Türk Biyokimya Derneği
Sivas Biyokimya Günleri
2-5 Kasım, 2016

Büyük Veriden İndirekt Referans Aralıklarının (i-RA) Eldesi ve Yeni Planlanan i-RA Çalışması

Prof. Dr. Yeşim Özarda

IFCC, The Committee on Reference Intervals and Decision Limits (**C-RIDL**), **Chair**

Uludağ Universitesi Tıp Fakültesi, **Bursa, Turkiye**
e-mail: yesim@uludag.edu.tr

İlginç Bilgiler

Normal bir insan, ,

- 75 yıl yaşıyor
- 26 yıl uyuyor
- 2 yıl telefonla konuşuyor
- 90 milyon kelime konuşuyor
- İki yüzme havuzu kadar tükrük salgılıyor
- Her yıl yaklaşık 430 böcek yutuyor

İlginç Bilgiler

Normal bir insan

- Hayatı boyunca kaç çok merkezli çalışmaya katılabilir?

- İskandinavya (The Nordic Reference Interval Project)
- Kanada (CALIPER Project)
- İngiltere (UK Harmonization Group)
- Avustralya (The Aussie Normals Study)
- IFCC, Committee on Reference Intervals and Decision Limits (C-RIDL)

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Research Article

Common reference intervals for aspartate aminotransferase (AST), alanine aminotransferase (ALT) and γ-glutamyl transferase (GGT) in serum: results from an IFCC multicenter study

Ferruccio Ceriotti[1,*], Joseph Henny[2], Josep Queraltó[3], Shen Ziyu[4], Yeşim Özarda[5], Baorong Chen[6], James C. Boyd[7] and Mauro Panteghini[8] on behalf of the IFCC Committee on Reference Intervals and Decision Limits (C-RIDL) and Committee on Reference Systems for Enzymes (C-RSE)

techniques from the results of 765 individuals (411 females and 354 males, 18–85 years old) selected on the basis of the results of other laboratory tests and a specific questionnaire. **Results:** AST results from the four regions (Milan, Beijing, Bursa and Nordic Countries) were statistically different, but these differences were too small to be clinically relevant. Likewise, differences between the upper reference limits for

	Females			Males		
	Number of individuals	Age, years[a]	BMI, kg/m^2[a]	Number of individuals	Age, years[a]	BMI, kg/m^2[a]
Milan	97	40 (21–72)	21.2 (16.2–28.7)	85	42 (18–76)	24.4 (18.4–29.4)
Beijing	47	47 (21–73)	21.7 (18.0–29.7)	50	42 (22–76)	23.1 (18.4–29.3)
NORIP	188	52 (19–90)	23.1 (17.3–29.8)	168	51.5 (18–85)	24.8 (19.2–29.9)
Bursa	79	32 (20–54)	22.1 (16.9–30.0)	51	31 (20–59)	23.9 (17.0–29.4)

[a]Median (range). BMI, body mass index.

A Global Multicenter study on Reference Intervals

DOI 10.1515/cclm-2013-0249 — Clin Chem Lab Med 2013; aop

Yesim Ozarda, Kiyoshi Ichihara*, Julian H. Barth, George Klee and on behalf of the Committee on Reference Intervals and Decision Limits (C-RIDL), International Federation for Clinical Chemistry and Laboratory Medicine

Protocol and standard operating procedures for common use in a worldwide multicenter study on reference values

Abstract

The reference intervals (RIs) given in laboratory reports have an important role in aiding clinicians in interpreting test results in reference to values of healthy populations. In this report, we present a proposed protocol and standard operating procedures (SOPs) for common use in conducting multicenter RI studies on a national or international scale. The protocols and consensus on their contents were refined through discussions in recent C-RIDL meetings. The protocol describes in detail (1) the scheme and organi-

George Klee, MD, PhD: Laboratory Medicine and Pathology, Mayo Clinic College of Medicine, Rochester, MN, USA

1 Introduction

The interpretation of data in laboratory medicine is a comparative decision-making process, and reference intervals (RIs) given in laboratory reports have an important role in aiding the clinician in interpreting test results in refer-

Kiyoshi Ichihara*, Yesim Ozarda, George Klee, Joely Straseski, Nikola Baumann and Kiyohide Ishikura on behalf of the 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

Abstract

Background: In a planned International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) world-wide study on reference intervals (RIs), a common panel of serum samples is to be measured by laboratories from different countries, and test results are to be compared through conversion using linear regression analysis. This report presents a validation study that was conducted in collaboration with four laboratories.

Methods: A panel composed of 80 sera was prepared from healthy individuals, and 45 commonly tested analytes (general chemistry, tumor markers, and hormones) were measured on two occasions 1 week apart in each laboratory. Reduced major-axis linear regression was used to convert reference limits (*LL* and *UL*). Precision was expressed as a ratio of the standard error of converted *LL* or *UL* to the standard deviation (SD) comprising RI (approx. 1/4 of the RI width corresponding to between-individual SD). The allowable and optimal levels of error for the SD ratio (SDR) were set as ≤0.250 and ≤0.125, respectively, in analogy to the common method of setting limits for analytical bias based on between-individual SD.

be a practical size for the panel, reference values of 89% (80%) of analytes examined were made comparable by regression analysis with the allowable (optimal) level of precision.

Keywords: method comparison; multicenter study; panel of sera; reduced major-axis regression; reference interval.

***Corresponding author: Kiyoshi Ichihara**, MD, PhD, Faculty of Health Sciences, Department of Clinical Laboratory Sciences, Graduate School of Medicine, Yamaguchi University, Minami-Kogushi 1-1-1, Ube 755-8505, Japan, Phone: +81-836-22-2884, Fax: +81-836-35-5213, E-mail: ichihara@yamaguchi-u.ac.jp
Yesim Ozarda: Department of Biochemistry and Clinical Biochemistry, Uludag University Medical School, Bursa, Turkey
George Klee and Nikola Baumann: Laboratory Medicine and Pathology, College of Medicine, Mayo Clinic, Rochester MN, USA
Joely Straseski: ARUP Laboratories, University of Utah School of Medicine, Salt Lake City, UT, USA
Kiyohide Ishikura: PhD, Beckman Coulter Japan, Tokyo, Japan

Abbreviations: AFP, α-fetoprotein; Alb, albumin; ALP,


China
Saudi
S. Africa
Nepal
Australia
China
Bangladesh
Russia
BC
USA
Turkey
C-RIDL in Istanbul, June22-24, 2014


UK, SD Chair


Russia
Turkey
S Africa
India
Australia
Abbot
Russia
USA
Canada
Pakistan
Nepal
India
BC
Malaysia
June 23, 2015, Paris

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CCA-14501; No of Pages 13

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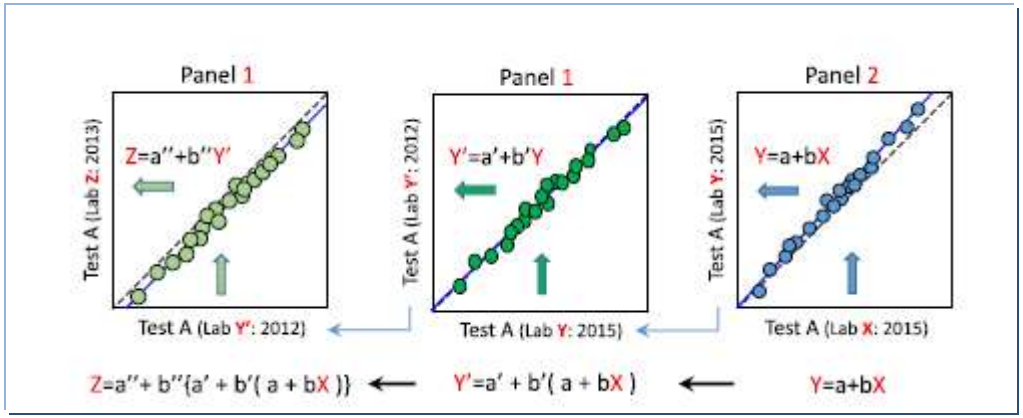
journal homepage: www.elsevier.com/locate/clinchim

A global multicenter study on reference values: 1. Assessment of methods for derivation and comparison of reference intervals

Kiyoshi Ichihara [a,*], Yesim Ozarda [b], Julian H Barth [c], George Klee [d], Ling Qiu [e], Rajiv Erasmus [f], Anwar Borai [g], Svetlana Evgina [h], Tester Ashavaid [i], Dilshad Khan [j], Laura Schreier [k], Reynan Rolle [l], Yoshihisa Shimizu [m], Shogo Kimura [a], Reo Kawano [a,n], David Armbruster [o], Kazuo Mori [p], Binod K Yadav [q], on behalf of, Committee on Reference Intervals and Decision Limits, International Federation of Clinical Chemistry and Laboratory Medicine:



Biyokimya Parametreleri Referans Aralıkları

International Federation of Clinical Chemistry and Laboratory Medicine

Selçuklu Üniv., Selçuklu, **Konya,n=100**

Ankara Eğitim Hast, **Ankara,n=69**

Hacettepe Üniv., **Ankara,n=119**

GATA, **Ankara,n=40**

NEB Üniv., Meram, **Konya,n=80**

İstanbul Univ., Kard. Enst. **İstanbul, n=80**

Lüleburgaz Dev. Hast., **Kırklareli, n=48**

Şişli Etfal Eğitim Hast., **İstanbul, n=62**

Karaelmas Üniv., **Zonguldak,n=102**

OM Üniv.,**Samsun n=100**

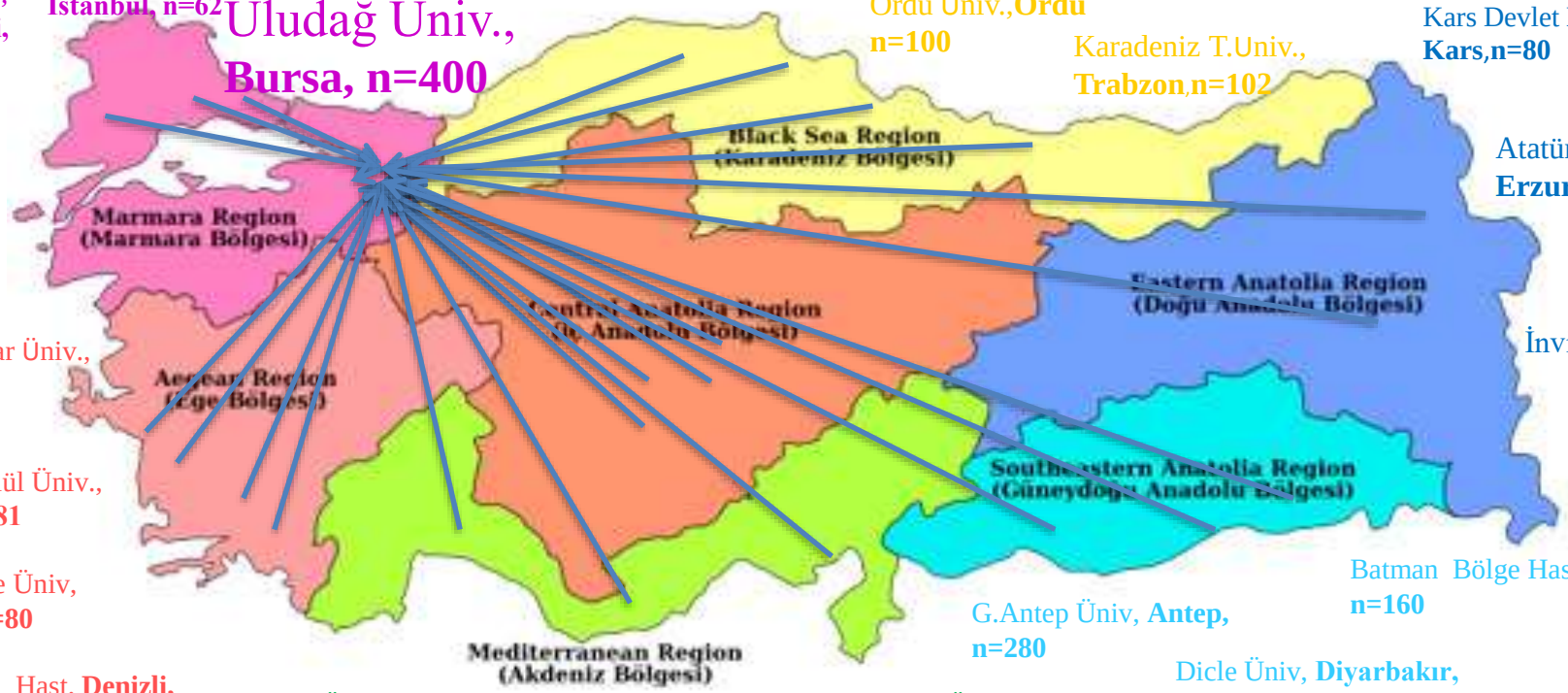
Keçi Ören Eğitim Hast., **Ankara,n=40**

Uludağ Üniv., **Bursa, n=400**

Ordu Univ.,**Ordu n=100**

Karadeniz T.Univ., **Trabzon,n=102**

Kars Devlet Hast., **Kars,n=80**



Atatürk Üniv., **Erzurum,n=240**

İnvitro Lab, **Ela**

Celal Bayar Üniv., **Manisa, n=120**

Dokuz Eylül Üniv., **İzmir, n=81**

Pamukkale Üniv, **Denizli,n=80**

Servergazi Hast, **Denizli, n=115**

Batman Bölge Hast., **Batman, n=160**

G.Antep Üniv, **Antep, n=280**

Dicle Üniv, **Diyarbakır, n=128**

Akdeniz Üniv, **Antalya, n=45**

Mersin Üniv, **Mersin,n=100**

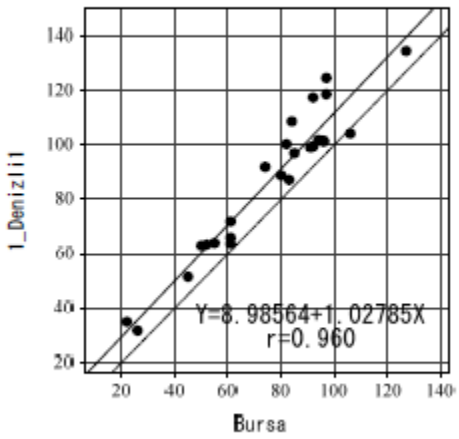
Adana Başkent Üniv, **Adana,n=100**

Medical Park Hast. **Antalya, n=80**

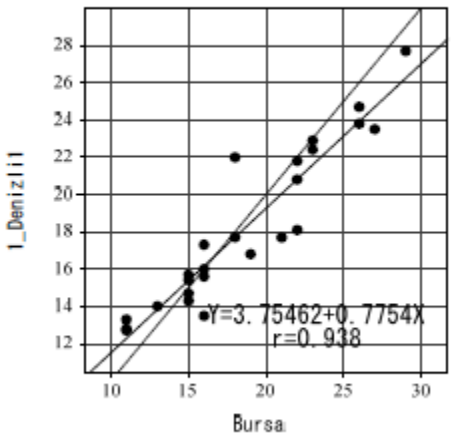
Serumlar kuru buz içerisinde Uludağ Üniversitesi'ne gönderildi, -80 ºC

Analyte, unit	Method	Traceability	Within day CV	Between day CV
TP, g/L	Biuret	_	0.75	1.05
ALB, g/L	Bromocresol green	_	1.24	1.27
UN, mmol/L	Urease, UV	SRM 1950	1.14	1.26
UA, µmol/L	Uricase, colorimetric	SRM 1950	0.56	0.95
CRE, µmol/L	Alkaline picrate	SRM 1950	1.19	1.13
DBil, µmol/L	Diazotization	_	2.10	2.04
TBil, µmol/L	Evelyn Malloy	_	0.84	1.07
GLU, mmol/L	Hexokinase	SRM 1950	1.33	1.96
TC, mmol/L	Enzymatic (CHOD) colorimetric method	SRM 1951b	1.12	1.74
TG, mmol/L	Enzymatic (CK/GPO) colorimetric method	SRM 1951b	2.13	1.49
HDL-C, mmol/L	Direct, non-immunological	SRM 1951b	1.34	2.41
LDL-C, mmol/L	Direct	SRM 1951b	1.19	1.92
Na, mmol/L	ISE indirect	SRM 1950	0.28	0.62
K, mmol/L	ISE indirect	SRM 1950	0.61	0.87
Cl, mmol/L	ISE indirect	SRM 1950	0.47	0.60
Ca, mmol/L	Arsenazo III	SRM 1950	0.52	1.04
IP, mmol/L	Phosphomolydate formation, UV	_	0.83	1.55
Mg, mmol/L	Enzymatic, UV	SRM 1950	2.03	2.24
Fe, µmol/L	Ferrene method	_	1.12	1.68
AST, U/L	UV without P5P	JCTLM Ref Lab.	2.48	1.91
ALT, U/L	UV without P5P	JCTLM Ref Lab.	1.79	1.61
LDH, U/L	Lactate-pyruvate, UV	JCTLM Ref Lab.	0.91	1.66
ALP, U/L	P-NPP, AMP	-	0.99	1.06
GGT, U/L	γ-Glutamyl-carboxy-nitroanilide	JCTLM Ref Lab.	2.37	2.93
CK, U/L	UV, NAC activated	JCTLM Ref Lab.	1.30	2.18
AMY, U/L	Choloro-nitrophenyl-maltotrioside	-	1.13	2.37

Fe



AST



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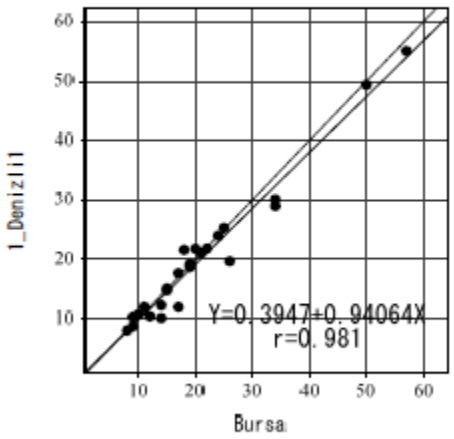
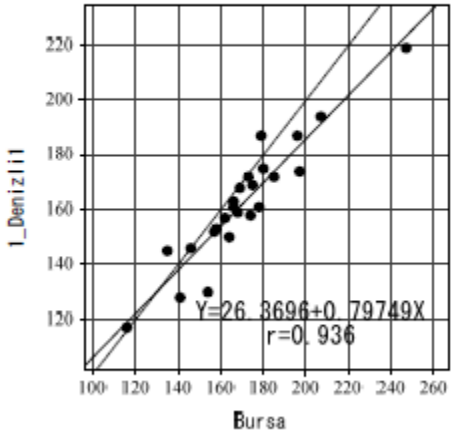
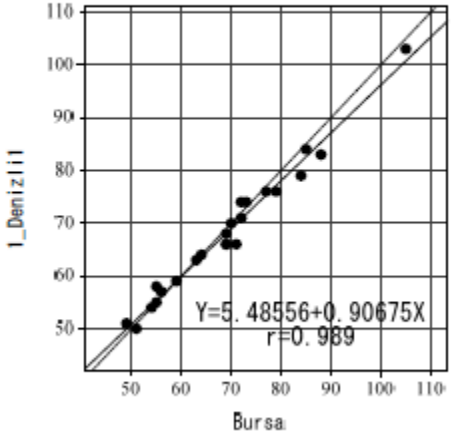


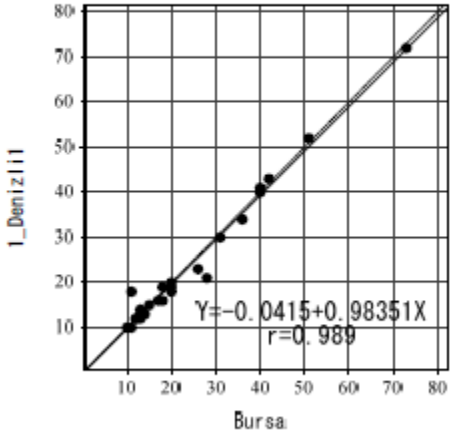
LDH



ALP



GGT



Analit	Ünite	Referans Aralık Çalışma Sonuçları			Firmalar Tarafından Önerilen Değerler					
		Erkek+Kadın	Erkek	Kadın	Abbott		Roche		Beckman	
TP	g/dL	6.6-8.2			6.6-8.7		6.6-8.7		6.6-8.3	
ALB	g/dL	4.0-5.0			3.5-5.0		3.9-5.0		3.5-5.2	
UN	mg/dL		8.0-20.0	6.0-18.0	9.0-21	7.0-19	0.0-24		8.0-25	
UA	mg/dL		3.7-7.7	2.8-5.8	3.4-7.0	2.4-5.7	3.4-7.0	2.4-5.7	3.5-7.2	2.6-6.0
CRE	mg/dL		0.7-1.1	0.6-0.9	0.7-1.2	0.5-0.9	0.7-1.2	0.5-0.9	0.8-1.4	0.7-1.09
TBil	mg/dL		0.22-1.3	0.16-0.93	0.0-1.2		0.0-1.0		0.3-1.2	
DBil	mg/dL	0.08-0.4			0.0-0.5		0.0-0.2		<0,2	
Na	mmol/L	137-144			136-145		136-145		136-146	
K	mmol/L	3.7-4.9			3.5-5.1		3.5-5.1		3.5-5.1	
Cl	mmol/L	99-107			98-107		98-107		101-109	
Ca	mg/dL	8.5-10.0			8.4-10.2		8.6-10.2		8.8-10.6	
P	mg/dL	2.4- 4.4			2.3-4.7		2.7-4.5		2.5-4.5	
Mg	mg/dL	1.9-2.7			1.6-2.7		1.4-2.1		1.8-2.6	1.9-2.5
GLU	mg/dL	70-105			70-105		70-115		74-106	
TC-C	mg/dL		123-247	124-228	50-200		50-200		<200	
TG	mg/dL		49-297	41-203	<150		60-150		<150	
HDL-C	mg/dL		31-61	38-75	40-70	40-80	40-70	40-80	>=60	
LDL-C	mg/dL		58-165	51-151	60-130		60-130		<100	
AST	U/L		13-30	11-25	5.0-34		0-40	0-32	<50	<35
ALT	U/L		8-44	7-22	0-55		0-41	0-33	<50	<35
LDH	U/L	126-222			125-243		135-225	135-215	208-378	
ALP	U/L		43-116	35-105	40-150		40-129	35-104	80-300	64-300
GGT	U/L		11-57	7-24	22.0-64	9.0-36	10.0-71	6.0-41	<55	<38
CK	U/L		48-227	34-131	30-200	29-168	39-308	26-192	<=171	<=145
AMY	U/L	34-119			25-125		28-100		28-100	

Yesim Ozarda*, Kiyoshi Ichihara, Diler Aslan, Hulya Aybek, Zeki Ari, Fatma Taneli, Canan Cok
Pinar Akan, Ali Riza Sisman, Onur Bahceci, Nurzen Sezgin, Meltem Demir, Gultekin Yucel, Ha
Akbas, Sebahat Ozdem, Gurbuz Polat, Ayse Binnur Erbagci, Mustafa Orkmez, Nuriye Mete, O
Evliyaoglu, Aysel Kiyici, Husamettin Vatansev, Bahadir Ozturk, Dogan Yucel, Damla Kayaalp,
Dogan, Asli Pinar, Mehmet Gurbilek, Cigdem Damla Cetinkaya, Okhan Akin, Muhittin Serdar,
Kurt, Selda Erdinc, Ozgur Kadicesme, Necip Ilhan, Dilek Sadak Atali, Ebubekir Bakan, Harun
Tevfik Noyan, Murat Can, Abdulkerim Bedir, Ali Okuyucu, Orhan Deger, Suret Agac, Evin Ader
Ayşem Kaya, Turkan Nogay, Nezaket Eren, Melahat Dirican, GulOzlem Tuncer, Mehmet Aykus
Gunes, Sevda Unalli Ozmen, Reo Kawano, Sehavet Tezcan, Ozlem Demirpence and Elif Degir

A multicenter nationwide reference intervals study for common biochemical analytes in Turk using Abbott analyzers

DOI 10.1515/cclm-2014-0228
Received March 1, 2014; accepted May 21, 2014; previously published online August 15, 2014

Abstract

population for 25 commonly tested biochemical a
and to explore sources of variation in reference
including regionality.

Methods: Blood samples were collected nation
28 laboratories from the seven regions (≥400 s

In this issue: Harmonization of Clinical Laboratory Test Results

The Journal of the International Federation of Clinical Chemistry and Laboratory Medicine

eJIFCC

Opinion paper: deriving harmonised reference intervals – global activities

Jillian R. Tate[1], Gus Koerbin[2], Khosrow Adeli[3]

[1] Pathology Queensland, Royal Brisbane and Women's Hospital, Brisbane, QLD, Australia
[2] NSW Health Pathology, Chatswood, NSW, Australia
[3] Clinical Biochemistry, The Hospital for Sick Children, University of Toronto, ON, Canada

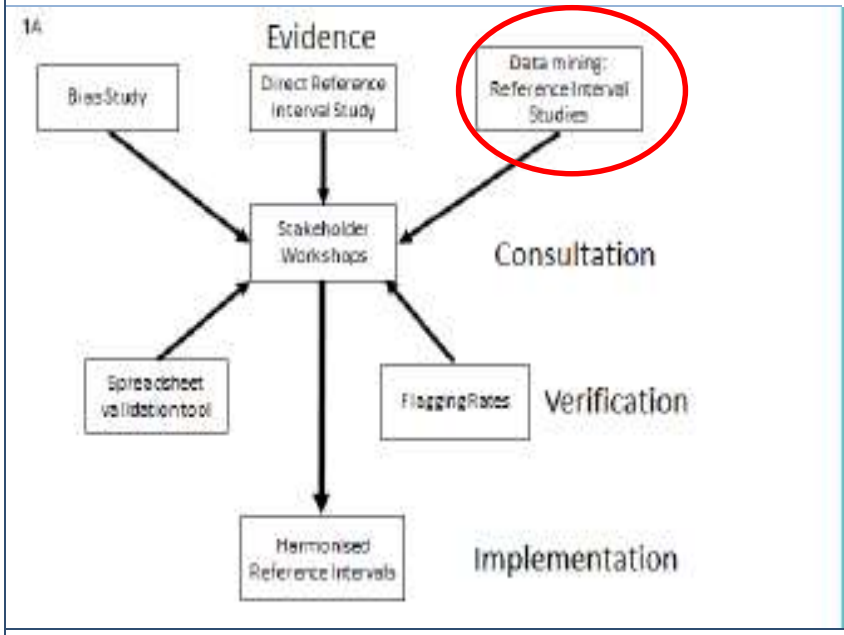
Harmonisation of reference intervals (RIs) refers to use of the same or common RI across different platforms and /or assays for a specified analyte. It occurs optimally for those analytes where there is sound calibration and traceability in place and evidence from a between-method comparison shows that bias would not prevent the use of a common RI. The selection of the RI will depend on various sources of information including local formal RI studies, published studies from the literature, laboratory surveys, manufacturer's product information, relevant guidelines, and mining of databases. Pre-analytical and partitioning issues, significant figures and flagging rates, are assessed for each analyte.

Several countries and regions including the Nordic countries, United Kingdom, Japan, Turkey, and Australasia are using common RIs that have been determined either by direct studies or by a consensus process. In Canada, the Canadian Society of Clinical Chemists Taskforce is assessing the feasibility of establishing common reference values using the CALIPER (Canadian Laboratory Initiative on Pediatric Reference Intervals) and CHMS (The Canadian Health Measures Survey) databases as the basis. Development of platform-specific common reference values for each

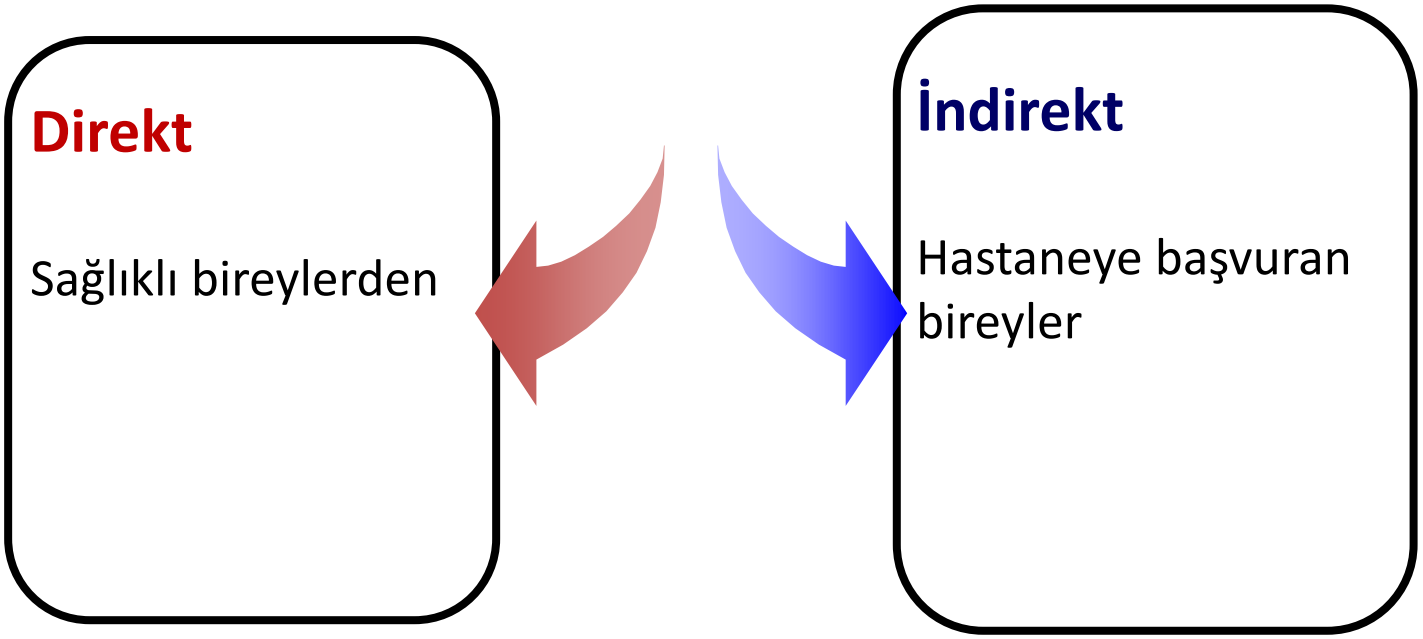
Table 3 Adult reference intervals (RIs) for chemistry analytes determined by direct RI studies or by consensus

Analyte	Unit	Australia[44] Cat 2a Direct Architect	Turkey[45] Cat 2a Direct Architect	Nordic countries[16] Cat 2a Direct Multiple platforms	United Kingdom[5] Cat 4 Consensus Multiple platforms	Japan[46] Cat 2a Direct 4 main platforms	Canada[28] Cat 2a Direct Architect	Australasia[2] Cat 4 Consensus 8 main platforms
Sodium (M)	mmol/L	136-145	137-144	137-145	133-146	137-144	16-49y: 137-142 50-79y: 136-143	135-145
Sodium (F)	mmol/L	136-145	137-144	137-145	133-146	137-144	16-49y: 137-143 50-79y: 136-143	135-145
Potassium	mmol/L	3.7-4.9	3.7-4.9	3.6-4.6	3.5-5.3	3.6-4.8	3.8-4.9	3.5-5.2
Chloride	mmol/L	101-110	99-107	-	95-108	101-108	30-79y: 102-108	95-110
Bicarbonate	mmol/L	20-29*	-	-	22-29	-	19-26	22-32
Creatinine (M)	µmol/L	<75y: 65-103 75+y: 47-120	59-92	60-100	60-100	57-94	16-79y: 63-102	60-110***
Creatinine (F)	µmol/L	<75y: 54-83 75+y: 40-91	50-71	50-90	60-100	41-69	17-79y: 49-85	45-90***

Analyte	Creatinine (plasma and serum)
Population RI	Based on healthy subjects not hospital patients. eGFR used for decision making.
Units	µmol/L
JCTLM-listed traceability or preferred method and reference material	ID-GC/MS and ID-LC/MS (some methods require instrument factors). SRM 914 (pure creatinine). SRM 909, 967 (human serum).
Pre-analytics 1. Serum/plasma 2. Sample collection 3. Interferences	1. Interchangeable. 2. Increases with meat consumption.
Analytical differences	Analytically there are no differences.
Partitioning by 1. Gender 2. Age	1. Gender differences. 2. Age-related increases above 60 years not agreed by Renal Physicians.
Reporting Interval	1 µmol/L



REFERANS ARALIK ÇALIŞMALARI



Verilerin Toplanması

Solberg HE. **IFCC.** Approved recommandation on the theory of reference values. **Part III. Preparation of individuals and collection of specimens for the production of reference values.** Clin Chim Acta 1988;177:S1-12

C28-A3 Kılavuzu (CLSI, IFCC)

- ✓120 örnek ile direkt referans aralıkları yada 20 örnek ile onay
- ✓Bazı analitler için karar limitlerini kullanımı
- ✓Çok merkezli çalışmalar; Genel referans aralıkları
- ✓Çocuk ve yaşlı gruplarda indirekt referans aralıkları

Clin Chem Lab Med 2006;44(7):867–876 © 2006 by Walter de Gruyter • Berlin • New York. DOI 10.1515/CCLM.2006.139

Use of total patient data for indirect estimation of reference intervals for 40 clinical chemical analytes in Turkey

Yesim Ozarda Ilcol[1,*] and Diler Aslan[2]

[1] Department of Biochemistry, Uludag University Medical School, Bursa, Turkey
[2] Department of Biochemistry, Pamukkale University Medical School, Denizli, Turkey

Abstract

In the present study we used patient data to calculate laboratory-specific indirect reference intervals. These values were compared with reference intervals obtained for a healthy group according to recommendations of the International Federation of Clinical Chemistry and Laboratory Medicine and manufacturer suggestions. Laboratory results (422,919 records) from all subjects of 18–45 years of age over a 1-year period were retrieved from our laboratory information system and indirect reference intervals for 40 common analytes were estimated using a modified Bhattacharya procedure. Indirect reference intervals for most of the biochemical analytes were comparable, with small differences in lower [alkaline phosphatase (ALP) (male), alanine aminotransferase (ALT), creatine kinase, iron (male), total iron-binding capacity, folic acid, calcium (female), lactate dehydrogenase (LDH), lipoprotein (a) [Lp(a)], thyroid-stimulating hormone (TSH), total triiodothyronine (T_3), direct bilirubin, apolipoprotein A-I (apoA-I), glucose, homocysteine, total cholesterol, ferritin, total protein, ceruloplasmin, sodium, blood urea nitrogen (BUN) and uric acid (female)] and/or upper limits [albumin, ALP (male), amylase, apoA-I, creatine kinase-MB (CK-MB), total iron-bind-

Keywords: biochemical analytes; healthy subjects; indirect reference intervals; manufacturer suggestions; modified Bhattacharya procedure; patient data; Turkish population.

Introduction

Reference values and intervals serve as the basis for interpreting laboratory test results and aid the physician in differentiating between healthy and diseased patients. It is important to compare patient results with reference values and intervals derived from a matched population using defined statistical methods. The production of such reference values and the determination of reference intervals are very important tasks in clinical chemistry. In a series of articles (1–6) on reference values and intervals, the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) outlined recommendations for the establishment of reference intervals in the individual clinical chemistry laboratory. The IFCC documents describe the basic concepts of the theory of reference values (1) and recommend procedures for the selection of reference individuals (2), specimen collection and handling (3), the control of analytical variation in the production and application of reference values (4), statistical procedures for the estimation of reference values (5) and the presentation of reference values (6). The IFCC also recommends that each laboratory should produce its own reference intervals (1).

Clinical Chemistry 51:7
1232–1240 (2005)

Laboratory Management

The REALAB Project: A New Method for the Formulation of Reference Intervals Based on Current Data

ENZO GROSSI,[1] ROBERTO COLOMBO,[2] SILVIO CAVUTO,[3] and CARLO FRANZINI[4*]

Background: **In a primary healthcare center concerned more with maintaining wellness than with diagnosing and monitoring illness, it is particularly important to compare patients' results with reference intervals derived from a matched population by use of defined statistical methods.**

Methods: **Laboratory results over a 3-year period (~15 000 000 records; 197 350 individuals) were retrieved from our laboratory information system. An inclusion/exclusion procedure for individual patients was applied based on (*a*) presence of at least 1 of 23 previously defined "basic tests"; (*b*) only 1 measurement per test by the laboratory over the 3-year period; (*c*) for each test, absence of any abnormality in the correlated tests. analysis of large samples of data obtained at a given institution are particularly suitable for the evaluation of results for the presenting patient population at that institution.**

Despite progress in the conceptual aspects of reference values *(1–7)*, in practice their use is still not entirely satisfactory *(8, 9)*. There are two major reasons for this unsatisfactory situation. One factor is the metrologic uncertainty of measurements, particularly with regard to their trueness and method dependence. This uncertainty jeopardizes the transferability of reference values over

- Dışlama kriterleri
- Uç değerlerin eliminasyonu
- Klinik bilgi
- Kullanılan metod

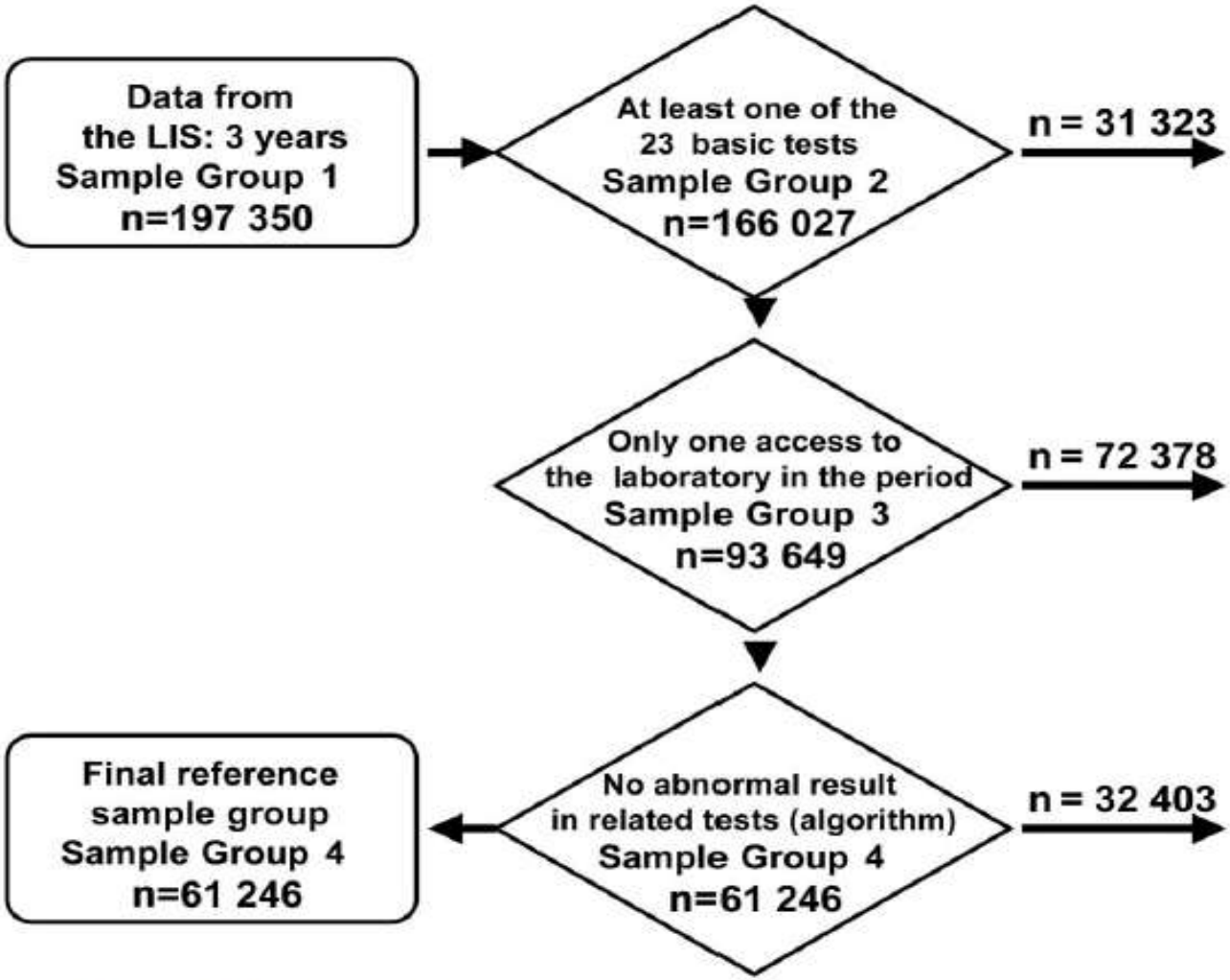


Fig. 1. Flow chart of the multistep inclusion/exclusion procedure.

A reference interval study for common biochemical analytes in Eastern Turkey: a comparison of a reference population with laboratory data mining

Ebubekir Bakan[1], Harun Polat[1], Yesim Ozarda[2], Nurinnisa Ozturk*[1], Nurcan Kilic Baygutalp[1], Fatma Zuhal Umudum[1], Nuri Bakan[1]

[1]Department of Medical Biochemistry, Ataturk University, School of Medicine, Erzurum, Turkey
[2]Department of Medical Biochemistry, Uludag University, School of Medicine, Bursa, Turkey

*Corresponding author: nurinnisa.ozturk@gmail.com

Abstract

Introduction: The aim of this study was to define the reference intervals (RIs) in a Turkish population living in Northeast Turkey (Erzurum) for 34 analytes using direct and indirect methods. In the present study, the regional RIs obtained were compared with other RI studies, primarily the nationwide study performed in Turkey.

Materials and methods: For the direct method, 435 blood samples were collected from a healthy group of females (N = 218) and males (N = 217) aged between 18 and 65 years. The sera were analysed in Ataturk University hospital laboratory using Roche reagents and analysers for 34 analytes. The data from 1,366,948 records were used to calculate the indirect RIs using a modified Bhattacharya method.

Results: Significant gender-related differences were observed for 17 analytes. There were also some apparent differences between RIs derived from indirect and direct methods particularly in some analytes (e.g. gamma-glutamyltransferase, creatine kinase, LDL-cholesterol and iron). The RIs derived with the direct method for some, but not all, of the analytes were generally comparable with the RIs reported in the nationwide study and other previous studies in Turkey.There were large differences between RIs derived by the direct method and the expected values shown in the kit insert (e.g. aspartate aminotransferase, total-cholesterol, HDL-cholesterol, and vitamin B12).

Conclusions: These data provide region-specific RIs for 34 analytes determined by the direct and indirect methods. The observed differences in RIs between previous studies could be related to nutritional status and environmental factors.

Key words: reference intervals; direct method; indirect method; Bhattacharya method; regional differences

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A SIMPLE METHOD OF RESOLUTION OF A DISTRIBUTION INTO GAUSSIAN COMPONENTS

C. G. BHATTACHARYA

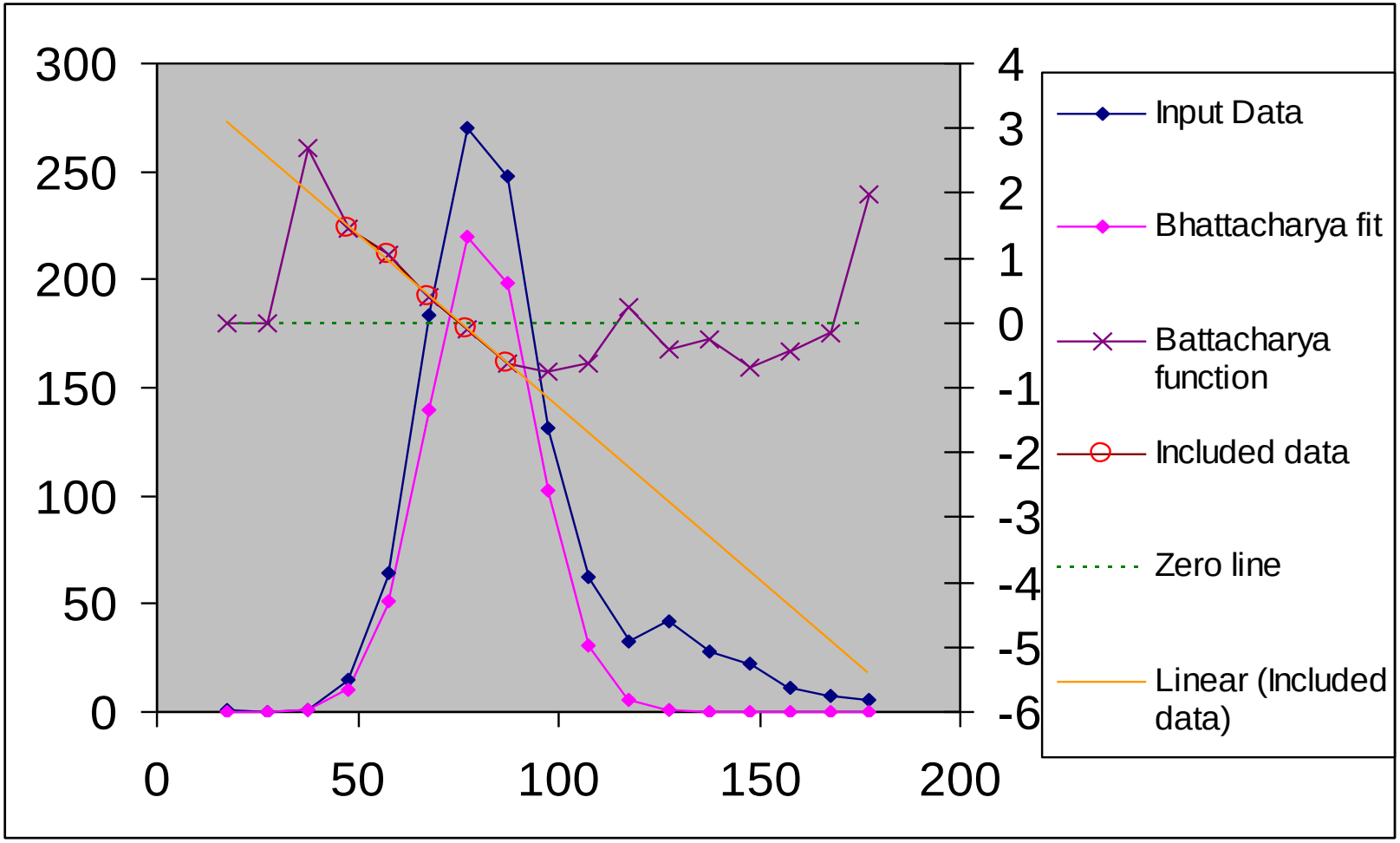
Central Inland Fisheries Research Institute, Barrackpore, India[1]

SUMMARY

An approximate method of solution is given of the problem of resolution of a distribution into Gaussian components when the component distributions are adequately separated. Illustrative examples are given.

- Bhattacharya, LG. Journal of the Biometric Society. 1967;23:115-135.

Bhattacharya yöntemi



İndirekt Referans Aralıkları Çalışması

Selçuk Üniv.,
Konya

Uludağ Üniv.,
Bursa

Karadeniz
T.Univ.,
Trabzon

Atatürk Üni
Erzurum

Celal Bayar
Üniv.,
Manisa

Pamukkale Üniv,
Denizli

Medikal Park,
Antalya

Dicle Üniv,
Diyarbakır

Yeni gerçekleşecek i-RA çalışmasında

- Bu çalışma yine 7 bölgemizi içerecek şekilde, çok merkezli olarak gerçekleştirilecektir

- Öncelikle ‘d-RA’ belirleme çalışmasına katılan merkezler ve d-RA çalışmasının yapıldığı dönem baz alınacak

Gerçekleşecek i-RA çalışmasında

- Öncelikle Bhattacharya olmak üzere çeşitli i-RA hesaplama yöntemleriyle hesaplanacak,
- d-RA ile karşılaştırılacak, optimizasyon sağlanacak,
- Daha sonra diğer parametreler ve tüm yaş gruplarına yaygınlaştırılacak

Hematoloji Parametreleri Referans Aralıkları

İstanbul FSM Hastanesi, Kuzey Lab.
İstanbul

Selçuklu Univ.,
Selçuklu,
Konya

Keçi Ören Hastanesi,
Ankara

Ordu Univ.,**Ordu**

Karadeniz T.Univ.,
Trabzon

Atatürk Univ.,
Erzurum

Uludağ Univ.,
Bursa

Dokuz Eylül Univ.,
İzmir

Celal Bayar Univ.,
Manisa,

Medical Park Hastanesi,
Antalya

Mersin Univ,
Mersin

Harran Univ, **Urfa,**

Dicle Univ, **Diyarbakır,**

Pathology (October 2014) 46(6), pp. 538–543

HAEMATOLOGY

A survey of Australian haematology reference intervals

LEANNE SINCLAIR[1,2], SARA HALL[3] AND TONY BADRICK[2]

[1]Sullivan Nicolaides Pathology, Brisbane, [2]Bond University, Robina, Qld, and [3]PathWest, Perth, WA, Australia

Summary

This study was designed to create a snapshot of Australian haematology reference intervals (RIs) in use, in particular red cell parameters. We present an analysis of survey results conducted across Australian laboratories between November 2012 and January 2013. All Australian laboratories enrolled in the Royal College of Pathologists of Australasia Quality Assurance Program (RCPA QAP) were invited to participate in the December 2012 Survey Monkey survey, with a response from 85 laboratories (17%) received. The scope included laboratory demographics (location, size/throughput, and network), RIs in use for the full blood count and selected derived parameters, their frequency of revision, source and statistical approach for derivation. Further questions related to uncertainty of measurement, pregnancy values, paediatric/adult cut-off, haematology profiles reported and the use of extended parameters. There is more consistency with some upper and lower limits than others, and wide ranges for reported uncertainty of measurement (UM). There is no apparent consistency with RIs used for

own RIs from a valid reference population because of cost and time constraints, with further challenges for sex and age specific ranges. The RIs for the most commonly used haematology parameters are commonly derived from 'transferring' other laboratories' or an older method, text books and scientific papers, or manufacturers' recommendations. For laboratories that do determine their own RIs, there are no clear guidelines for the statistical approach (parametric, transformed parametric, non-parametric) or sample size and so the resultant RIs. Recently, indirect methods such as data mining for determining RIs have been described, using extremely large sample numbers (>900,000), and this has been proposed as a more powerful alternative to direct methods.[2]

The lower limit of the haemoglobin RI defines when a patient is anaemic or not. Databases exist listing ethnic variations and sex/age differences for lower limits of normal[3] but they illustrate the considerable variation and question what are reasonable benchmarks for the definition of anaemia. The World Health Organization (WHO) published recommendations of haemoglobin (Hb) levels to diagnose anaemia at sea level in

Review

Reference intervals: current status, recent developments and future considerations

Yesim Ozarda

Department of Medical Biochemistry, Uludag University School of Medicine, Bursa, Turkey

Corresponding author: yesim@uludag.edu.tr

Biochemia Medica 2016;26:5-16

- Çok merkezli çalışmalar
- Referans Aralıklarının harmonizasyonu
- İndirekt referans aralıklarının değerlendirilmesi

Sonuç

- Elimizde çok değerli bir kaynak mevcut: Laboratuvar Verileri
- Veri madenciliği yöntemlerinin kullanımı
- İndirekt Referans Aralıkları
- Çok merkezli çalışmalar; EKİP ÇALIŞMASIDIR
- İletişim ve işbirliği şart