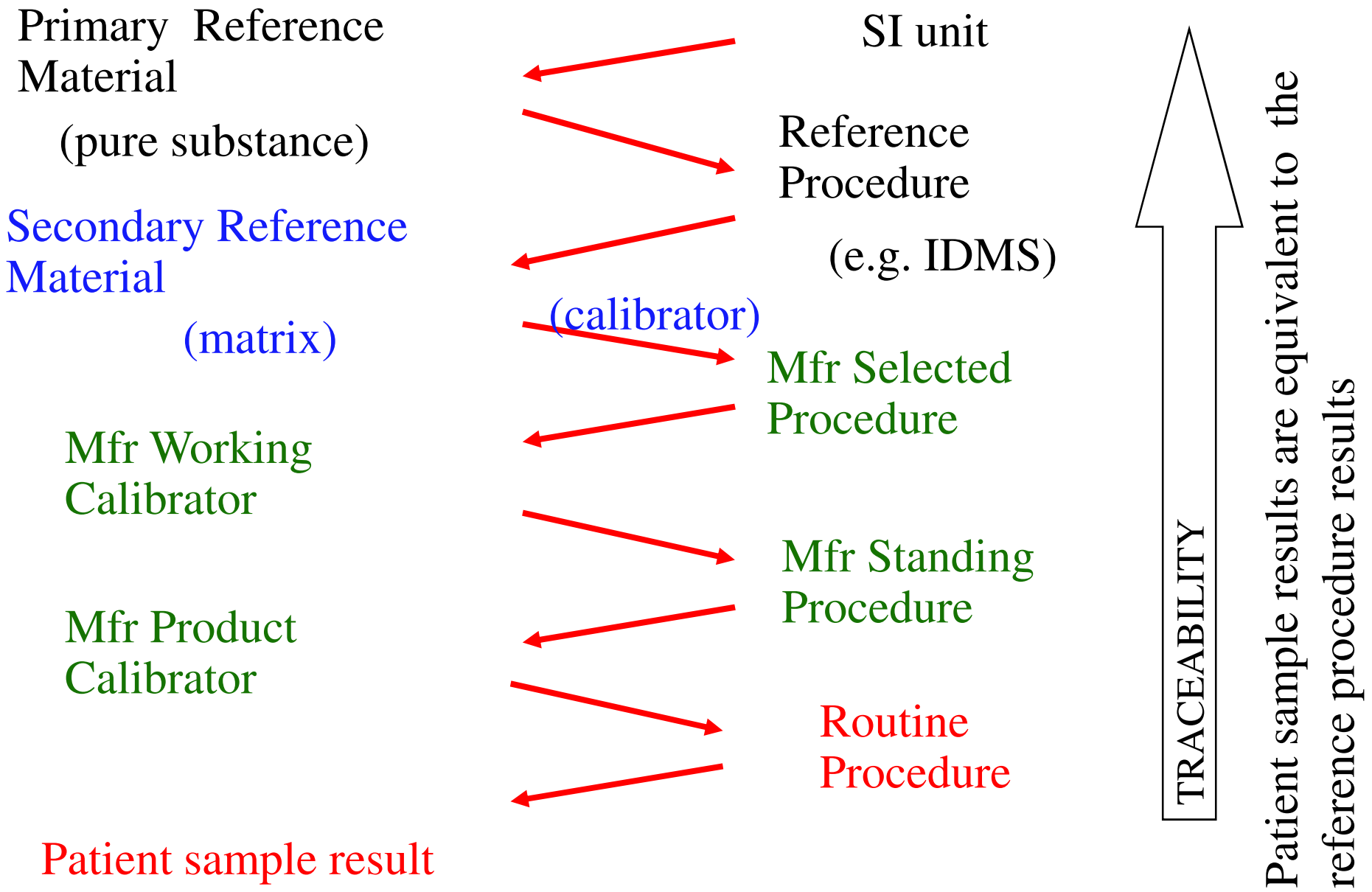
- Mission and objectives

# IFCC SD

**Mission: to** advance the science of Clinical Chemistry and to apply it to the practice of Clinical Laboratory Medicine

- By identifying technical innovations and diagnostic strategies and assisting the transfer of these to the profession
- By promoting the standardization of laboratory tests and the comparability of patient results through the development of reference measurement systems, or harmonization activities where this is not currently possible
- By establishing standards for scientific and technical aspects of good laboratory practice

# Traceability (based on ISO 17511)



# IFCC-SD – Working in Partnership

- IFCC Divisions
- Corporate members
- Metrology institutions
- Governmental bodies and non-Governmental organisations
- Other professional bodies
- Clinicians and clinical organisations

# IFCC SD

- Mission and objectives
- How SD is structured and how it works

# Scientific Division

| Committees | Working Groups |
| --- | --- |
| Theme orientated | Task orientated |
| Appointed Chair plus four/five elected members | Appointed Chair plus unlimited members |
| Corresponding members | |

# IFCC SD

- Mission and objectives
- How SD is structured and how it works
- Achievements and work programme

# IFCC SD – some key achievements

- More than 150 scientists and clinicians from all IFCC regions involved as members of Cs / WGs
- SD symposia at most major international congresses
- Bergmeyer conferences on Vitamin D and Women's Health
- Key publications

# SD-Committees

| | | |
|---|---|---|
| 8.2.6. | Nomenclature, Properties and Units (C-NPU) in collaboration with International Union of Pure and Applied Chemistry (IUPAC) | R.Flatman (AUS) |
| 8.2.11. | Molecular Diagnostics (C-MD) | D.Payne (US) |
| 8.2.21. | Reference Systems of Enzymes (C-RSE) | F. Ceriotti (IT) |
| 8.2.23. | Traceability in Laboratory Medicine (C-TLM) | L.Siekman (DE) |
| 8.2.24. | Reference Intervals and Decision Limits (C-RIDL) | K. Ichihara (JP) |
| 8.2.25. | Standardization of Thyroid Function Tests (C-STFT) | L. Thienpont (BE) |

# Committee on Nomenclature, Properties and Units
## Robert Flatman (AUS)

- **Current Projects**
- Transfer and maintenance of the NPU generic database on the IFCC site
- Mapping of the IFCC-IUPAC laboratory coding system to SNOMED CT
- Development of an international vocabulary for nominal examinations in scientific communication

# Committee on Molecular Dlagnostics
## Debs Payne (US)

- **Current Projects**
- Establish an International Network of IFCC Reference Centres in Molecular Diagnostics
- Standardise formats for reporting of molecular diagnostic results

# Committee on Reference Systems of Enzymes
## Ferruccio Ceriotti (IT)

- Development of a reference measurement procedure for Pancreatic Lipase
- A recertification campaign for a primary reference material for LD, CK and ALT in cooperation with IRMM
- A certification campaign for a primary reference material for ALP in cooperation with IRMM

# Committee on Traceability in Laboratory Medicine

## Lothar Siekmann (DE)

- To support activities regarding Traceability in Laboratory Medicine
- To support reference laboratories in the context of complete reference systems by establishing an External Quality Assessment Scheme (EQAS) for reference laboratories in order to monitor their competence
- To promote establishment and maintenance of IFCC reference laboratory networks for clinically relevant measurands

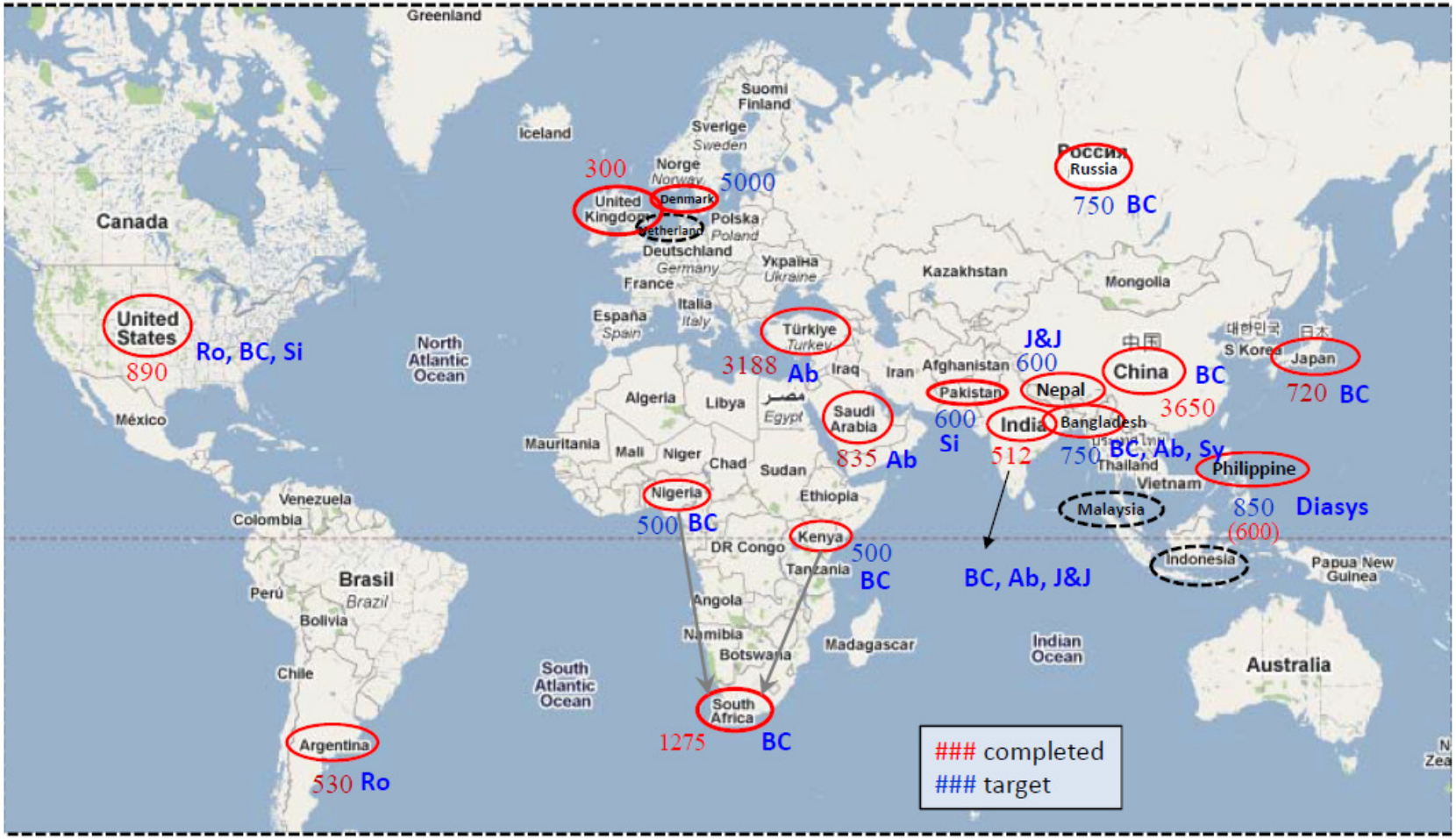
# Reference Intervals and Decision Limits

## Kiyoshi Ichihara (JP)

- To make available reference intervals and decision limits that respect the requirements of international directives
- To determine priority list of measurands (analytes) for which reference intervals and/or decision limits have to be developed, considering various factors, such as age, gender, ethnicity, and for which the greatest improvements in medical decision making are anticipated
- To establish transferabilty protocols for reference intervals and decision limits
- To collaborate with other organizations and/or to undertake establishment of reference intervals or decision limits for measurands (analytes) identified as a priority

# The 18 countries collaborating in the global study

Rev: 2014/6/7




BC: Beckman Coulter; Ab: Abbott; Ro: Roche; Si: Siemens;
Sy: Sysmex; J&J: Jonson and Johnson; Diasys;

IFCC International Federation of Clinical Chemistry and Laboratory Medicine

# Reference Intervals and Decision Limits
## Kiyoshi Ichihara (JP)

- Ichihara K, Ozarda Y, Klee G, Straseski J, Baumann N, Ishikura K; Committee on Reference Intervals and Decision Limits, International Federation for Clinical Chemistry and Laboratory Medicine.
- Utility of a panel of sera for the alignment of test results in the worldwide multicenter study on reference values
- Clin Chem Lab Med. 2013 May;51(5):1007-25. doi: 10.1515/cclm-2013-0248

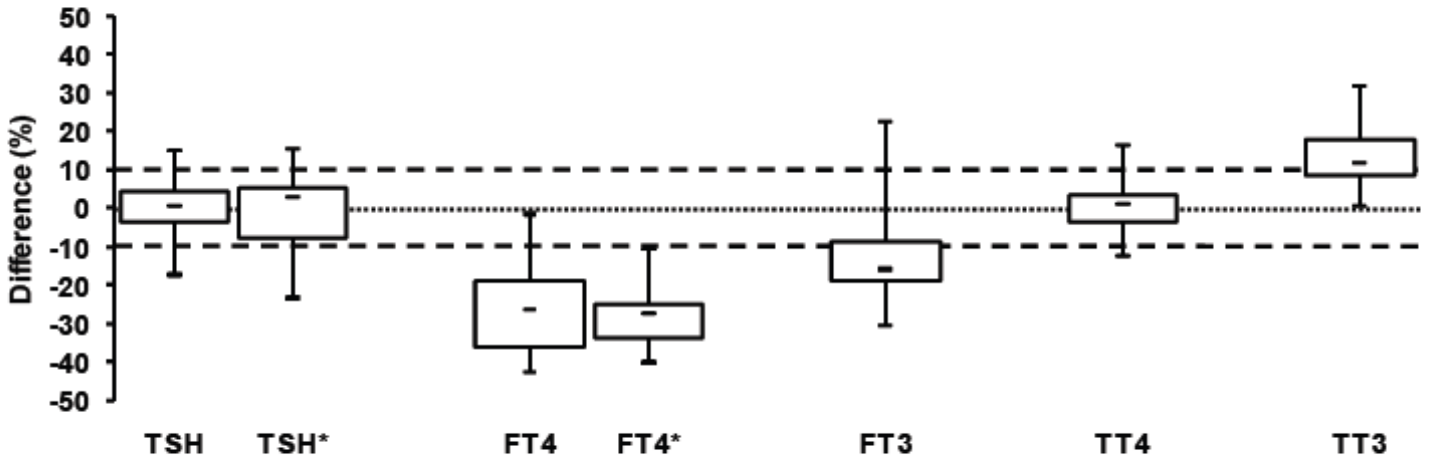
# Thyroid Function Tests
## Linda Thienpont (BE)

- Method comparison studies for FT4 and TSH measurement with clinical samples in preparation for standardization/harmonization; FT4 measurements to be assessed against the conventional reference measurement procedure, TSH against the all-procedure trimmed mean.
- Establishment of a network of FT4 reference measurement laboratories.

# Standardisation of Thyroid Function Tests
# Linda Thienpont (BE)

## Status report

### Phase II (proof-of-concept): before recalibration



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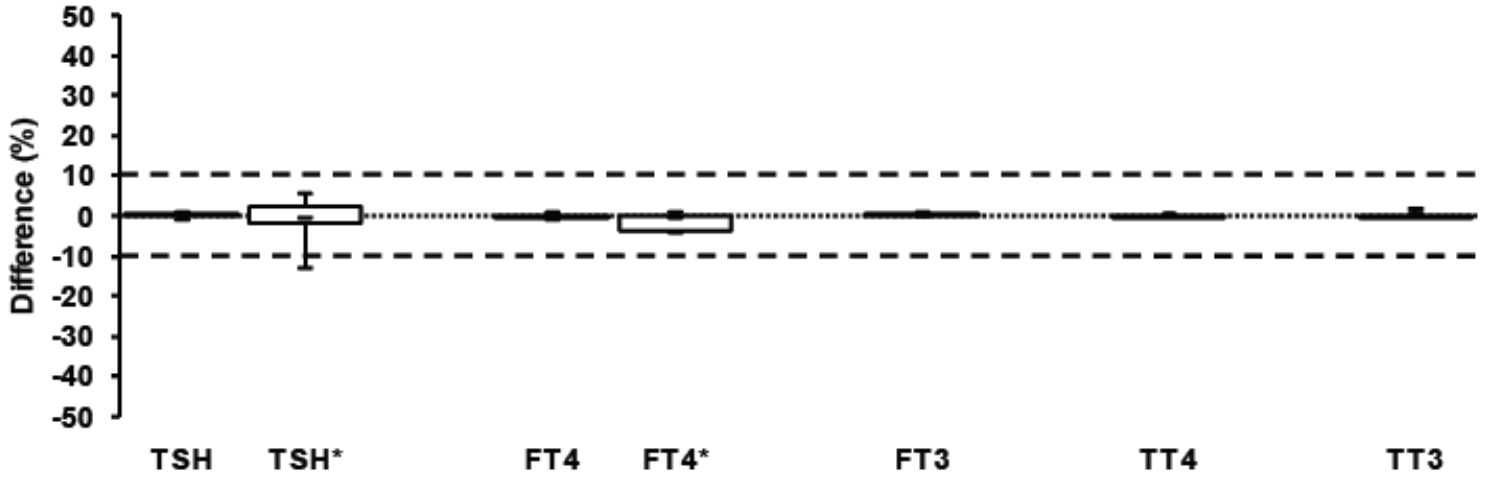


# SD Working Groups

| | | |
|---|---|---|
| 8.3.35 | Standardisation of Haemoglobin A2 (WG-HbA2) | R. Paleari (IT) |
| 8.3.36 | Standardisation of Carbohydrate-Deficient Transferrin (WG-CDT) | F.Schellenberg (FR) |
| 8.3.39 | Standardisation of Albumin Assay in Urine (WG-SAU) | G. Miller (US) |
| 8.3.40 | Standardisation of Pregnancy-Associated Plasma Protein A (WG-PAPP A) | K. Pettersson (FI) |
| 8.3.42 | Standardisation of Insulin Assays (WG-SIA) | M. Steffes (US) |
| 8.3.43 | Standardisation of Troponin I (WG-TNI) | J. Tate (AU) |
| | | |

# SD Working Groups

| | | |
|---|---|---|
| 8.3.45 | Harmonisation of Autoantibody Tests (WG-HAT) | J. Sheldon (UK) |
| 8.3.47 | Clinical Quantitative Mass Spectrometry Proteomics (WG-cMSP) | S.Lehmann (FR) |
| 8.3.48 | Serum Parathyroid Hormone (WG-sPTH) | C.Sturgeon (UK) |
| 8.3.49 | CSF Proteins (WG-CSFP) | K.Blennow (SE) |
| 8.3.50 | Standardization of Bone Marker Assays (WG-SBMA) | H.Morris (AU) |
| 8.3.51 | Commutability (WG-COMM) | G.Miller (US) |

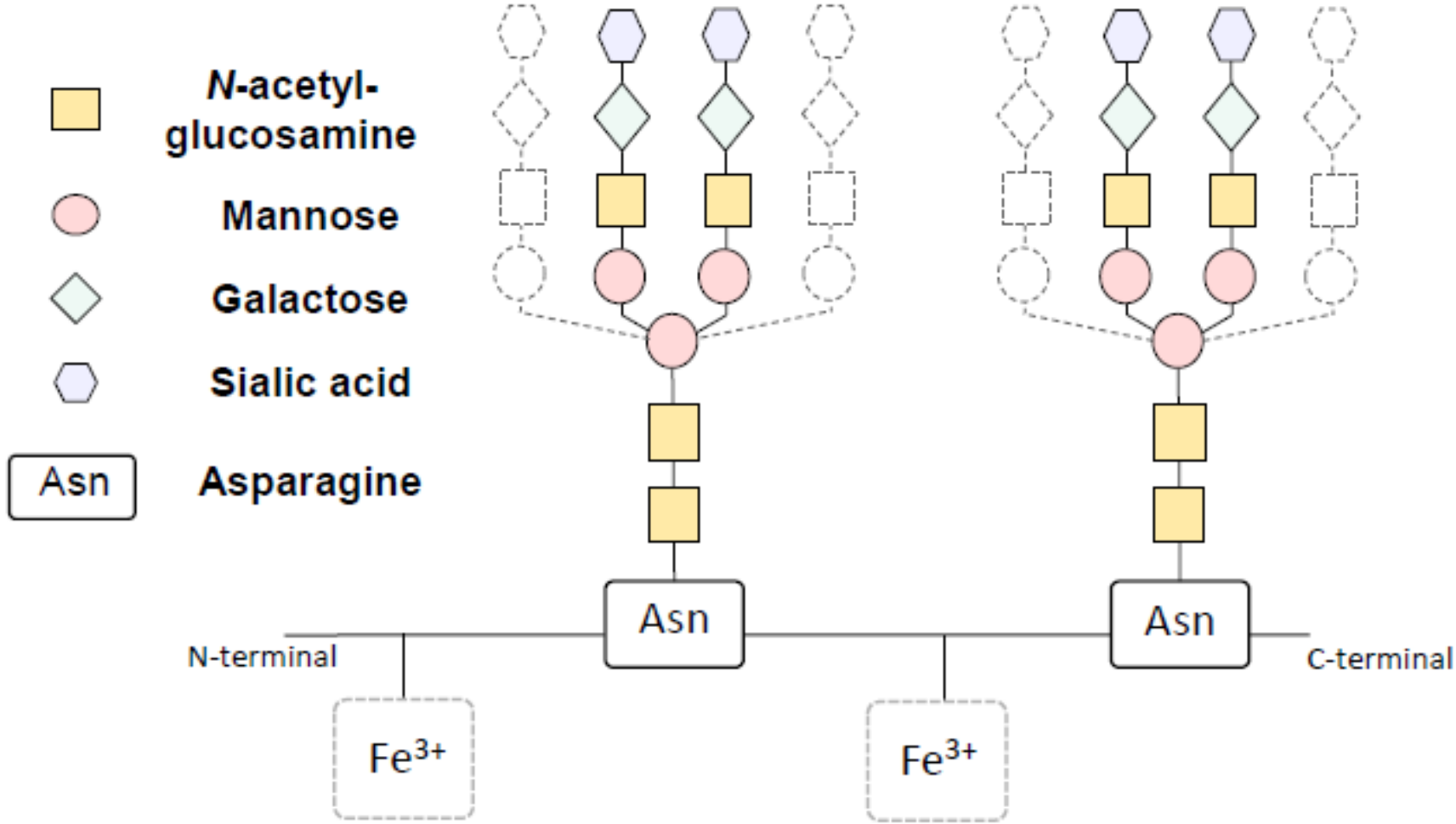
# WG – Carbohydrate Deficient Transferrin
## Francois Schellenberg (FR)

- **Terms of Reference**
- Definition of the measurand and standardisation of the nomenclature
- Preparation of reference material and selection of reference method
- Establishment of appropriate reference intervals
- Development of guidelines for clinical use of CDT assays

# Carbohydrate deficient transferrin (CDT)

- CDT is the generic term that refers to the transferrin glycoforms whose concentration in blood is temporarily increased by sustained alcohol consumption

# *Tetrasialo-Tf*

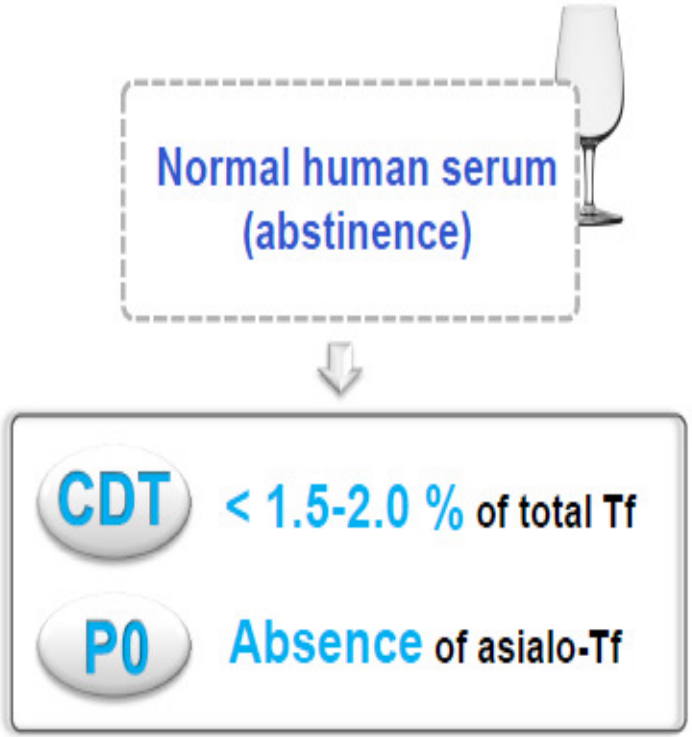


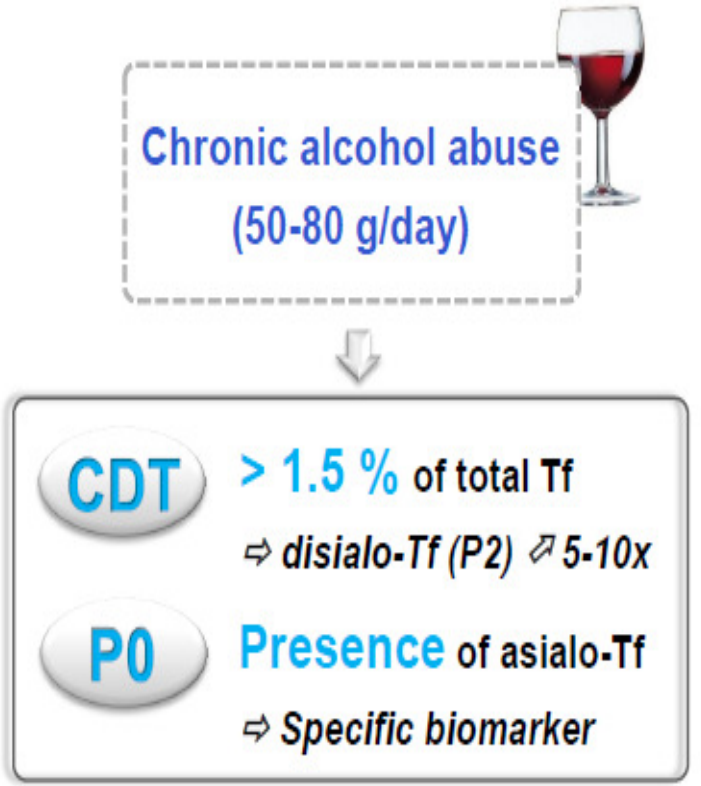
# Other glycoforms of CDT

- pentasialotransferrin (≈15%)
- trisialotransferrin (≈4%)
- disialotransferrin (≈1.5%)
- hexasialotransferrin (≈1%)

# Effect of alcohol consumption on CDT

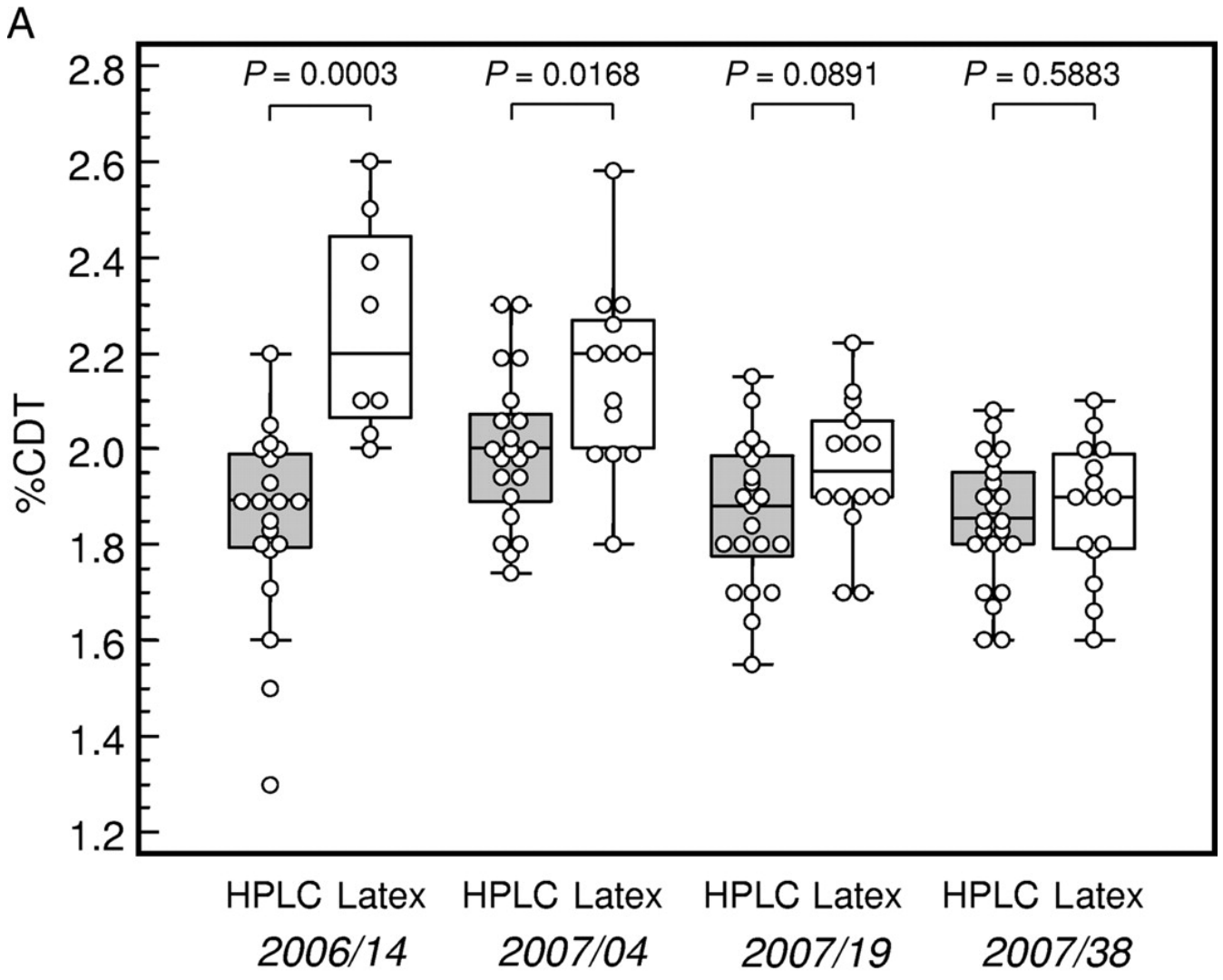
- Alcohol consumption of more than 60 g/d for more than two weeks leads to a relative increase of disialotransferrin.
- When disialotransferrin level reaches approximately twice the initial level, asialotransferrin becomes detected.




*Stibler H., Allqulander C., Borg S., Kjellin KG., Acta Med Scand 204 (1978)49*

# Need for CDT standardization



# CDT standardization

- Disialotransferrin (disialylated monoglycan transferrin) was defined as the measurand and the target analyte for standardization
- HPLC with photometric detection was proposed as the candidate reference method
- A network of reference laboratories running this method was formed that demonstrated good within- and between-laboratory performance

# CDT standardization

- The candidate reference HPLC method does not require primary calibrators
- The Working Group focused their efforts on the production of secondary calibrators  (Commutable and Stable)

# CDT standardization

- Native and disialotransferrin-spiked serum panels were tested as candidate secondary reference material.
- This was done by testing commutability in a group of references laboratories, in the manufacturers' laboratories and in two national external quality assurance (EQA) schemes.
- In addition, the WG tested whether a single or multiple point calibration is needed for calibration of the present commercial methods.

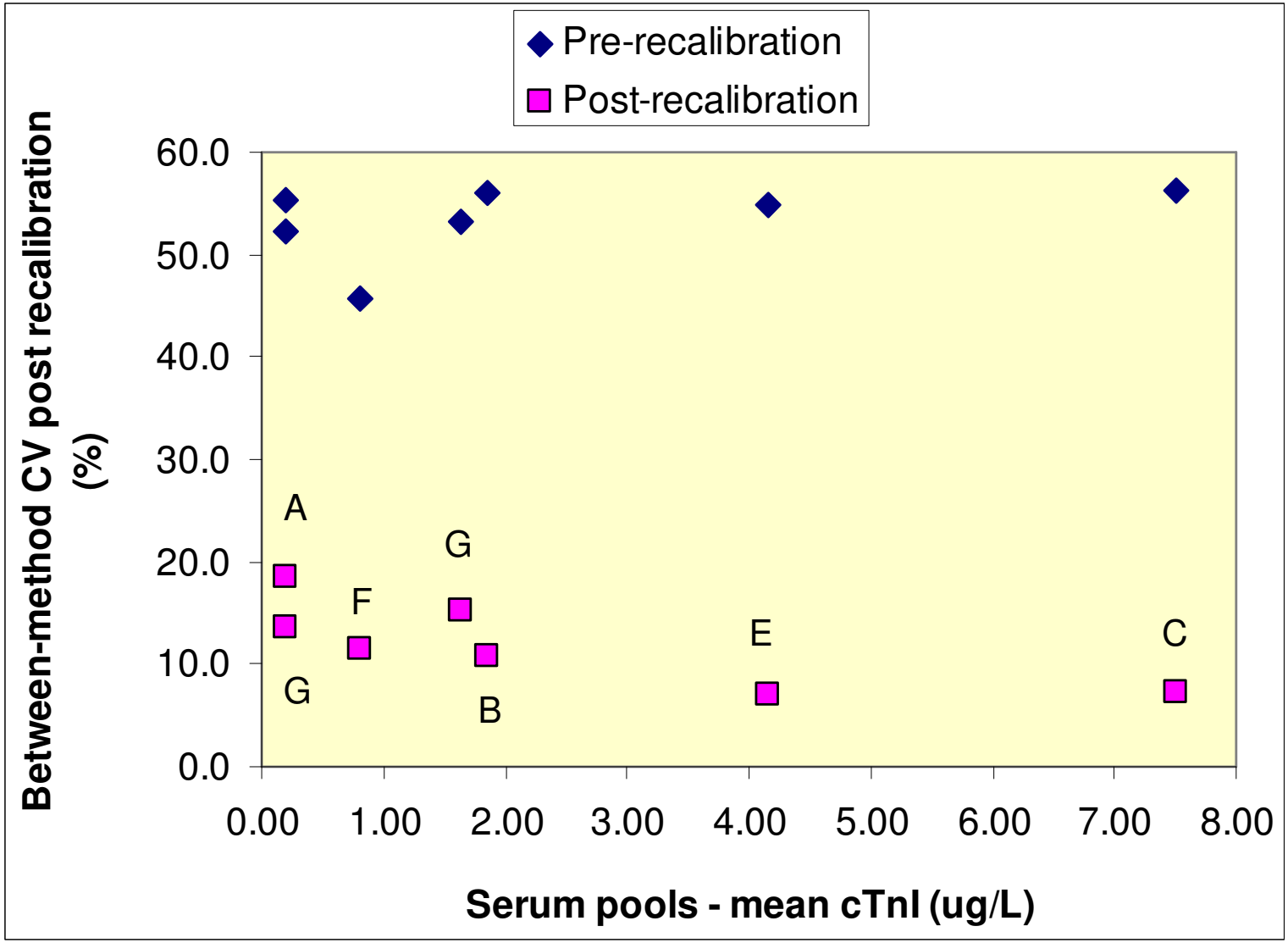
| | Harmonization potential | | | | | |
|---|---|---|---|---|---|---|
| | Patient panel P1 and P3 | | | | Spiked panel S3 | |
| Method | P1 before | P1 after | P3 before | P3 after | S3 before | S3 after |
| Bio-Rad | 1.12 | 1.23 | 3.69 | 3.99 | 4.22 | 4.58 |
| Siemens N Latex | 1.85 | 1.34 | 4.09 | 3.80 | 3.87 | 3.60 |
| Sebia | 0.66 | 1.31 | 3.46 | 3.70 | 3.42 | 3.66 |
| Candidate reference | 1.16 | 1.16 | 3.83 | 3.83 | 4.27 | 4.27 |
| | | | | | | |
| Mean | **1.20** | **1.26** | **3.77** | **3.83** | **3.94** | **4.03** |
| Intermethod CV | **40%** | **4%** | **7%** | **3%** | **10%** | **12%** |

Table 2: Calibration potential of candidate reference materials applied to mean results obtained in EQA laboratories with three different samples.

# Standardisation of Troponin I
# Jill Tate (AUS)

- **Terms of Reference**
- Development of a candidate secondary reference measurement procedure and candidate secondary reference material for cardiac troponin I (cTnI)
- Testing for cTnI standardization and clinical validation by comparison with validated commercial assays in a round robin study
- **Current Projects**
- Preparation of a secondary reference material for cTnI consisting of three cTnIpositive serum pools (Phase 2)
- Validation of cTnI standardization through a round robin after a value transfer using the secondary reference material as common calibrator (Phase 3)

# cTnI serum pools pre and post recalibration



# Development of New Projects

SD horizon scannning

Third party approach

Assessment of need
Development and submission of formal proposal
Agreement on terms of reference

↓

Approval by SD and EB
Establishment of WG or C

↓

Work cycle with ongoing review

# Becoming involved in the work of SD

- Apply for positions on SD or C's
- Become a corresponding member of a C
- Become a member of a WG
- Propose a new WG or C

**On behalf of SD**

Thank you!

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