Trazabilidad en el laboratorio clínico:
lo que cada profesional de laboratorio clínico debería saber

JCTLM
Accurate results for patient care

Silvia Quiroga

Departamento de Análisis Clínicos ProgBA

CEMIC – Hospital Universitario Sede Saavedra

LABORATORIO DE RUTINA/CAMPO: ANÁLISIS CLÍNICOS

- ***NO*** **SON LABORATORIOS DE REFERENCIA**
- ***NO*** **UTILIZAN MÉTODOS DE REFERENCIA**
- ***NO*** **DISPONEN DE PREPARACIONES DE REFERENCIA**
- **PRESENTAN LA *MAYOR INCERTIDUMBRE* EN LA ESCALA JERÁRQUICA DE TRAZABILIDAD**
- ***NO*** **PUEDEN GARANTIZAR LA TRAZABILIDAD**
- **PERO SU *INCERTIDUMBRE DE MEDICIÓN* DEBE SER MENOR A LA VARIABILIDAD BIOLÓGICA DEL ANALITO**

LABORATORIO DE ANÁLISIS CLÍNICOS

SIN EMBARGO .....

- **DAN LOS RESULTADOS DE SUS MEDICIONES A LOS CLIENTES / USUARIOS**

Y .....

- **A PARTIR DE SUS RESULTADOS SE TOMAN DECISIONES CRÍTICAS Y SE DEFINEN DIAGNÓSTICOS / TRATAMIENTOS**

Y ADEMÁS .....

- **DEBEN SER COSTO / EFECTIVOS**


definición de unidades SI (UI)
Calibrador primario
Calibrador secundario
Calibrador de trabajo
Calibrador del kit
Muestra de rutina
Método de referencia primario
Método de referencia secundario
Método seleccionado por el fabricante
Método de rutina del fabricante
Método de rutina del usuario
RESULTADO
LAB ANÁLISIS CLÍNICOS
incertidumbre

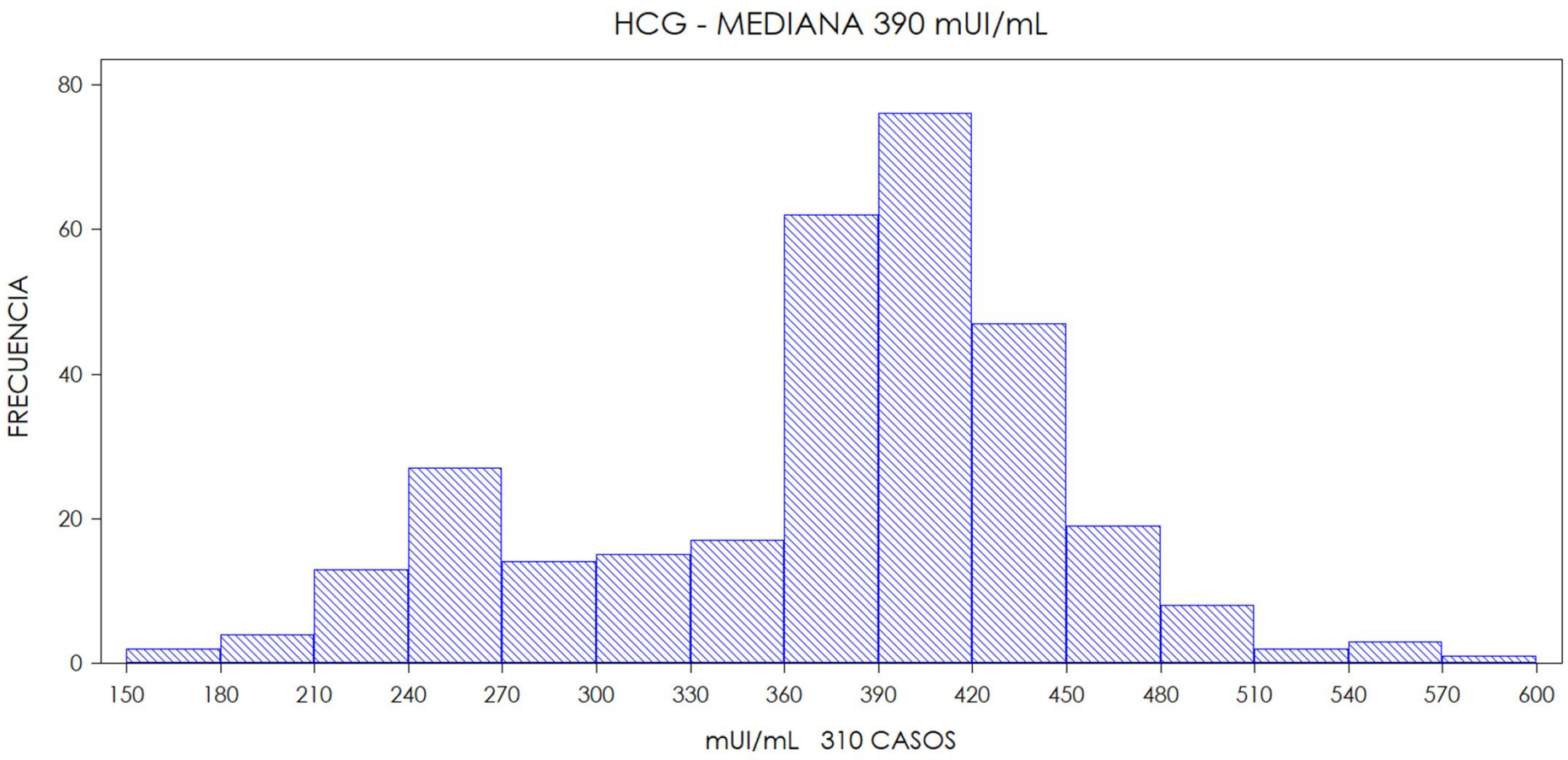
Ejemplo: DOSAJE DE HCG

- EMBARAZO NORMAL
- PÉRDIDA TEMPRANA DE EMBARAZO
- EMBARAZO ECTÓPICO
- DIAGNÓSTICO PRENATAL DE ANOMALÍAS CROMOSÓMICAS
- MOLA HIDATIDIFORME
- ENFERMEDAD TROFOBLÁSTICA PERSISTENTE
- CORIOCARCINOMA
- TUMORES NO TROFOBOBLÁSTICOS (TUMORES DE CÉLULAS GERMINALES, DE VEJIGA, ETC)
- MARCADOR TUMORAL

MEDICIÓN DE HCG

DISTINTAS

- **preparaciones de HCG como standard**
- **preparaciones comerciales usadas como calibrador secundario**
- **epitopes antigénicos asociados a los fragmentos HCG**
- **No estandarización de ensayos de HCG**



ProgBA – Ronda XXXI

4th Standard 1999 (NIBSC), coded 75/589

Medicines & Healthcare products Regulatory Agency

NIBSC
Confidence in Biological Medicines

WHO International Standard
4th IS Chorionic Gonadotropin, Human
NIBSC code: 75/589
Instructions for use
(Version 3.0, Dated 30/11/2007)

1. INTENDED USE

The 3rd International Standard for Chorionic Gonadotrophin (3rd IS; in ampoules coded 75/537) was established by the WHO Expert Committee on Biological Standardization in 1986 (WHO ECBS, 1987). The same material had earlier been established as the International Reference Preparation of Human Chorionic Gonadotrophin for Immunoassay (WHO ECBS, 1975), and its unitage assigned in 1978 (WHO ECBS, 1978) on the basis of the results of a collaborative study (Storring et al., 1980). This Standard has been widely used for the calibration of assays to control the quality and potency of chorionic gonadotrophin (CG) used in the treatment of infertility in women and sometimes in men, and for the calibration of assays used in the diagnosis of pregnancy and a range of other clinical conditions. In 1999 it became apparent that stocks of the 3rd IS were becoming exhausted and that it needed to be replaced.

A second batch of ampoules (coded 75/589; CG 75/589), containing the same bulk preparation of CG as that in the 3rd IS, had been prepared at the same time as the 3rd IS using identical procedures, and was included in the collaborative study of this Standard (Storring et al., 1980). In the collaborative study, CG 75/589 did not differ significantly from the 3rd IS in any of the biological or immunological assay systems studied, and so appeared to be suitable to replace the 3rd IS, and with the same potency of 650 International Units of CG activity per ampoule.

Further studies of the activity and stability of CG 75/589 were carried out during 1999: The CG activity of ampoules of CG 75/589 kept at +4°C, +20°C and +37°C for 23.2 years were estimated by the seminal vesicle weight gain assay (Van Hell et al., 1964) as % of that in ampoules kept at -20°C. The mean estimates of activity (with 95% confidence limits) were 130 (107-157%) from two assays of ampoules kept at +4°C, 115 (83.8-158)% from two assays of ampoules kept at +20°C and 102 (69.7-174)% from one assay of CG 75/585 kept at +37°C. The CG activity of CG 75/589 kept at -20°C estimated in terms of the 3rd IS in a seminal vesicle weight gain assay was found to be 689 iu/ampoule, with 95% confidence limits of 482-997 iu/ampoule. The degradation rates of CG 75/589 were considered using the methods of Jorne & Perry (1956) and Kirkwood (1977), taking each of

2. CAUTION

<u>This preparation is not for administration to humans or animals in the human food chain</u>

The preparation contains material of human origin, and either the final product or the source materials, from which it is derived, have been tested and found negative for HBsAg, anti-HIV and HCV RNA.
However, as with all preparations of human origin, this material cannot be assumed to be free from infectious agents. Suitable precautions should be taken in the use and disposal of the ampoule and its contents. Such safety procedures probably will include the wearing of protective gloves and avoiding the generation of aerosols. Care should be exercised in opening ampoules or vials, to avoid cuts.

3. UNITAGE

Each ampoule contains 650 INTERNATIONAL UNITS (by definition).

4. CONTENTS

Country of origin of biological material: United Kingdom.
Each ampoule contains the freeze-dried residue of 0.5 ml of a solution which contained:

Human chorionic gonadotrophin	approx	70µg
Human plasma albumin	"	5mg
sodium chloride	"	445µg
acetic acid	"	300µg

Nitrogen gas at slightly less than atmospheric pressure.

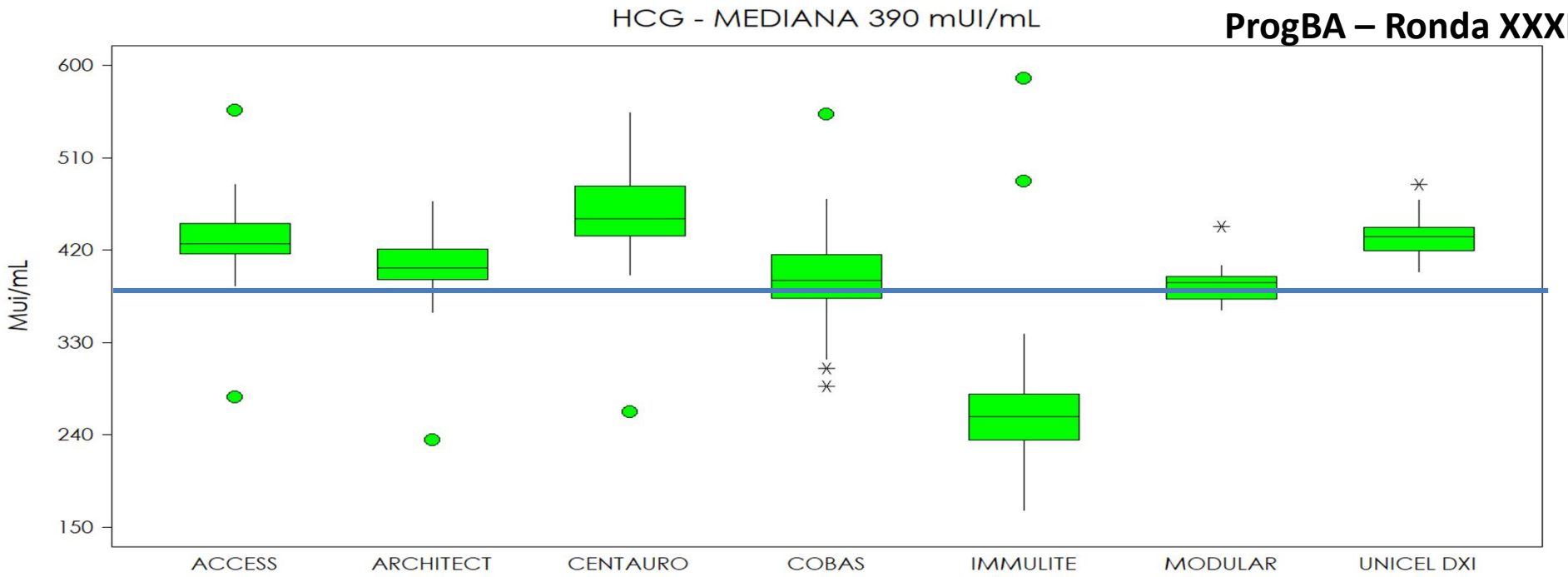
5. STORAGE

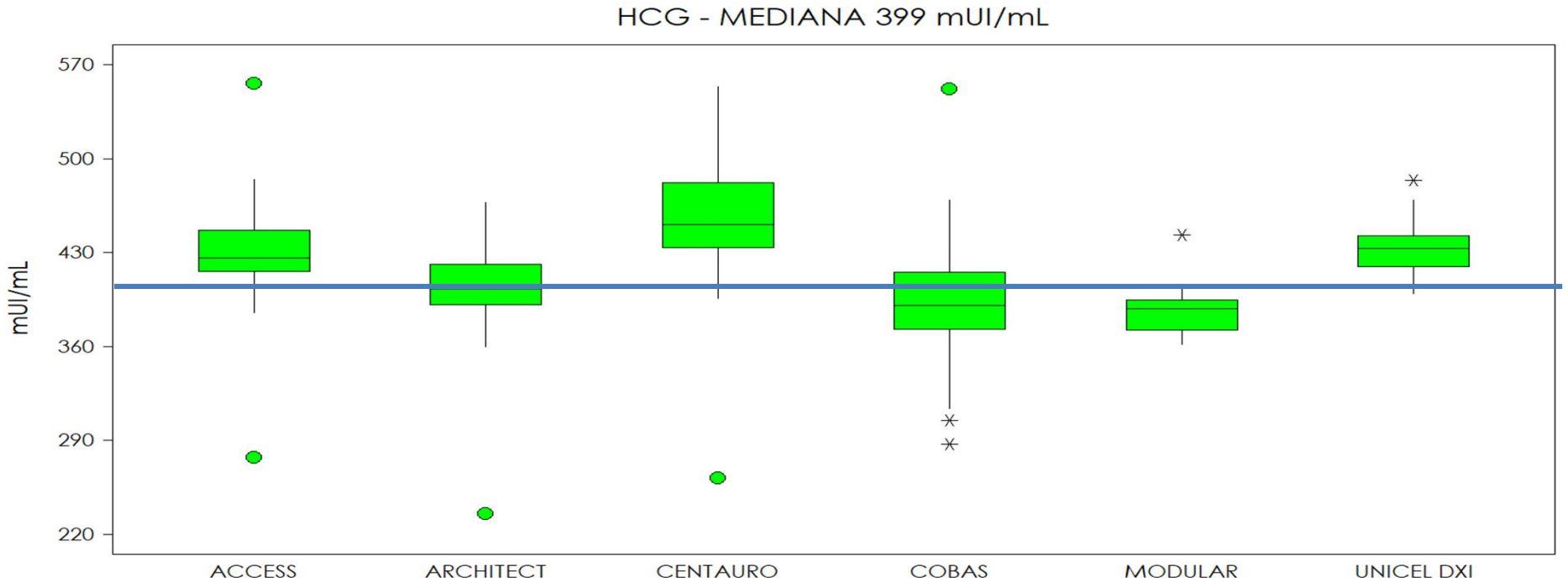
Unopened ampoules should be stored at -20°C
Please note: because of the inherent stability of lyophilized material, NIBSC may ship these materials at ambient temperature.

6. DIRECTIONS FOR OPENING

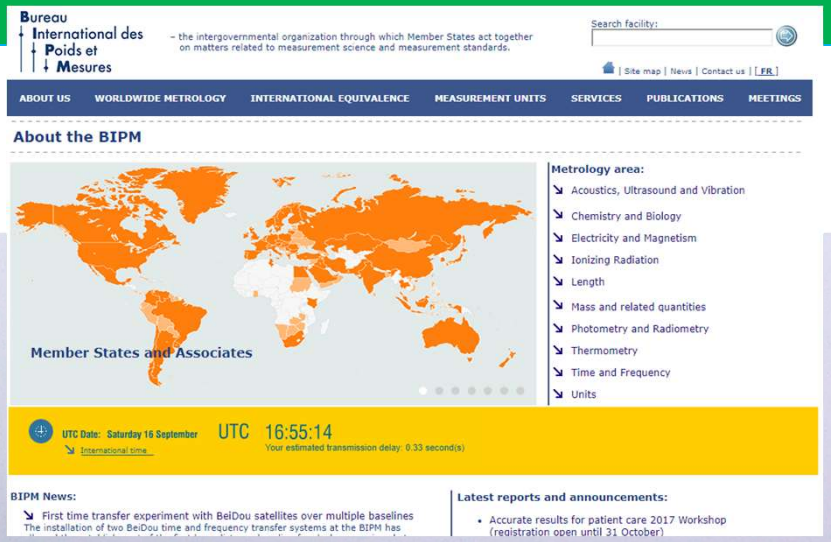
Tap the ampoule gently to collect the material at the bottom (labelled) end. Ensure ampoule is scored all round at the narrow part of the neck, with a diamond or tungsten carbide tipped glass knife file or other suitable implement before attempting to open. Place the ampoule in the ampoule opener, positioning the score at position 'A'; shown in the diagram below. Surround the ampoule with cloth or layers of tissue paper. Grip the ampoule and holder in the hand and squeeze at point 'B'. The ampoule will snap open. Take care to avoid cuts and projectile glass fragments that enter eyes. Take care that no material is lost from the ampoule and

ProgBA – Ronda XXXI





IFCC-BIPM-ILAC



Paris, Sèvres BIPM

Joint Committee of Traceability in Laboratory Medicine

JCTLM

Comité Conjunto de Trazabilidad en Medicina de Laboratorio

El *International Committee of Weights and Mesures†* (CIPM), la *International Federation for Clinical Chemistry and Laboratory Medicine* (IFCC), y la *International Laboratory Accreditation Cooperation* (ILAC) acuerdan cooperar para establecer el Joint Committee for Traceability in Laboratory Medicine, con el acrónimo JCTLM.

Para los propósitos de del Comité Internacional de Pesas y Medidas (CIPM) va a ser representado por el Bureau

Internacional de Pesas y Medidas (BIPM)

JOINT COMMITTEE OF TRAZABILITY IN LABORATORY MEDICINE JCTLM

COMITÉ CONJUNTO DE TRAZABILIDAD EN MEDICINA DE LABORATORIO

La misión del JCTLM es apoyar mundialmente la comparabilidad, confiabilidad y equivalencia de las mediciones de los análisis clínicos/ medicina de laboratorio con el propósito de mejorar el cuidado de la salud y facilitar el intercambio de dispositivos in vitro nacional e internacionalmente:

MISIÓN JCTLM

- promoviendo la utilización del Sistema Internacional de Unidades (SI) o, cuando sea necesario, otras referencias acordadas internacionalmente ,
- promoviendo lazos cercanos entre los Laboratorios de Referencia en los análisis clínicos /la medicina de laboratorio y los Institutos Nacionales de Metrología
- coordinando y guiando en el establecimiento de Sistemas de Medida de Referencia relacionadas a las necesidades médicas
- identificando y priorizando los mensurandos que requieran trazabilidad y comparabilidad y , por consiguiente, estimulando las organizaciones apropiadas a aceptar la responsabilidad del desarrollo de métodos y procedimientos de medida apropiados y materiales de referencia certificados

MISIÓN JCTLM

- **estimulando a la industria de IVD a aplicar los sistemas de referencia de medición convenidos,**
- **Estimulando a los organizadores de EQAS a aplicar los sistemas de referencia de medición convenidos,**
- **proveyendo soporte a los Laboratorios de Referencia para preparar su acreditación**
- **publicitando ampliamente la información relevante a las partes interesadas**
- **proveyendo experiencia científica y organizacional a las partes interesadas involucradas**


definición de unidades SI (UI)
Glucosa, colesterol
Método de referencia primario
Calibrador primario
Método de referencia secundario
Calibrador secundario
Método seleccionado por el fabricante
Calibrador de trabajo
Método de rutina del fabricante
Calibrador del kit
PTH, Vit D, HCG
Método de rutina del usuario
Muestra de rutina
RESULTADO
LAB ANÁLISIS CLÍNICOS
incertidumbre

QUÉ NECESITA EL LABORATORIO CLÍNICO

- **métodos trazables, que sólo necesiten verificación de SU aptitud de medición**
- **equipamiento validado por el fabricante**
- **conmutabilidad de los calibradores de trabajo y muestras humanas (EN ISO 17511 (cláusula 7.2))**

LABORATORIO DE ANÁLISIS CLÍNICOS
MIDEN ANALITOS DE LA .....

- ***LISTA I:*** **ANALITOS BIEN DEFINIDOS** *

  P.E. ELECTROLITOS, ENZIMAS, DROGAS, METABOLITOS Y SUSTRATOS, HORMONAS NO PEPTÍDICAS, Y ALGUNAS PROTEÍNAS.

- ***LISTA II:*** **SUSTANCIAS NO TRAZABLES A UNIDADES SI Y/O SIN PROCEDIMIENTOS DE MEDIDA DE REFERENCIA** *

  P.E. FACTORES DE COAGULACIÓN, ÁCIDOS NUCLEICOS, PSA

- ***ANALITOS NO INCLUÍDOS EN I ni II** **

  PE MARCADORES TUMORALES

* ***EN FLUIDOS BIOLÓGICOS***

BASE DE DATOS ACTUAL DEL JCTLM

- **298 MATERIALES DE REFERENCIA PARA 175 MENSURANDOS**
- **180 MÉTODOS DE REFERENCIA PARA 80 MENSURANDOS**
- **146 SERVICIOS DE MEDIDA DE REFERENCIA PARA 39 MENSURANDOS**

	MATERIALES DE REFERENCIA	MÉTODOS DE REFERENCIA	SERVICIOS DE MEDIDA DE REFERENCIA
CATEGORÍA ANALÍTICA	N° ANALITOS	N° ANALITOS	N° ANALITOS
Conteo glóbulos rojos		1	
Gases en sangre			
Grupos sanguíneos	3		
Factores de coagulación	1		
Drogas	24	9	3
Electrolitos	6	7	6
Enzimas	7	7	7
Metabolitos y sustratos	52	13	9
Serología microbiana			
Metales no electrolitos	31	7	
Hormonas no peptídicas	11	13	10
Ácidos nucleicos	2		
Proteínas	29	18	2
Vitaminas	9	5	2
Totales	175	80	39

Bureau International des Poids et Mesures

Database of higher-order reference materials, measurement methods/procedures and services

JCTLM
Accurate results for patient care

> You are here : JCTLM-DB

T+ T T-

JCTLM database: Laboratory medicine and *in vitro* diagnostics

2017 Worskhop

- **Register now!**
- Workshop Flyer

JCTLM Database

- Search Form
- List of reference materials no longer listed in the JCTLM Database
- List of reference measurement methods no longer listed in the JCTLM database
- Contact us
- Survey Form

JCTLM Newsletters

- Issue 4 - March 2017
- Previous Issues

JCTLM

- *Preamble*
- Joint Committee for Traceability in Laboratory Medicine (JCTLM)
- Leaflet

ifcc
International Federation of Clinical Chemistry and Laboratory Medicine

Analyte keyword search for reference materials, measurement methods/procedures and services

Type an analyte name in part or full, e.g. cholesterol

glucose

Refine search by analyte category

Metabolites and substrates

Refine search by matrix category

Blood serum

All
Blood plasma
Blood serum
Calibration solution
High purity material
Urine
Whole blood
Other

Please select your requirement :

- Higher-order reference materials
- Reference measurement methods/procedu
- Reference measurement services

Reset × Search →

Download entries as PDF

Please select your requirement :

- Higher-order reference materials
- Reference measurement methods/procedures
- Reference measurement services

Select an analyte category

Download

Select a matrix category

Blood serum

Download

View a list of all entries

Download

JCTLM database : Laboratory medicine and *in vitro* diagnostics

Analyte	Matrix/Material	Name of the reference material	Producer	Quantity	Range of certified values in reference material	Range of expanded uncertainties for certified value	Listed in
glucose	human serum	JCCRM521	ReCCS (Reference Material Institute for Clinical Chemistry Standards), Japan Phone : +81 (0)44 850 3140 Fax : +81 (0)44 850 3141 h-umemoto@reccs.net	Mass concentration	73.9 mg/l to 239 mg/l	0.5 mg/l to 1.7 mg/l Level of confidence 95 %	List I
glucose	frozen human serum	HRM-3002A, Creatinine, Glucose, Total Cholesterol, Urea, and Uric Acid in Frozen Human Serum	HSA (Health Sciences Authority), Singapore Phone : +65 6775 1605 ext 104 Fax : +65 6775 1398 HSA_CML@hsa.gov.sg	Amount-of-substance concentration	4.76 mmol/l to 16.36 mmol/l	0.05 mmol/l to 0.19 mmol/l Level of confidence 95 %	List I
glucose	frozen human serum	LNE CRM Bio 101a, Glucose, creatinine, total cholesterol, total glycerides, HDL-cholesterol, LDL-cholesterol in frozen human serum	LNE (Laboratoire National de Métrologie et d'Essais), France Phone : +33 (0)1 40 43 40 75 Fax : +33 (0)1 40 43 37 05 vincent.delatour@lne.fr	Amount-of-substance concentration	4.148 mmol/l to 11.663 mmol/l	0.064 mmol/l to 0.165 mmol/l Level of confidence 95 %	List I
glucose	glucose crystalline material	NIM CRM GBW 10062, Purity of Glucose	NIM (National Institute of Metrology), China Phone : +86 10 6422 1811 Fax : +86 10 6421 3149 crmservice@nim.ac.cn	Mass fraction	0.996 g/g	0.003 g/g Level of confidence 95 %	List I
glucose	frozen human serum	DMR 263a, Frozen human serum	CENAM (Centro Nacional de Metrología), Mexico Phone : +52 (442) 211 05 00 Fax : +52 (442) 211 05 69 gsainz@cenam.mx	Amount-of-substance concentration	4.6 mmol/l	0.13 mmol/l Level of confidence 95 %	List I

Greyed out rows indicate the (Certified) Reference Materials reviewed for compliance with ISO 15194:2003 but not reviewed against ISO 15194:2009. Database of higher-order reference materials, measurement methods/procedures and services. 12 July 2017

National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 965b

Glucose in Frozen Human Serum

This Standard Reference Material (SRM) is intended primarily for use in evaluating the accuracy of procedures for the determination of glucose in human serum. It is also intended for use in validating working or secondary reference materials. Because it is made from pools of human serum that have been modified to achieve the target concentrations, this material may not be commutable with natural human serum in all routine glucose measurement procedures. However, NIST is unaware of any commutability problems with the previous lots of this frozen serum material, which were similarly prepared. A unit of SRM 965b consists of eight flame-sealed ampoules of frozen human serum, two ampoules at each of four different glucose concentration levels. Each ampoule contains 2.00 mL ± 0.04 mL of human serum.

Certified Concentration Values: The certified concentration values of glucose are provided in Table 1. A NIST certified value is a value for which NIST has the highest confidence in its accuracy in that all known or suspected sources of bias have been investigated or taken into account [1]. The certified concentration values for each level are based on the NIST definitive isotope dilution gas chromatography – mass spectrometry (ID/GC/MS) method for glucose [2,3]. The concentrations and their expanded uncertainties for the four concentration levels are listed in Table 1. The certified concentrations apply only to serum thawed to room temperature, 20 °C to 25 °C; see "Instructions for Storage and Use."

Table 1. Certified Concentration Values for Glucose in SRM 965b[a]

Concentration Levels	mmol/L	mg/dL
Level 1	1.836 ± 0.027	33.08 ± 0.48
Level 2	4.194 ± 0.059	75.56 ± 1.06
Level 3	6.575 ± 0.094	118.5 ± 1.7
Level 4	16.35 ± 0.20	294.5 ± 3.6

[a] Each certified concentration value is the mean of the measurements made using the NIST definitive method for glucose. The uncertainty in the certified value, calculated according to the method described in the ISO/IEGM Guide [4], is expressed as an

Material Measurement Laboratory
Standard Reference Materials
SRM Order Request System
NIST National Institute of Standards and Technology
Login | My Account | View Cart | Checkout

Search for Materials
SRM/RM Number:
Search
Keywords:
Search
Browse the ORS
ORS Home
Ordering Information
Shipping Information
FAQs
Price List
Product Returns
SRM Home
Archived Certificates

Material Details

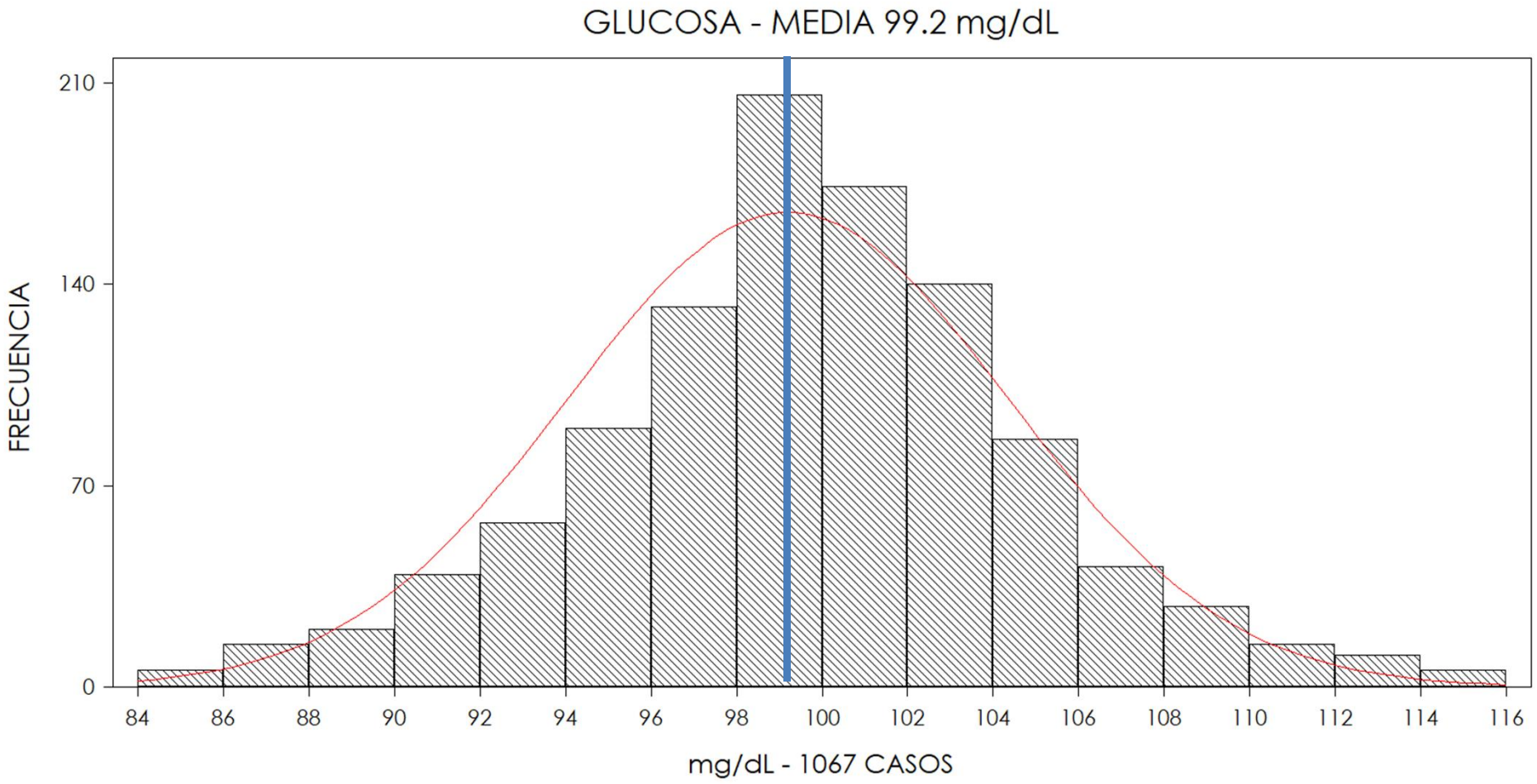
SRM 965b - Glucose in Frozen Human Serum

C - Certificate M - MSDS T - Table

Add Material to Cart

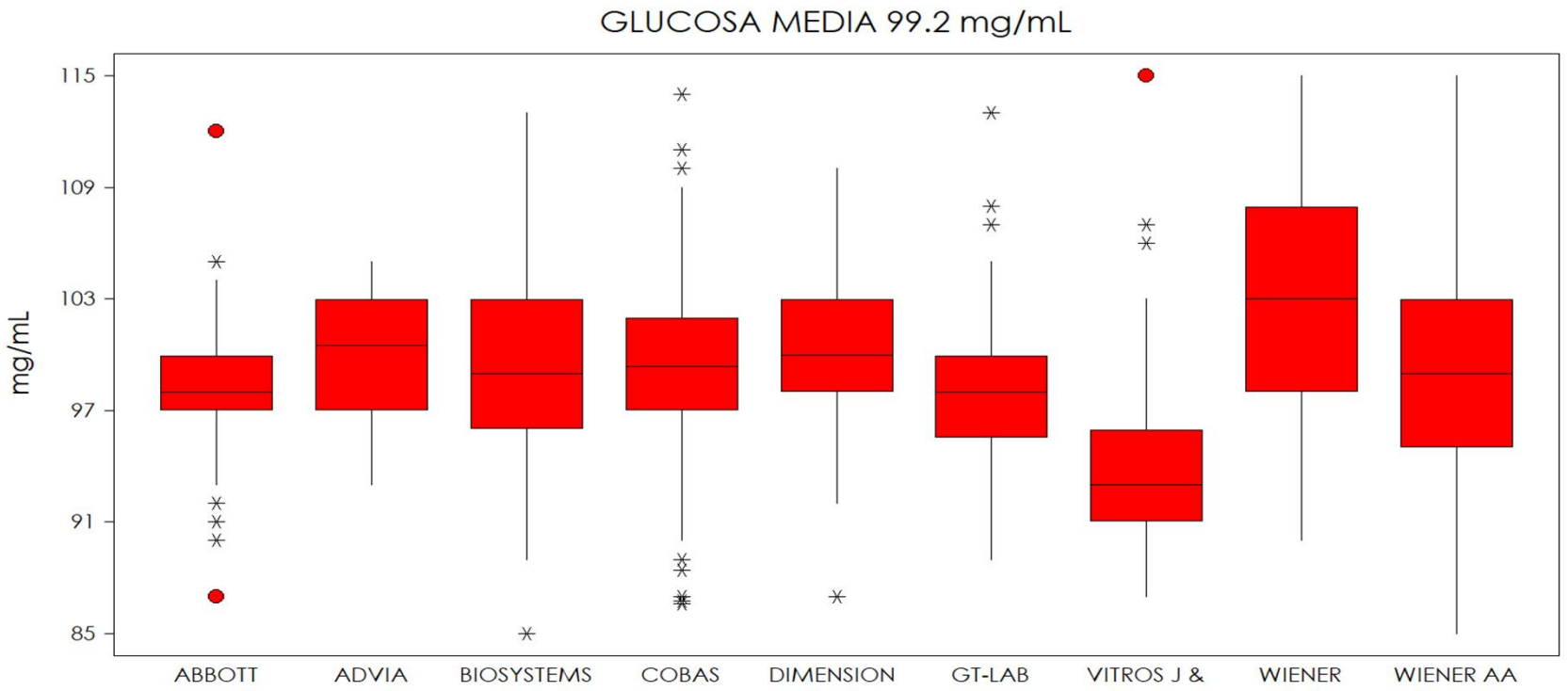
- C Certificate
- M Material Safety Data Sheet (MSDS)
- T Related Materials: 105.1 - Clinical Laboratory Materials (gas, liquid, and solid forms)
- T Related Materials: 105.2 - Serum and Plasma Materials (frozen, liquid, and lyophilized forms)

Details	
Description:	Glucose in Frozen Human Serum
Lot:	N/A
Expiration Date:	12/31/2019
Unit Price * :	$922.00
Unit of Issue:	8 ampoules x 2 mL
Status:	Now Selling
Certificate Date:	2/9/2016
Certificate Revision Date:	09 February 2016 (Editorial changes).
MSDS Date:	2/9/2016
Technical Contact:	Johanna Camara
Additional Information:	N/A



LISTA I: **ANALITOS BIEN DEFINIDOS**

Fuente ProgBA Ronda XXX. Sept. 2016

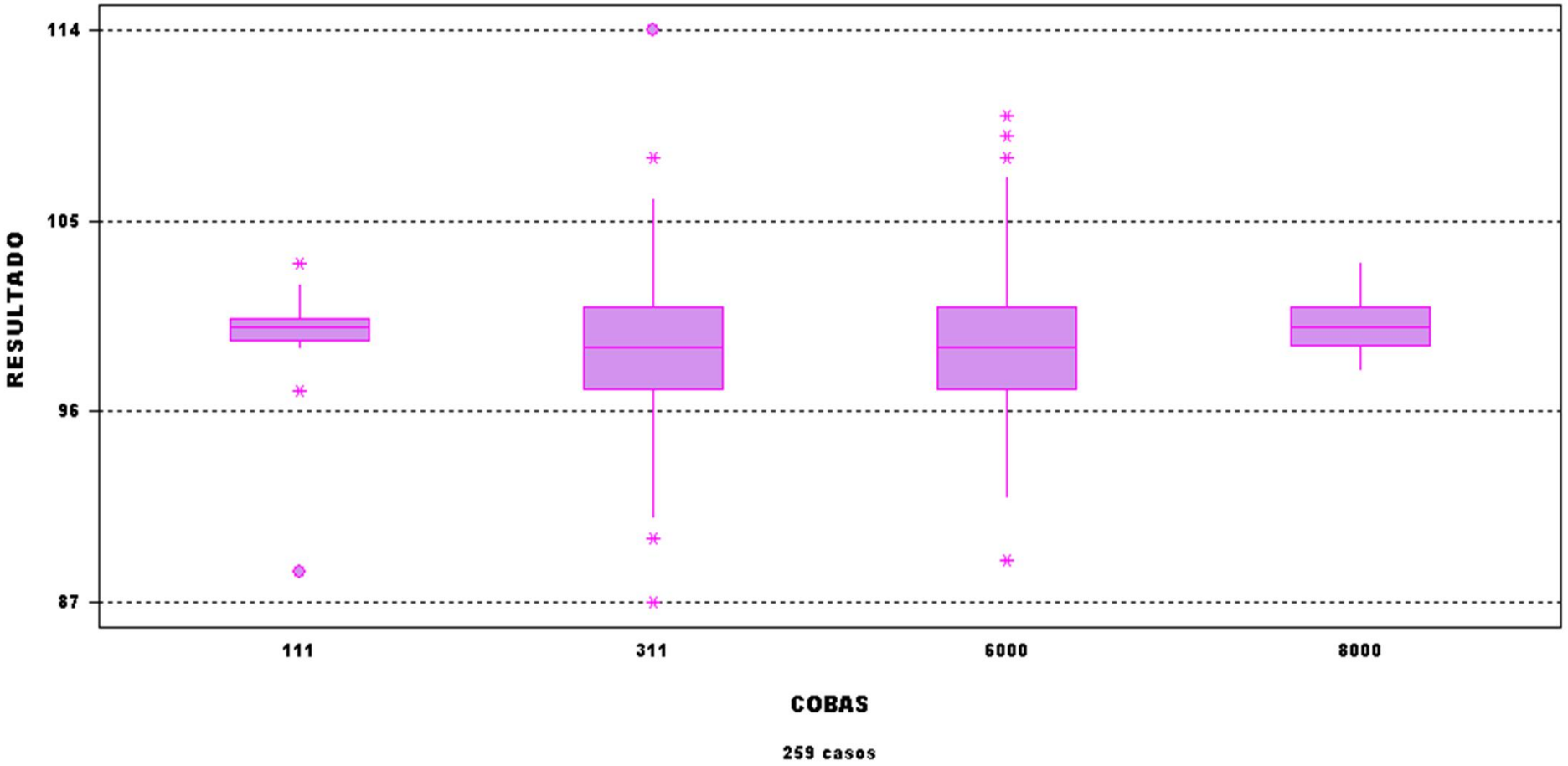


TUKEY (HSD) COMPARISON OF MEANS OF RESULTADO BY REACTIVO

REACTIVO	MEAN	HOMOGENEOUS GROUPS
ADVIA	100.07	I
DIMENSION	100.02	I
COBAS	99.338	I
WIENER AA	98.657	I
ABBOTT	98.135	I
BIOSYSTEMS	98.040	I
VITROS J &	94.257	.. I

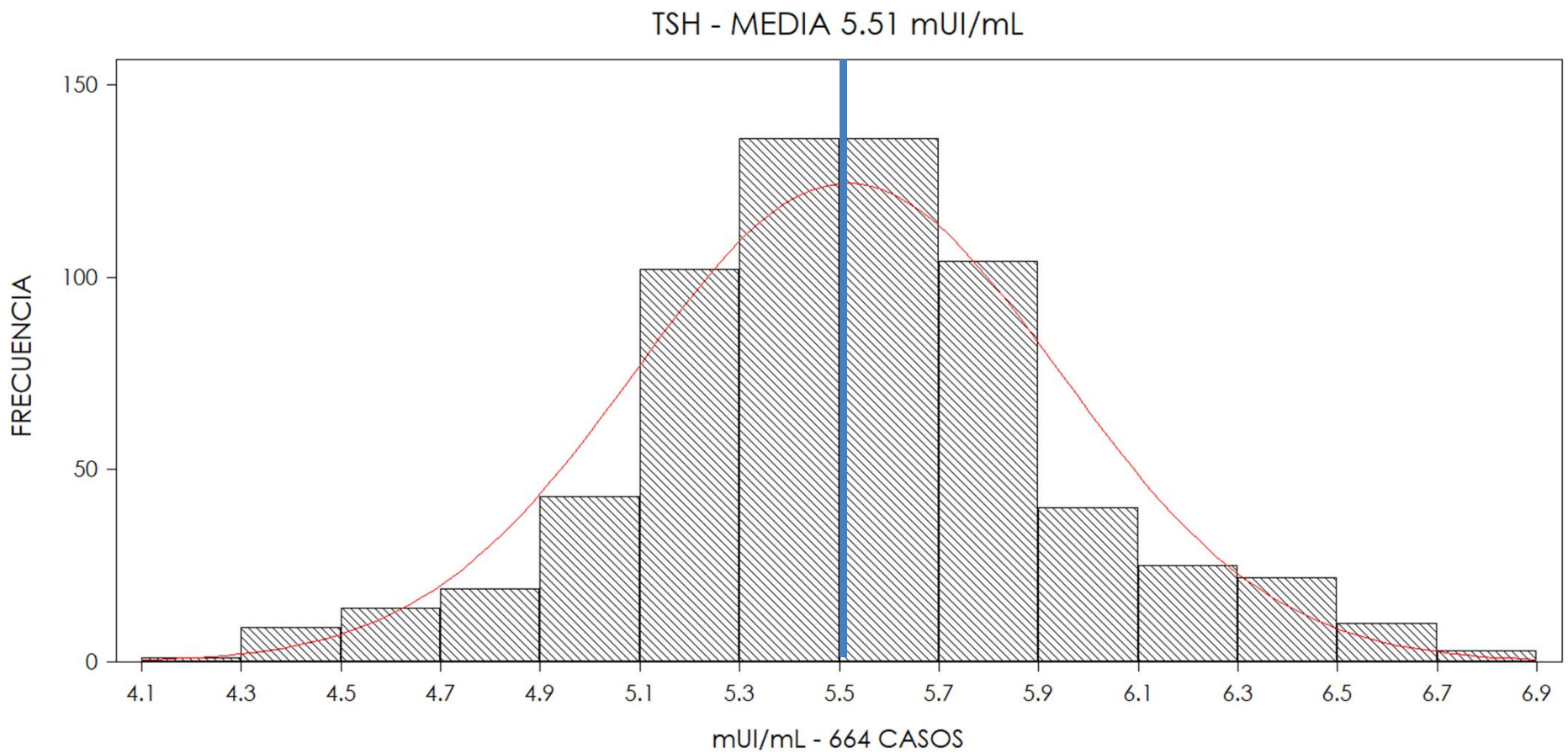
THERE ARE 2 GROUPS IN WHICH THE MEANS ARE
NOT SIGNIFICANTLY DIFFERENT FROM ONE ANOTHER.

CRITICAL Q VALUE 4.168 REJECTION LEVEL 0.050
STANDARD ERRORS AND CRITICAL VALUES OF DIFFERENCES
VARY BETWEEN COMPARISONS BECAUSE OF UNEQUAL SAMPLE SIZES.



THERE ARE NO SIGNIFICANT PAIRWISE DIFFERENCES AMONG THE MEANS

Fuente ProgBA Ronda XXX. Sept. 2016



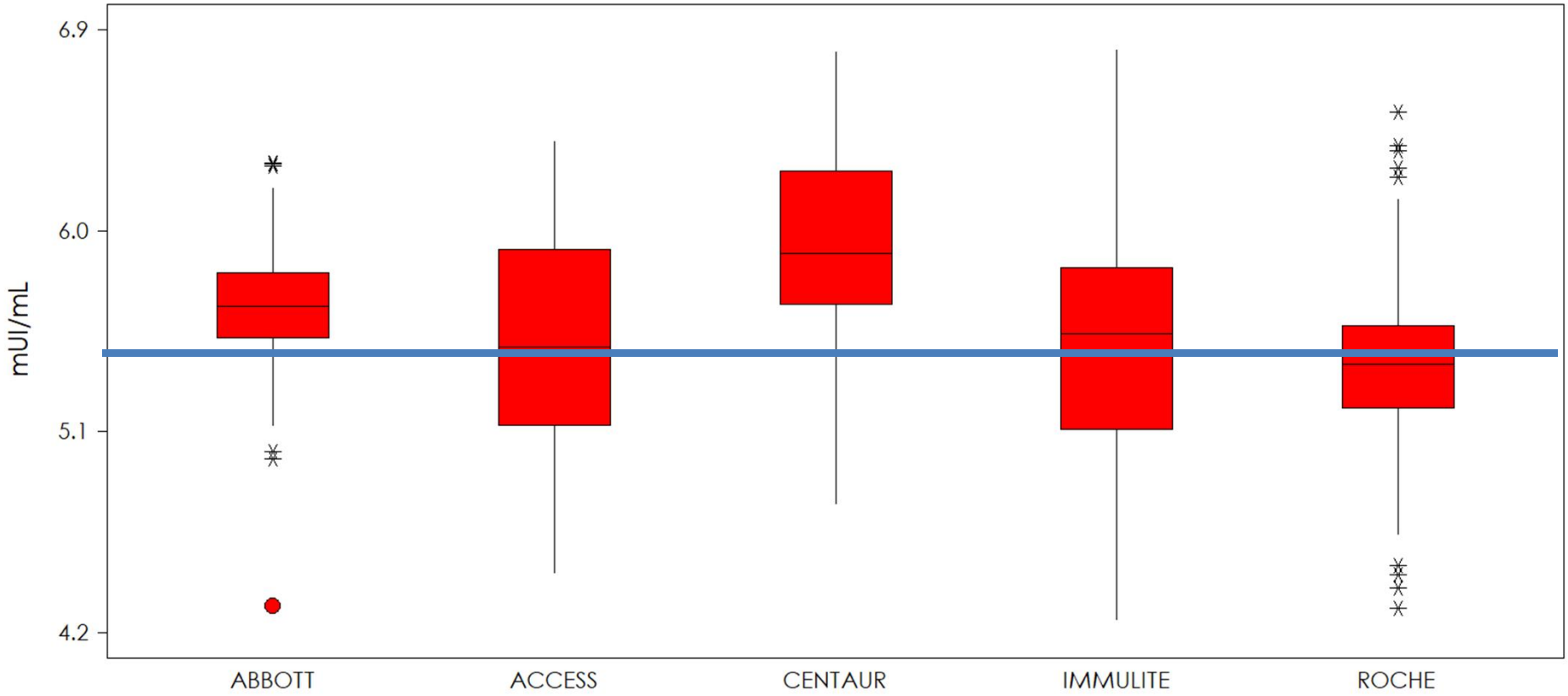
The National Institute for Biological Standards and Control (NIBSC)

Product Number	03/192
Product Description	Thyroid-Stimulating Hormone, Recombinant, Human, for Bioassay (1st International standard)
Type of Standard	WHO International Standard
Category	Biotherapeutics > Protein Hormones and Endocrine Products
Instructions for Use	03-192.pdf
Keywords	bioassay, TSH
Related Products	
Customer Notes	03/192 is the 1st IS for the calibration of TSH preparations by bioassay
Minimum Quantity	1
Unit Price	£109.00

Fuente ProgBA Ronda XXXI. Sept. 2017

Description
Thyroid-Stimulating Hormone, Recombinant, Human, for Bioassay (1st International standard) WHO International Standard
Parathyroid hormone 1-34 ,Recombinant, Human(International Standard) WHO International Standard
Chorionic Gonadotrophin, (5th International Standard) WHO International Standard
Follicle-Stimulating Hormone, human, recombinant, for bioassay (2nd International Standard) WHO International Standard
Follicle Stimulating Hormone, Luteinizing Hormone human, urinary for bioassay(5th International Standard) WHO International Standard

TSH Mediana 5.51 mUI/mL



	N	MEDIA	SD	CV %	MEDIANA
ABBOTT	113	5,65	0,29	5,18	5,66
ACCESS	31	5,52	0,54	9,77	5,48
CENTAUR	59	5,93	0,44	7,37	5,90
IMMULITE	136	5,50	0,56	10,25	5,54
ROCHE	325	5,40	0,31	5,75	5,40
	664				

media media	**5,60**
sd	**0,17**
cv %	**2,99**

WHO2ndIRP (80/558)
En suero humano

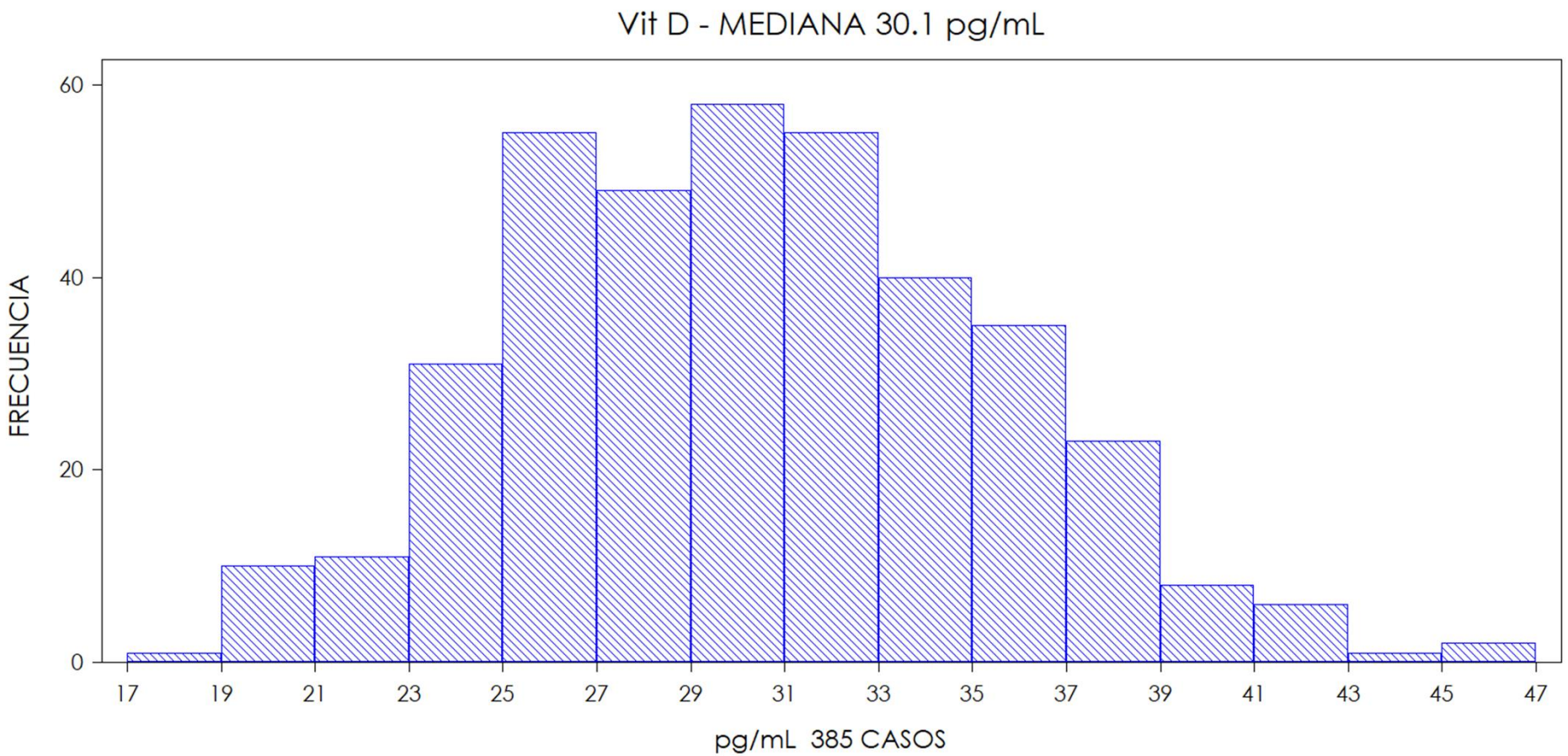
Fuente ProgBA Ronda XXXI. Sept. 2017

TUKEY (HSD) COMPARISON OF MEANS OF RESULTADO BY REACTIVO

REACTIVO	MEAN	HOMOGENEOUS GROUPS
CENTAUR	5.9313	I
BIOMERIEUX	5.9154	I I
ABBOTT	5.6528	.. I I
ACCESS	5.5168	.... I I
IMMULITE	5.5040	 I
ROCHE	5.3985	 I

THERE ARE 4 GROUPS IN WHICH THE MEANS ARE NOT SIGNIFICANTLY DIFFERENT FROM ONE ANOTHER.

CRITICAL Q VALUE 4.029 REJECTION LEVEL 0.050
STANDARD ERRORS AND CRITICAL VALUES OF DIFFERENCES
VARY BETWEEN COMPARISONS BECAUSE OF UNEQUAL SAMPLE SIZES.



Vitamin D total NIST-Standard

Fuente ProgBA Ronda XXXI. Sept. 2017

National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 2973

Vitamin D Metabolites in Frozen Human Serum (High Level)

This Standard Reference Material (SRM) is intended for use as an accuracy control in the critical evaluation of methods for determining the amount-of-substance concentration of vitamin D metabolites in human serum. This SRM can also be used as a quality assurance tool for assigning values to in-house control materials for these constituents. A unit of SRM 2973 consists of two vials of frozen serum at one concentration level of 25-hydroxyvitamin D [25(OH)D] and 24R,25-dihydroxyvitamin D_3 [24R,25$(OH)_2D_3$]. Measurement of total 25(OH)D concentration in serum, the sum of 25-hydroxyvitamin D_2 [25$(OH)D_2$] and 25-hydroxyvitamin D_3 [25$(OH)D_3$], is generally considered a reliable indicator of vitamin D status. The concentration of 3-epi-25-hydroxyvitamin D_3 [3-epi-25$(OH)D_3$] is generally not included in total 25(OH)D, but this metabolite poses a potential measurement interference for some vitamin D metabolite assays. Measurement of 24R,25$(OH)_2D_3$ concentration in serum is considered as a catabolism marker and an indicator of kidney disease. Each vial of SRM 2973 contains approximately 1 mL of serum.

Certified Values for 25(OH)D_3 and 24R,25(OH)$_2D_3$: Values are the method mean of the results from analyses at NIST via reference measurement procedures using ID-LC-MS/MS. The uncertainty provided with each certified value is an expanded uncertainty about the method mean that covers the measurand with approximately 95 % confidence; it incorporates Type B uncertainty components related to the analyses, consistent with the Guide to the Expression of Uncertainty in Measurement [7]. The expanded uncertainties are calculated as $U = ku_c$, where u_c is the combined uncertainty and k is a coverage factor corresponding to approximately 95 % confidence for the analyte [7]. For the certified values shown in Table 1, $k = 2$. The measurands are the total concentrations of analytes listed in Table 1. Metrological traceability is to the SI derived units of mass fraction, expressed as nanograms per gram; mass concentration, expressed as nanograms per milliliter; and amount-of-substance concentration, expressed as nanomoles per liter.

Table 1. Certified Values for 25(OH)D_3 and 24R,25(OH)$_2D_3$ in SRM 2973

	ng/g			ng/mL[(a)]			nmol/L[(b)]		
25-hydroxyvitamin D_3	38.6	±	0.8	39.4	±	0.8	98.4	±	2.1
24R,25-dihydroxyvitamin D_3	3.06	±	0.11	3.13	±	0.11	7.51	±	0.26

[(a)] The mass concentration level was calculated from the mass fraction using a measured serum density: 1.02229 g/mL.

[(b)] The molar concentration level was calculated from the mass concentration level using the relative molecular mass of 400.64 g/mol for 25(OH)D_3 and 416.64 g/mol for 24R,25(OH)$_2D_3$. The equivalent conversion factor is 2.4960 for 25(OH)D_3 and 2.4002 for 24R,25(OH)$_2D_3$.

Reference Values for 25(OH)D_2 and 3-epi-25(OH)D_3: Values are the method means of the results from analyses at NIST using ID-LC-MS/MS. The uncertainty provided with each reference value is an expanded uncertainty about the method mean to cover the measurand with approximately 95 % confidence; it incorporates Type B uncertainty components related to the analyses, consistent with the Guide to the Expression of Uncertainty in Measurement [7]. The expanded uncertainties are calculated as $U = ku_c$, where u_c is the combined uncertainty and k is a coverage factor corresponding to approximately 95 % confidence for the analyte [7]. For the reference values shown in Table 3, $k = 2$

Table 2. Reference Values for 25(OH)D_2 and 3-Epi-25(OH)D_3, in SRM 2973

	ng/g	ng/mL[(a)]	nmol/L[(b)]
25-hydroxyvitamin D_2	0.64 ± 0.02	0.65 ± 0.02	1.59 ± 0.05
3-epi-25-hydroxyvitamin D_3	2.05 ± 0.08	2.10 ± 0.08	5.23 ± 0.20

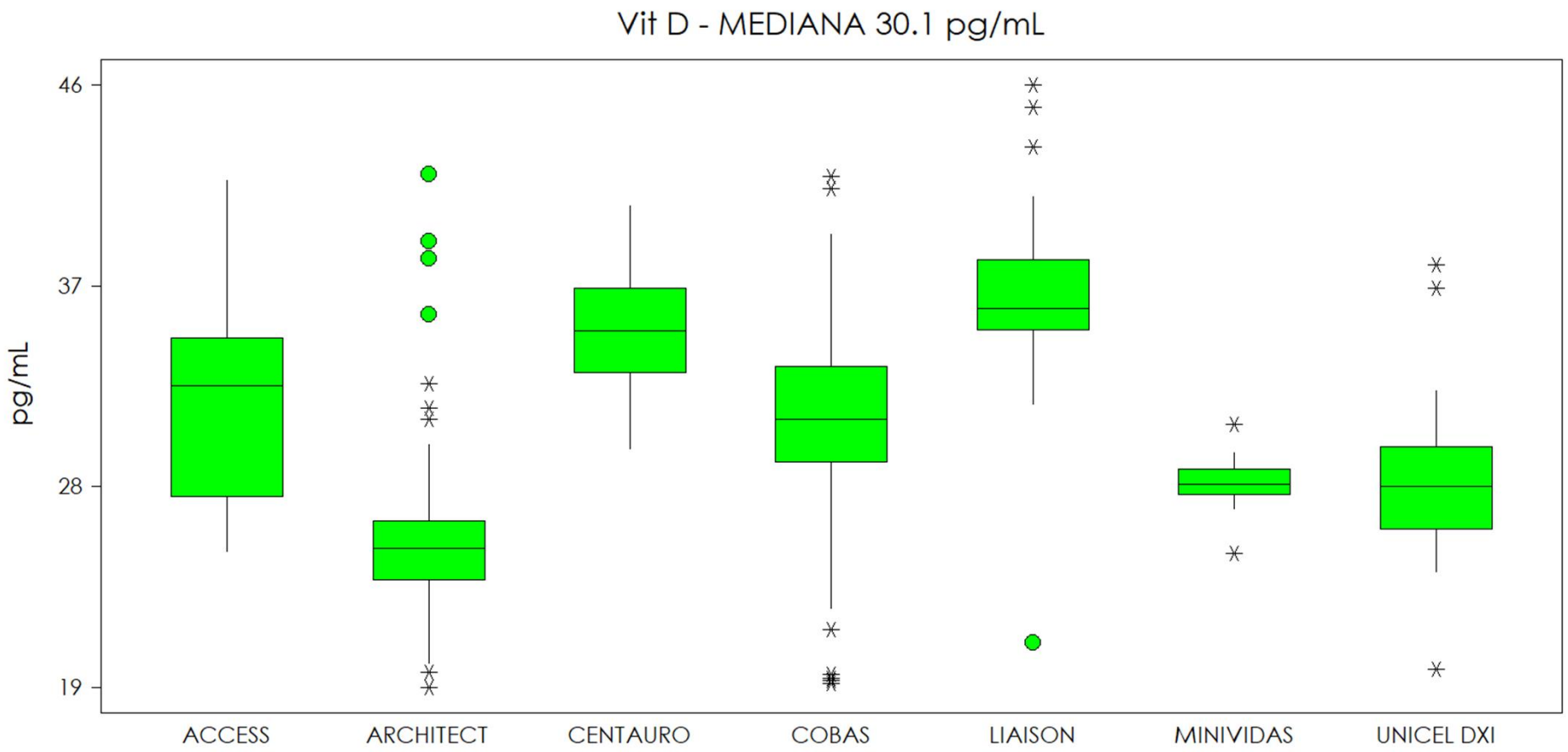
[(a)] Mass concentration levels were calculated from mass fractions using a measured serum density: 1.02229 g/mL.
[(b)] Molar concentration levels were calculated from mass concentration levels using the relative molecular masses. The relative molecular masses are 412.65 g/mol for 25(OH)D2 and 400.64 g/mol for 3-epi-25(OH)D3. The equivalent conversion factors are 2.4234 for 25(OH)D2 and 2.4960 for 3-epi-25(OH)D3.

Reference Value for Total 25(OH)D: Vitamin D levels in serum are typically reported as the total of 25(OH)D_3 and 25(OH)D_2. The value for total 25(OH)D as the sum of the individual values for 25(OH)D_3 and 25(OH)D_2 is shown in Table 3. The uncertainty provided with the value is an expanded uncertainty about total 25(OH)D to cover the measurand with approximately 95 % confidence; it incorporates Type B uncertainty components related to the analyses and their respective uncertainties of the two analytes, consistent with the Guide to the Expression of Uncertainty in Measurement [7]. The expanded uncertainty is calculated as $U = ku_c$, where u_c is the combined uncertainty and k is a coverage factor corresponding to approximately 95 % confidence. For the value shown in Table 3, $k = 2$.

Table 3. Reference Value for Total 25(OH)D in SRM 2973[(a)]

	ng/g	ng/mL[(b)]
Total 25(OH)D	39.2 ± 0.8	40.1 ± 0.8

[(a)] The value is denoted as a reference value based on the combination of a reference value for 25(OH)D2 and a certified value for 25(OH)D3. The measurands are the concentrations of the analytes listed in Table 4, as determined by the indicated methods. Metrological traceability is to the ID-LC-MS/MS method, with values expressed in SI derived units of mass fraction, expressed as nanograms per gram; mass concentration, expressed as nanograms per milliliter.
[(b)] The mass concentration level was calculated from the mass fraction using a measured serum density: 1.02229 g/mL.



Fuente ProgBA Ronda XXXI. Sept. 2017

IMPORTANCIA DE REDUCIR LA VARIABILIDAD ENTRE MÉTODOS I

- **Seguridad del paciente: las diferencias en la práctica y la variabilidad de los resultados ponen los pacientes en riesgo. La armonización deberían contribuir a RESULTADOS clínicos mejores.**

- **Fortalecimiento del paciente: el cuidado de la salud centrado en el paciente llevando a la presión de acceder a sus resultados. Esto expone cualquier inconsistencia y variabilidad.**

- **Confianza pública: el público estará reasegurado por el conocimiento que los resultados son exactos y transferibles entre laboratorios.**

Traceability in laboratory medicine: a global driver for accurate results for patient care

Graham H Beastall et all. Clin Chem Lab Med. 2017 Jul 26;55(8):1100-1108.

IMPORTANCIA DE REDUCIR LA VARIABILIDAD ENTRE MÉTODOS II

- **Acreditación de los laboratorios: la norma ISO 15189:2012 requiere veracidad de medida y trazabilidad metrológica**

- **Guías clínicas: el éxito en la implementación está muchas veces ligado al manejo de valores específicos o cambios en los resultados de los pacientes.**

- **Governance clínico: la diferencias entre los resultados de los pacientes lleva a preocupación acerca de la calidad y el profesionalismo del servicio brindado.**

- **Consolidación y redes de trabajo: las redes de laboratorio que proveen cuidados primarios y secundarios, deben informar resultados similares desde cualquier sede del laboratorio.**

IMPORTANCIA DE REDUCIR LA VARIABILIDAD ENTRE MÉTODOS III

- **Informática: los sistemas de información del laboratorio y los hospitalarios solamente podrán ser compartidos si comparten los resultados si están armonizados.**

- **Archivo electrónico del pacientes: los archivos electrónicos de los pacientes requieren que los resultados puedan ser insertados desde cualquier laboratorio y entonces deben ser transferibles**

DESAFÍO: ADOPCIÓN GENERALIZADA DE LA TRAZABILIDAD DE ANÁLISIS DE LABORATORIO

POR

- **diferencias geográficas**
- **uso variable de las unidades SI**
- **analitos complejos**
- **coordinación global limitada**

La colaboración global requiere el involucramiento de diferentes partes interesadas que va desde expertos internacionales a especialistas en análisis clínicos de laboratorios clínicos de rutina.

QUÉ NECESITA EL LABORATORIO CLÍNICO

- **Para los analitos de baja jerarquía de medición, cuidadosa definición del método de medición *(Por Ej. Definición de Epitopes)***

- **Que la incertidumbre del método sea siempre inferior a la variabilidad biológica**

Y ASÍ ASEGURAR .....

- la trazabilidad metrológica con una referencia establecida
- la comparabilidad entre laboratorios
- la comparabilidad en el tiempo
- la posibilidad para el laboratorio de acreditación con 15189

LA VALIDEZ DIAGNÓSTICA DE LOS RESULTADOS

PARA LA SEGURIDAD DEL PACIENTE

Programa Buenos Aires
de Aseguramiento Externo de la Calidad
Desde 1978

ACREDITADO
ISO 17043-2010 (OAA)

OAA

Organismo
Argentino de
Acreditación

Proveedor de Ensayos de Aptitud
PEA 002

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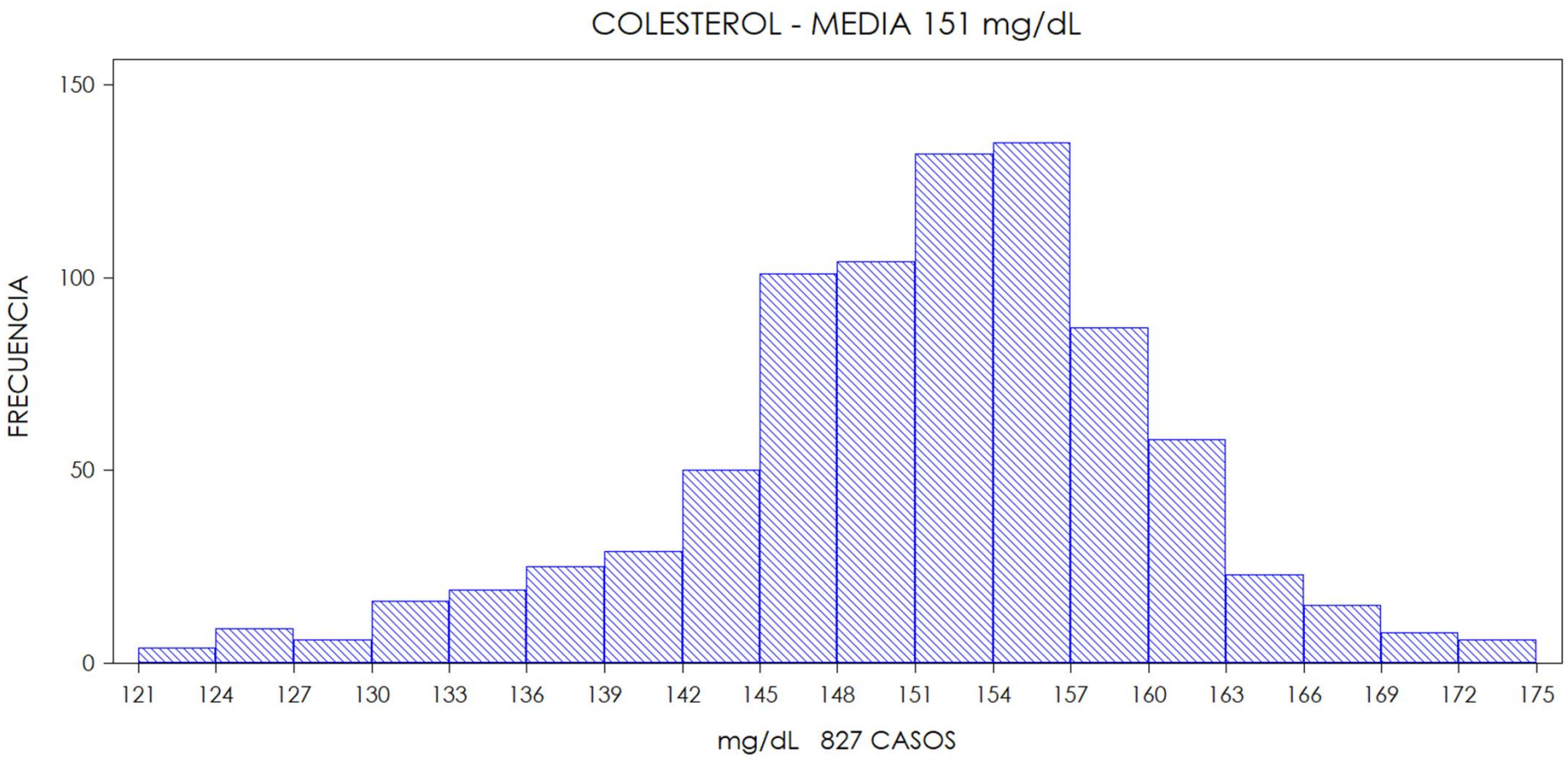
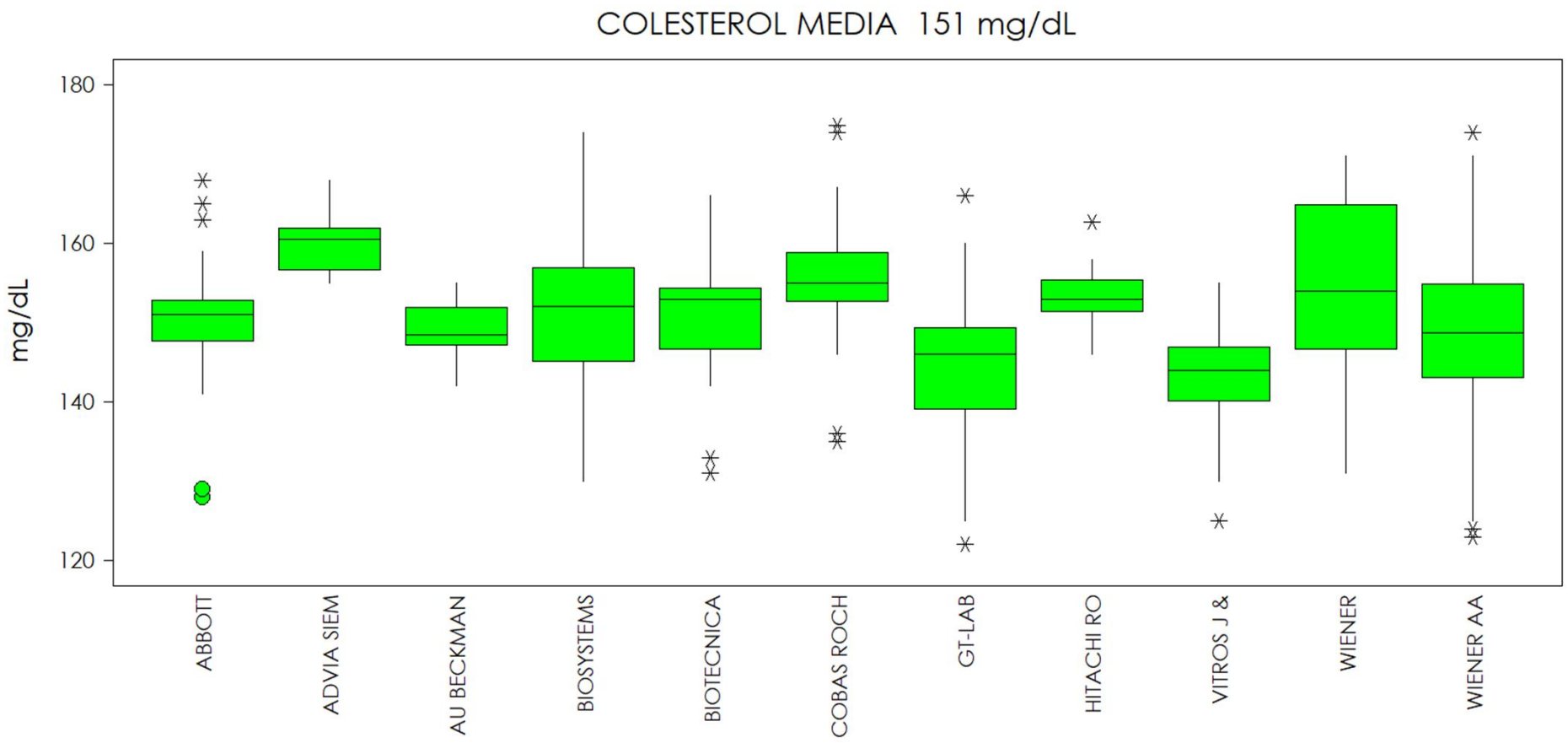


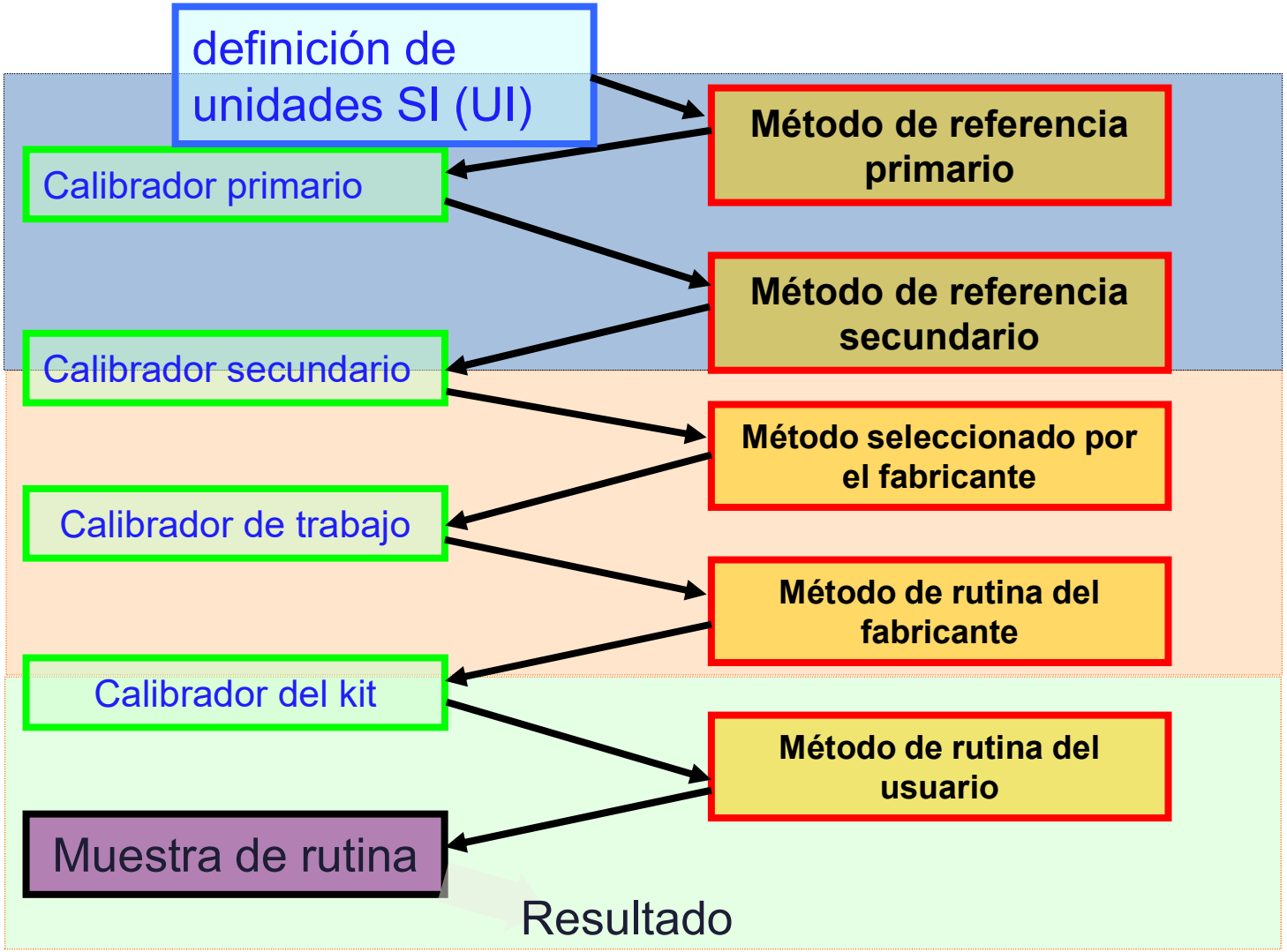
LISTA I: **ANALITOS BIEN DEFINIDOS**

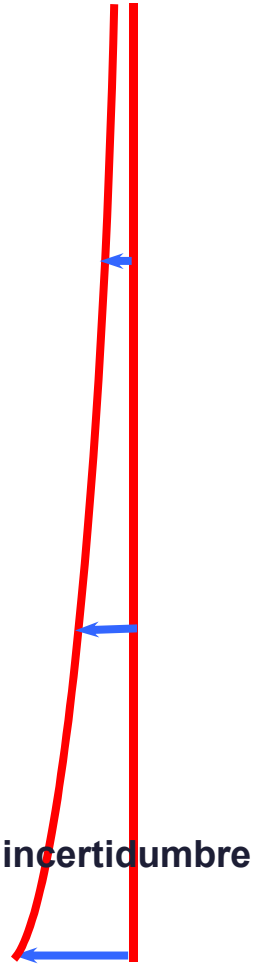
Fuente ProgBA Ronda XXXI. Sept. 2017



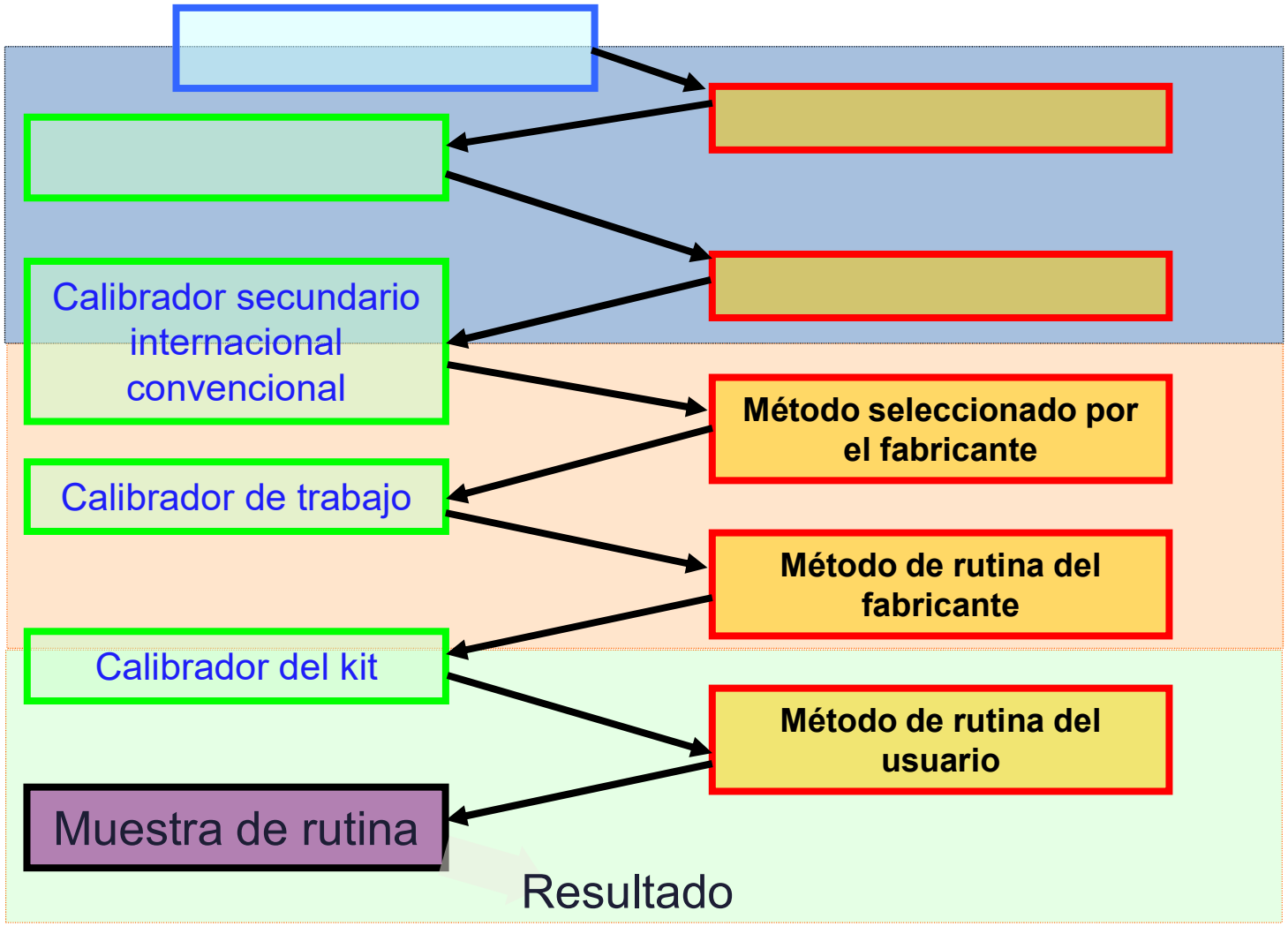
Fuente ProgBA Ronda XXXI. Sept. 2017

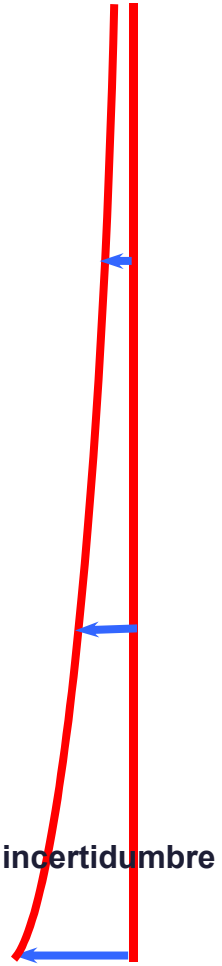
TRAZABILIDAD - JERARQUÍA COMPLETA



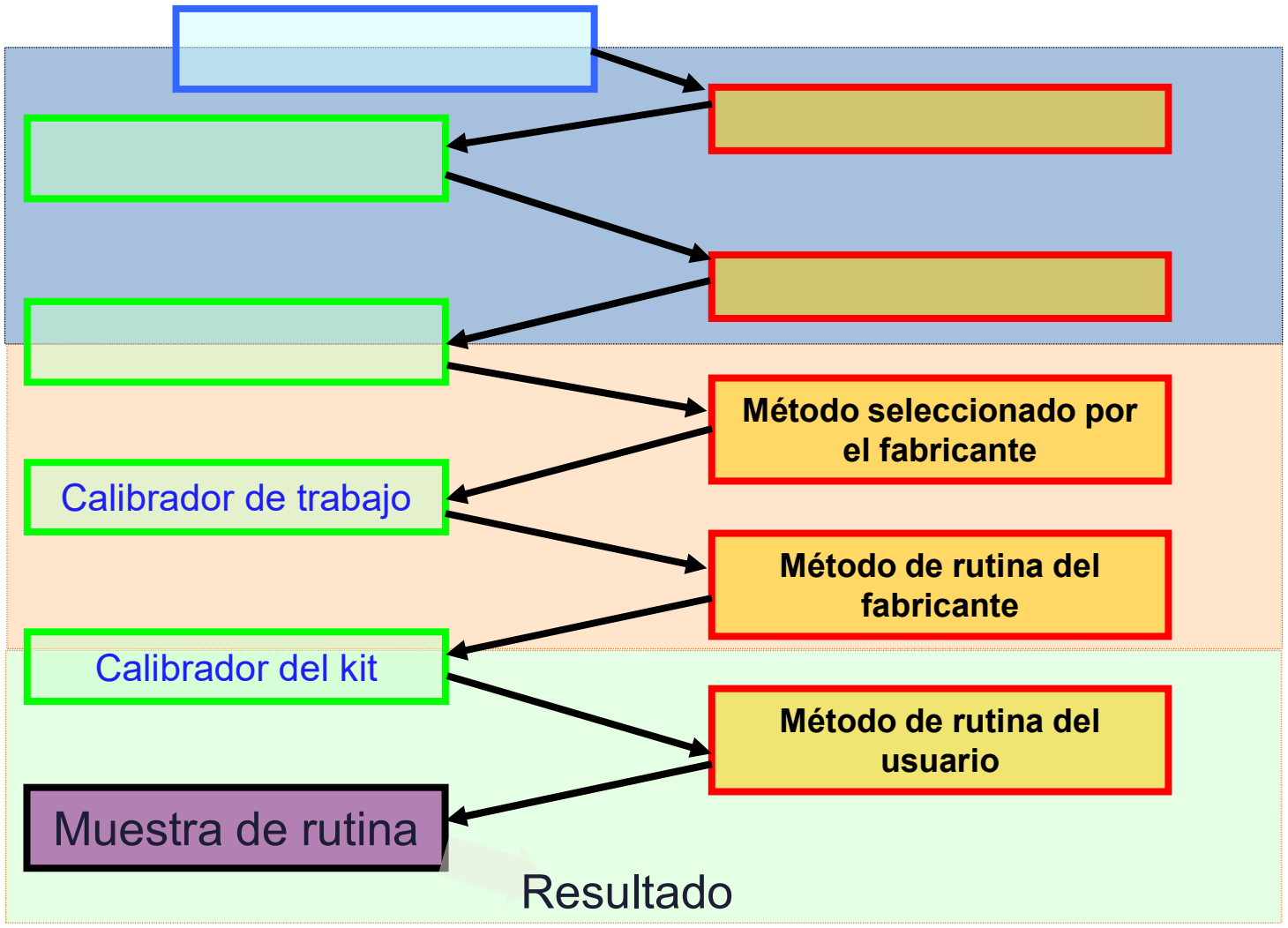


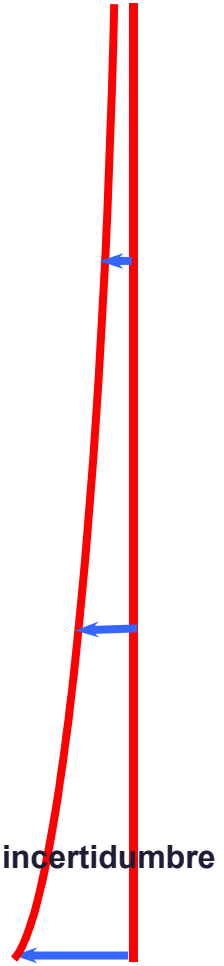
TRAZABILIDAD - JERARQUÍA MEDIA





TRAZABILIDAD - JERARQUÍA BAJA





CASOS QUE DEMOSTRARON EL VALOR DE LA TRAZABILIDAD EN ANÁLISIS CLÍNICOS

- **Colesterol**
- **La estandarización se logró hace más de 20 años**
- **La variabilidad entre métodos es < 5 %, la estandarización global es una realidad**
- **Facilitó el uso óptimo de cistatinas**
- **En ProgBA, el 60 % de los laboratorios presentó CV % <5.0**

CASOS QUE DEMOSTRARON EL VALOR DE LA TRAZABILIDAD EN ANÁLISIS CLÍNICOS

- **HbA1c**
  - La variabilidad es < 5 % en EQAS
  - El método de referencia de IFCC fue introducido 2004
  - En ProgBA, el 60 % CV %< 5

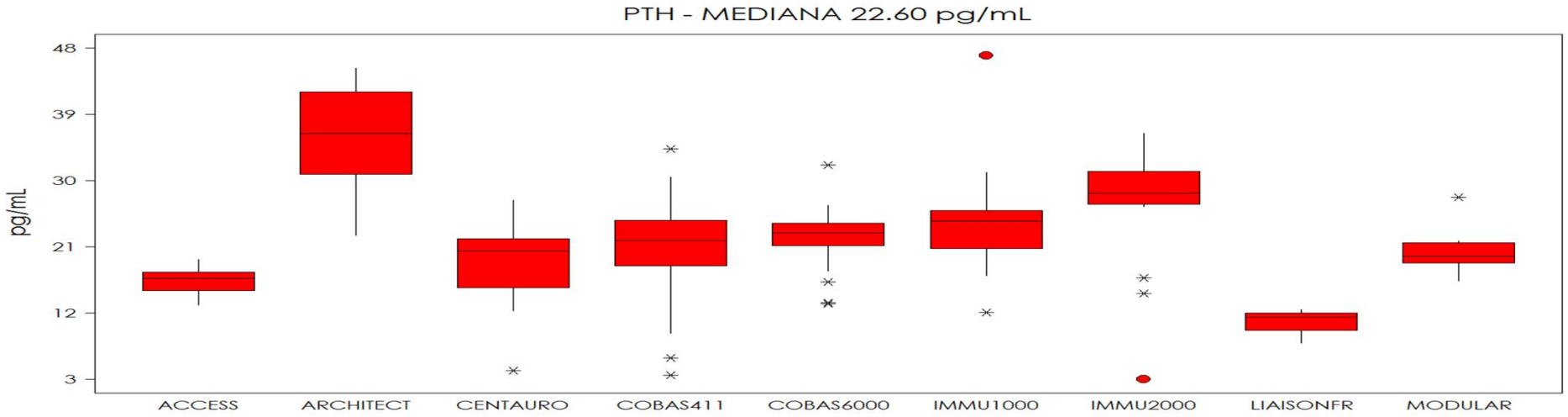
REACTIVO	NºLABS	%LABS con CV%<3,75
ABBOTT ARCHITECT	9/17	38,1%
BIORAD VARIAN	6/14	85,0%
SIEMENS DIMENSION	4/10	42,8%
TINA-QUANT ROCHE	32/66	50,7%
WIENER	4/13	38,5%

Total : 55 de 182 que cumplen con un CV% de 3.75%

Fuente ProgBA Informe Final Ronda XXX. Nov. 2016

CASOS QUE SE DEMUESTRA LA NECESIDAD DE LA TRAZABILIDAD EN ANÁLISIS CLÍNICOS

- **PTH**
  - **Diversidad molecular con T½ muy corto**
  - **Los ensayos no son transferibles entre pacientes**
  - **Se está trabajando para producir estándares y métodos de referencia**



Fuente ProgBA Informe Final Ronda XXX. Nov. 2016