SCREENING FOR KIDNEY DISEASES IN THE CAMP: WHICH TOOLS FOR THE BEST EFFICIENCY?

Pierre Delanaye, MD, PhD

Nephrology Dialysis and Transplantation

University of Liège

CHU Sart Tilman

Liège

BELGIUM

Conflict of interest

- I have no conflict of interest to declare
- I am nephrologist and my area of expertise is CKD epidemiology, GFR estimation and measurement
- I have no experience in humanitarian medicine
- I thank my friend, Dr Jean-Paul Jemmy, who helped me for this presentation

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Where? Why? Who?

- Acute kidney Injury

Most of the time AKI is associated with other diseases, especially in all diseases with a risk of dehydration (especially if dryness)

AKI due to rhabdomyolysis in the context of earthquake

- Chronic Kidney Disease

The silent killer

5 to 10% of the population

Diabetes

Each year, we welcome refugees with end stage renal diseases

Renal replacement therapy for refugees with end-stage kidney disease: an international survey of the nephrological community

Wim Van Biesen[1,2], Raymond Vanholder[1,2,3], Bert Vanderhaegen[4,5], Norbert Lameire[1,2], Christoph Wanner[6,7], Andrzej Wiecek[6,8], Mehmet S. Sever[2,9], Johan Feehally[10,11], Remuyza Kazancioglu[10,12], Eric Rondeau[10,13], Adeera Levin[10,14] and David Harris[10,15]

[1]Renal Division, Ghent University Hospital, Ghent, Belgium; [2]Renal Disaster Relief Task Force (RDRTF), International Society of Nephrology, Ghent, Belgium; [3]European Kidney Health Alliance, Brussels, Belgium; [4]Hospital and Research Ethics Committee, Ghent University Hospital, Ghent, Belgium; [5]Centre for Ethics in Medicine, University of Bristol, Bristol, UK; [6]European Renal Association-European Dialysis and Transplant Association (ERA-EDTA), Parma, Italy; [7]Renal Division, University Hospital of Würzburg, Würzburg, Germany; [8]Department of Nephrology, Transplantation and Internal Medicine Medical University of Silesia, Katowice, Poland; [9]Department of Nephrology, Istanbul School of Medicine, Istanbul, Turkey; [10]The International Society of Nephrology, Brussels, Belgium; [11]Department of Nephrology, Leicester General Hospital, Leicester, UK; [12]Department of Nephrology, School of Medicine, Bezmialen Vakif University, Istanbul, Turkey; [13]Renal Division, Assistance Publique-Hôpitaux de Paris, Tenon Hospital, Paris, France; [14]Division of Nephrology, University of Columbia, Vancouver, British Columbia, Canada; and [15]Sydney Medical School—Westmead University of Sydney, Westmead Hospital, Sydney, Australia

Kidney International Supplements (2016) **6**, 35–41

Table 1 | Geographic origin of respondents, with numbers of refugees on dialysis, by country

Region	Country (centers [*n*], refugees on dialysis in preceding 4 months [*n*])
Central and Eastern Europe	Albania (2, 2), Bulgaria (2, 0), Croatia (2, 0), Czech Republic (6, 0), Estonia (1, 0), Hungary (1, 1), Lithuania (6, 0), Macedonia (2, 2), Poland (2, 0), Romania (12, 0), Serbia (2, 8), Slovenia (4, 1), Turkey (23, 121)
Southern Europe	Greece (17, 22), Italy (13, 3), Portugal (1, 0), Spain (15, 3)
Middle East	Israel (5, 1), Iran (7, 6), Iraq (2, 30), Jordan (1, 0), Kuwait (1, 9), Lebanon (3, 31), Saudi Arabia (5, 20), United Arab Emirates (3, 1), Yemen (1, 80)
North Africa	Algeria (1, 2), Egypt (7, 0), Morocco (4, 0), Tunisia (3, 0)
North America	Canada (1, 0)
Scandinavian Europe	Denmark (3, 2), Finland (2, 0), Norway (1), Sweden (20, 32)
Western Europe	Austria (3, 3), Belgium (20, 67), France (15, 61), Germany (14, 28), Ireland (2, 0), Luxembourg (1, 0), Scotland (1, 0), Switzerland (17, 33), The Netherlands (27, 28), United Kingdom (18, 113)

ESRD: how many die on the way to Europe???

Table 2 | Staging of AKI

Stage	Serum creatinine	Urine output
1	1.5–1.9 times baseline OR $\geqslant$0.3 mg/dl ($\geqslant$26.5 μmol/l) increase	<0.5 ml/kg/h for 6–12 hours
2	2.0–2.9 times baseline	<0.5 ml/kg/h for $\geqslant$12 hours
3	3.0 times baseline OR Increase in serum creatinine to $\geqslant$4.0 mg/dl ($\geqslant$353.6 μmol/l) OR Initiation of renal replacement therapy OR, In patients <18 years, decrease in eGFR to <35 ml/min per 1.73 m^2	<0.3 ml/kg/h for $\geqslant$24 hours OR Anuria for $\geqslant$12 hours

Prognosis of CKD by GFR and albuminuria categories: KDIGO 2012

			Persistent albuminuria categories Description and range		
			A1	A2	A3
			Normal to mildly increased	Moderately increased	Severely increased
GFR categories (ml/min/1.73 m²) Description and range			< 30 mg/g < 3 mg/mmol	30–300 mg/g 3–30 mg/mmol	> 300 mg/g > 30 mg/mmol
G1	Normal or high	≥ 90			
G2	Mildly decreased	60–89			
G3a	Mildly to moderately decreased	45–59			
G3b	Moderately to severely decreased	30–44			
G4	Severely decreased	15–29			
G5	Kidney failure	< 15			

REVIEW www.jasn.org

CKD: A Call for an Age-Adapted Definition

Pierre Delanaye,[1] Kitty J. Jager,[2] Arend Bökenkamp,[3] Anders Christensson,[4] Laurence Dubourg,[5] Bjørn Odvar Eriksen,[6,7] François Gaillard,[8] Giovanni Gambaro,[9] Markus van der Giet,[10] Richard J. Glassock,[11] Olafur S. Indridason,[12] Marco van Londen,[13] Christophe Mariat,[14] Toralf Melsom,[6,7] Olivier Moranne,[15] Gunnar Nordin,[16] Runolfur Palsson,[12,17] Hans Pottel,[18] Andrew D. Rule,[19] Elke Schaeffner,[20] Maarten W. Taal,[21] Christine White,[22] Anders Grubb,[23] and Jan A. J. G. van den Brand[24]

J Am Soc Nephrol. 2019 Oct;30(10):1785-1805.

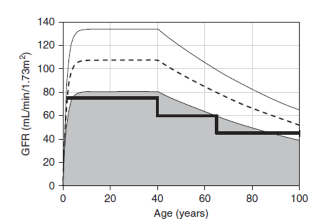

Figure 3. Age-specific thresholds in relation to age-specific GFR percentiles. GFR cut-off values and percentiles according to age (here percentiles of eGFR are calculated using the FAS equation). The bold line represents an age-adapted threshold for CKD: 75 ml/min per 1.73 m^2 for age below 40 years, 60 ml/min per 1.73 m^2 for age between 40 and 65 years, and 45 ml/min per 1.73 m^2 for age above 65 years. The dashed line represents the median (50th percentile) and the thin solid lines represent the 97.5th and 2.5th percentiles. The shaded zone is considered as below the normal reference intervals for GFR (<2.5th percentile).

Doocy *et al. BMC Public Health* (2015) 15:1097
DOI 10.1186/s12889-015-2429-3

BMC Public Health

RESEARCH ARTICLE Open Access

Prevalence and care-seeking for chronic diseases among Syrian refugees in Jordan

Shannon Doocy[1*], Emily Lyles[1], Timothy Roberton[1], Laila Akhu-Zaheya[2], Arwa Oweis[2] and Gilbert Burnham[1]

- 1550 Syrian refugees in Jordan
- Survey about HTA, CV diseases, diabetes, COPD, arthritis

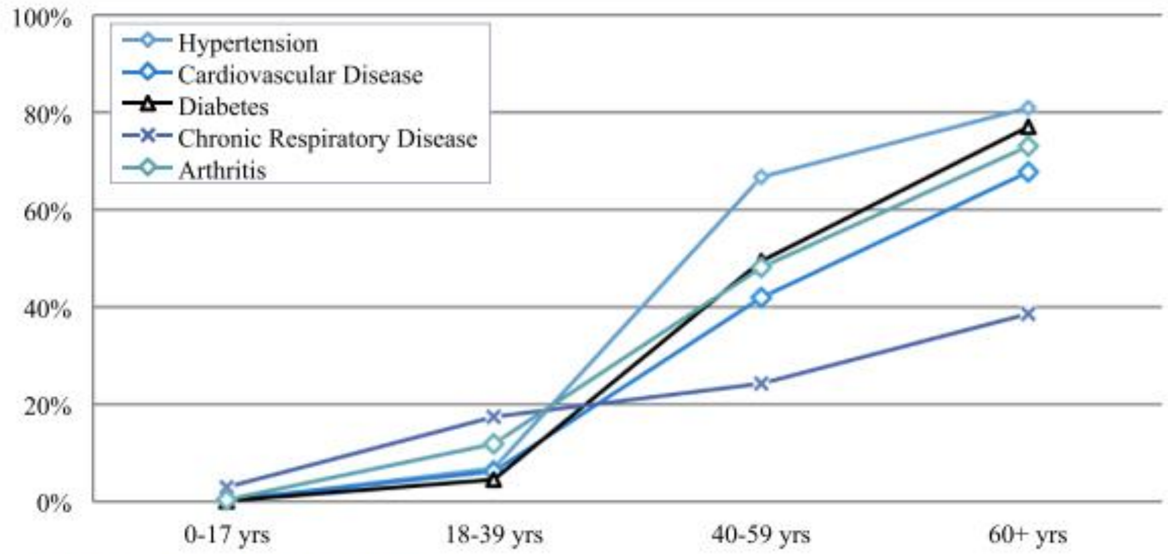

Fig. 3 Age specific prevalence rates of chronic health conditions

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Serum creatinine: Point of care (POC)

- Not in every situation…
- Before CT-Scan with contrast (as an example)
- Certainly in humanitarian situations…

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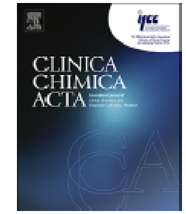


Estimated glomerular filtration rate using a point of care measure of creatinine in patients with iohexol determinate GFR

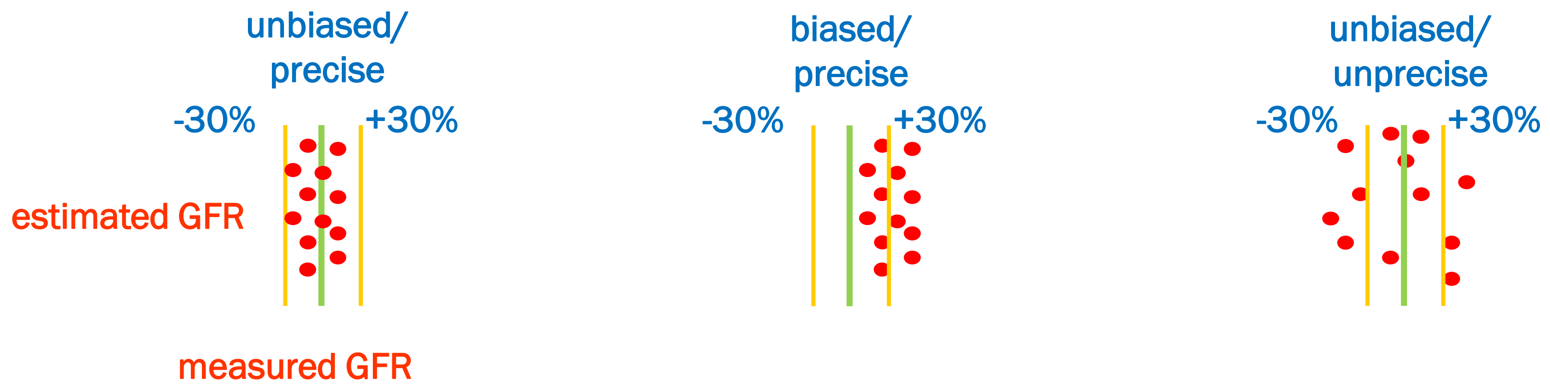
Violeta Stojkovic[a,*], Pierre Delanaye[b], Gregory Collard[a], Nunzio Ferrante[a], Caroline Le Goff[a], Laurence Lutteri[a], Etienne Cavalier[a]

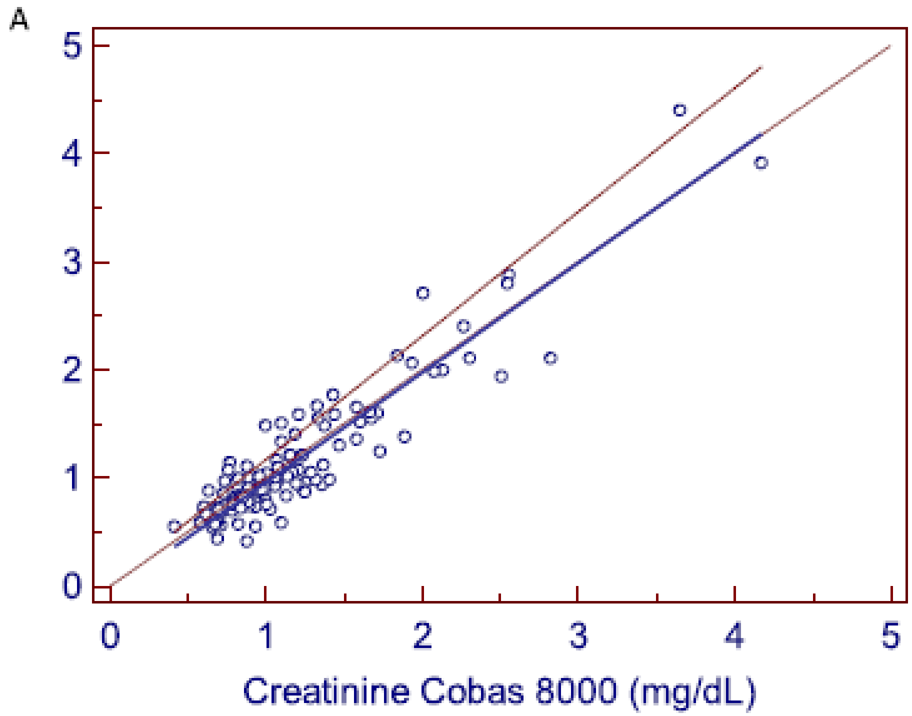
[a] Department of Clinical Chemistry, University of Liège, CHU Sart-Tilman, 4000 Liège, Belgium
[b] Nephrology, Dialysis, Transplantation, University of Liège, CHU Sart-Tilman, 4000 Liège, Belgium

- Creatinine measured with Enzymatic assay (Roche Cobas)
- Creatinine measured by POC capillary (StatSensor, Nova Medical)
- GFR estimated by the CKD-EPI$_{2009}$ equation
- GFR measured by iohexol plasma clearance
- 120 subjects, 52 ± 13 years, 49% of women, mean mGFR was 77 ± 27 mL/min/1.73m² (29 patients with mGFR<60 mL/min/1.73m²)

Statistics

- Good correlation: a "*sine qua non*" condition but insufficient
- Bias: mean difference between two values = the systematic error
- Precision: SD around the bias = the random error
- Accuracy 30% = % of eGFR between ± 30% of measured GFR





Passing-Bablok: Creatinine (POC)=1.02 x Creatinine (Cobas) – 0.07

95% CI: 0.93 to 1.15 for slope

−0.20 to 0.020 for intercept

POC Cobas

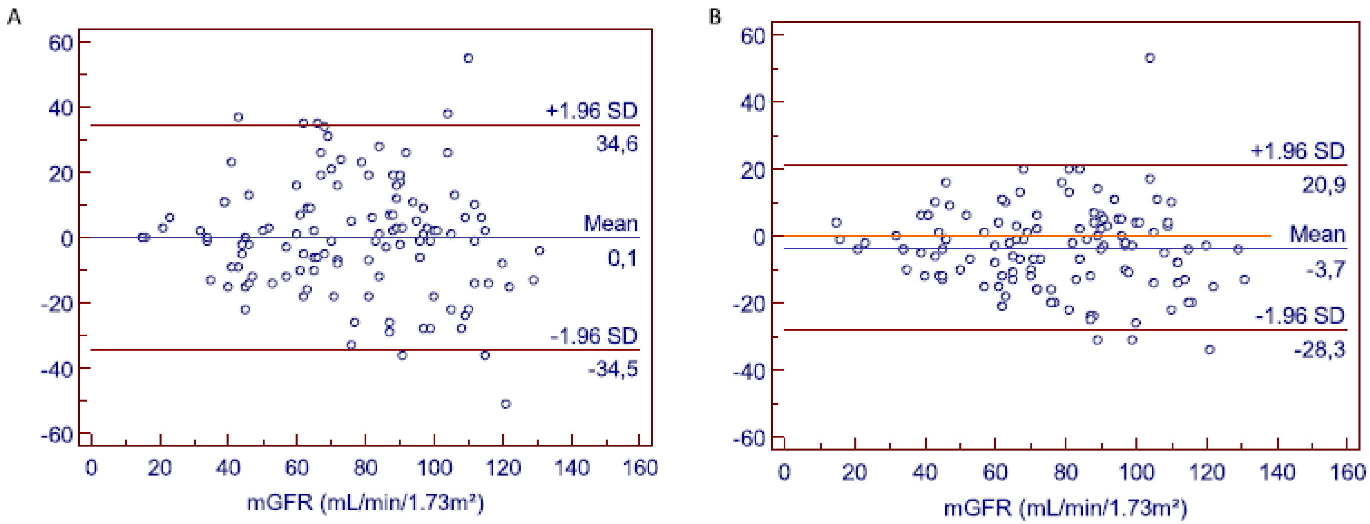


Fig. 2. (A) Bland-Altman chart of the eGFR (mL/min/1.73m^2) obtained with the POC (Statsensor) in comparison to mGFR (mL/min/1.73m^2). (B) Bland-Altman chart of the eGFR (mL/min/1.73m^2) obtained with the Cobas 8000 in comparison to mGFR (mL/min/1.73m^2).

Accuracy within 30%: 81% POC
95% Cobas
(p=0,0017)

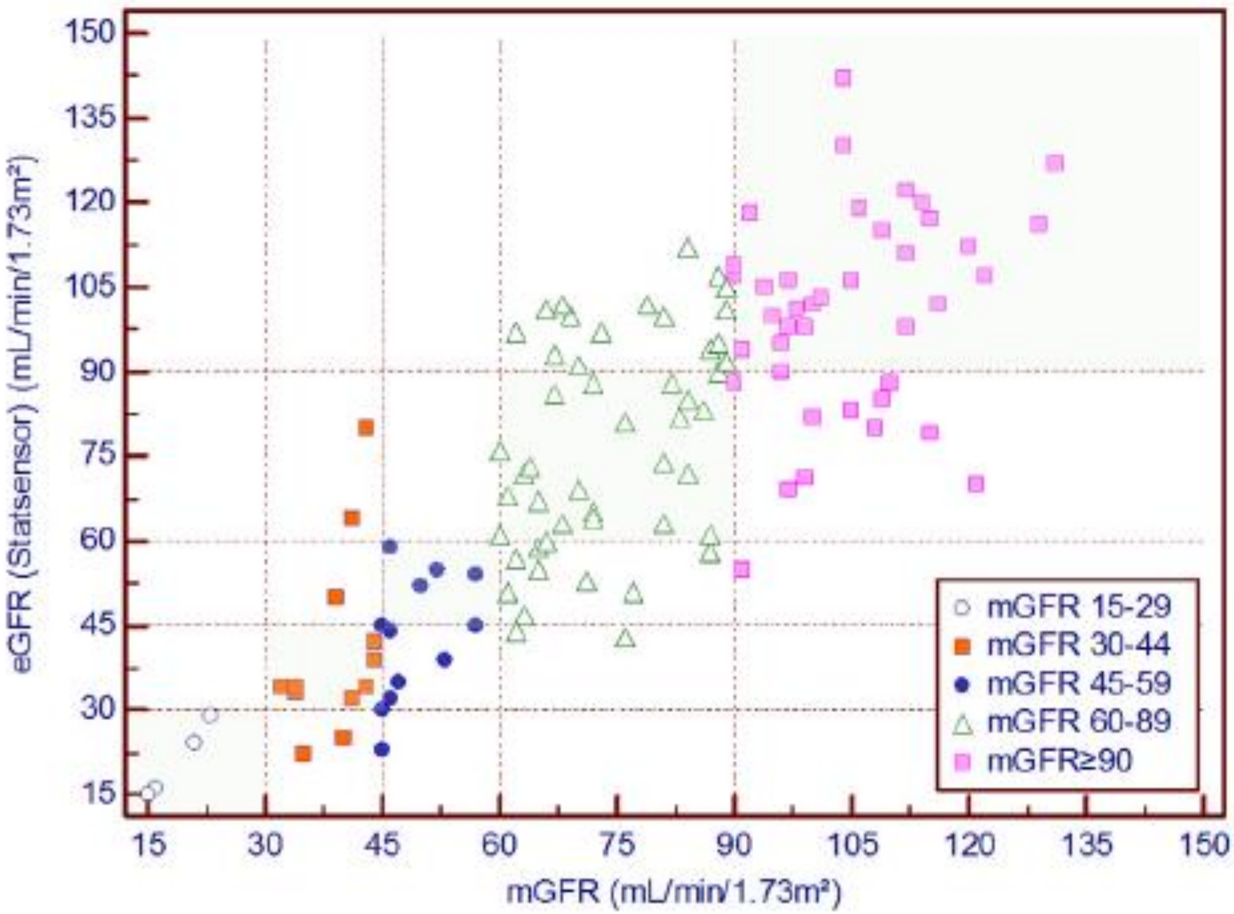


Fig. 3. Concordance of eGFR (mL/min/1.73m^2) obtained with Statsensor with mGFR (mL/min/1.73m^2) for categorizing CKD stages.

Zone of concordance calculated at 58% (70/120).

Zone of concordance calculated at 63% (76/120) with Cobas

DE GRUYTER Clin Chem Lab Med 2021; aop

Sean Currin*, Mwawi Gondwe, Nokthula Mayindi, Shingirai Chipungu, Bongekile Khoza, Lungile Khambule, Tracy Snyman, Stephen Tollman, June Fabian and Jaya George, on behalf of the ARK Consortium

Evaluating chronic kidney disease in rural South Africa: comparing estimated glomerular filtration rate using point-of-care creatinine to iohexol measured GFR

Clin Chem Lab Med. 2021 Mar 15;59(8):1409-1420.

- Creatinine measured with kinetic Jaffe assay (Roche Cobas)
- Creatinine measured by POC (StatSensor capillary and venous, Nova Medical and iSTAT, Abbott)
- GFR estimated by the CKD-EPI$_{2009}$ equation
- GFR measured by iohexol plasma clearance
- N=674, 43 ± 14 years, 59% of women, mean mGFR was 81 ± 24 mL/min/1.73m² (134 patients with mGFR<60 mL/min/1.73m²)

DE GRUYTER

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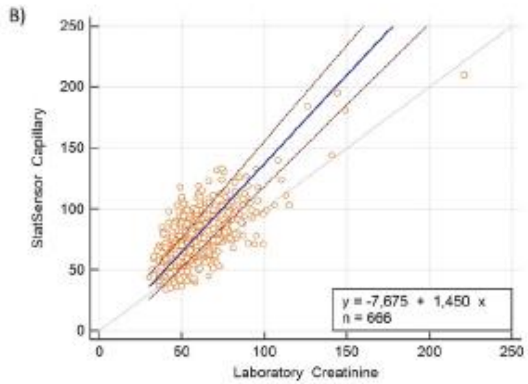
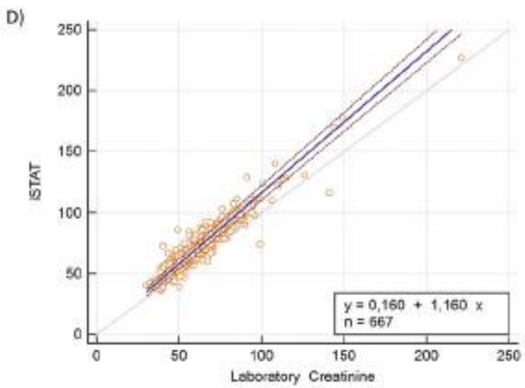


Passing-Bablok: Creatinine (POC)=1.45 x Creatinine (Cobas) – 7,68

95% CI: 1,33 to 1.57 for slope

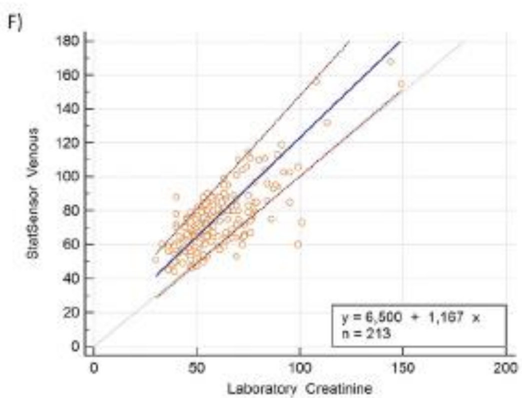
−14,43 to -1,33 for intercept



Passing-Bablok: Creatinine (POC)=1.16 x Creatinine (Cobas) + 0,16

95% CI: 1,13 to 1.20 for slope

−2,2 to -2,13 for intercept



Passing-Bablok: Creatinine (POC)=1.17 x Creatinine (Cobas) +6,50

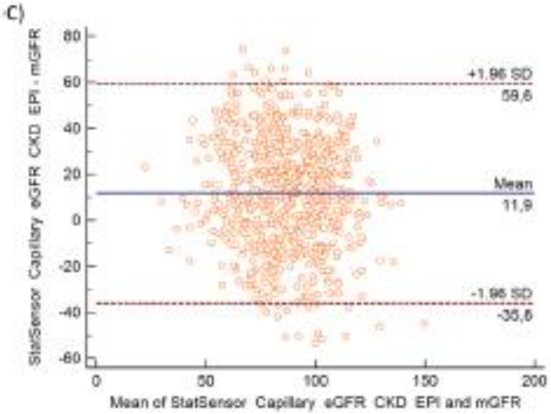
95% CI: 1,03 to 1.33 for slope

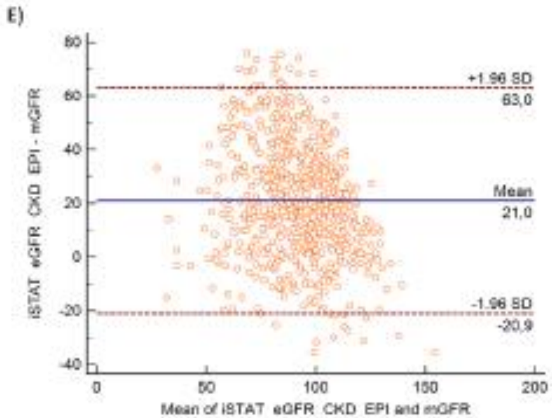
−2,33 to 14,58 for intercept

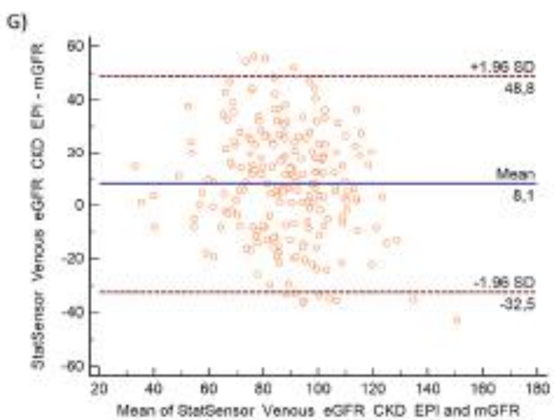
StatSensor® capillary + iohexol mGFR **n= 670**

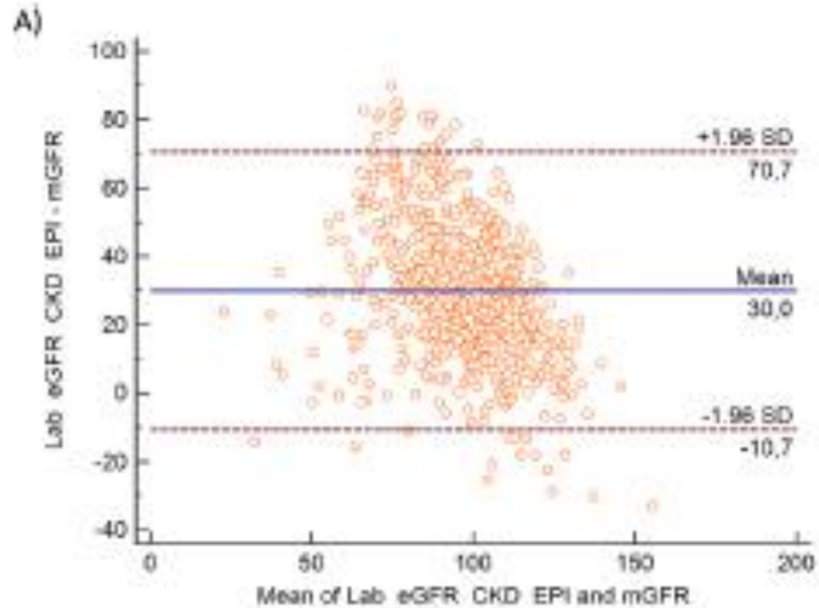
iSTAT® + iohexol mGFR **n= 667**

StatSensor® venous + iohexol mGFR **n= 214**

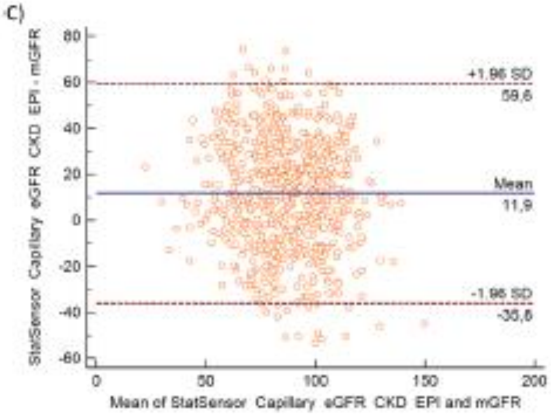


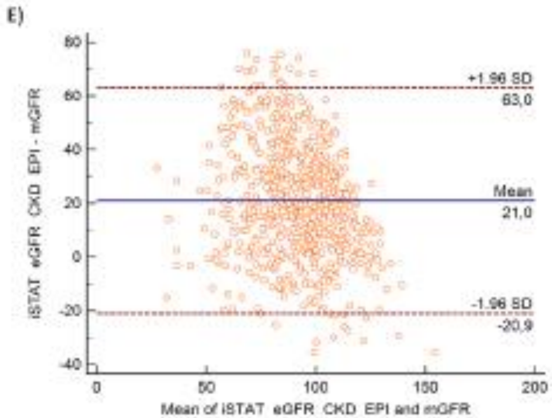


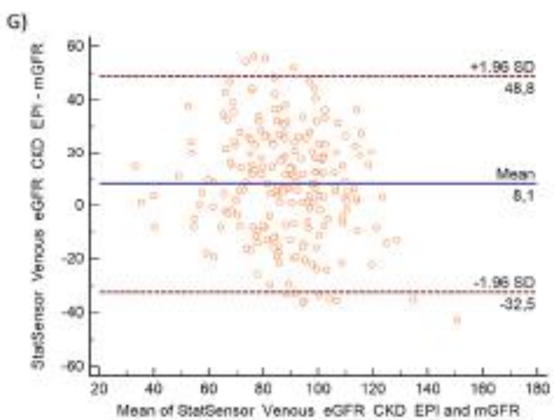


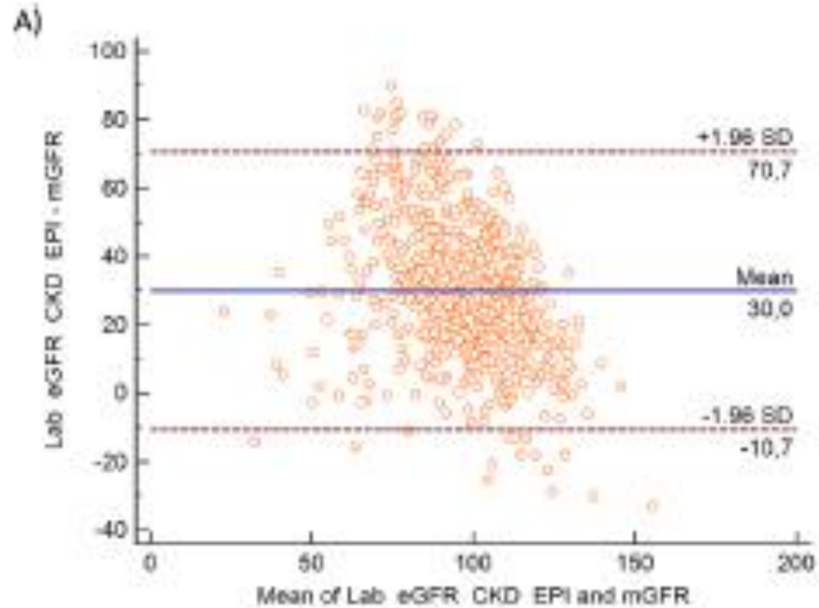


The percentage of total samples correctly classified into the eGFR groups of <60, 60–89 and >90 mL/min/ 1.73 m2 ranged from 41.7% (95% CI: 38.0–45.6) to 52.8% (95% CI: 45.9–59.7).









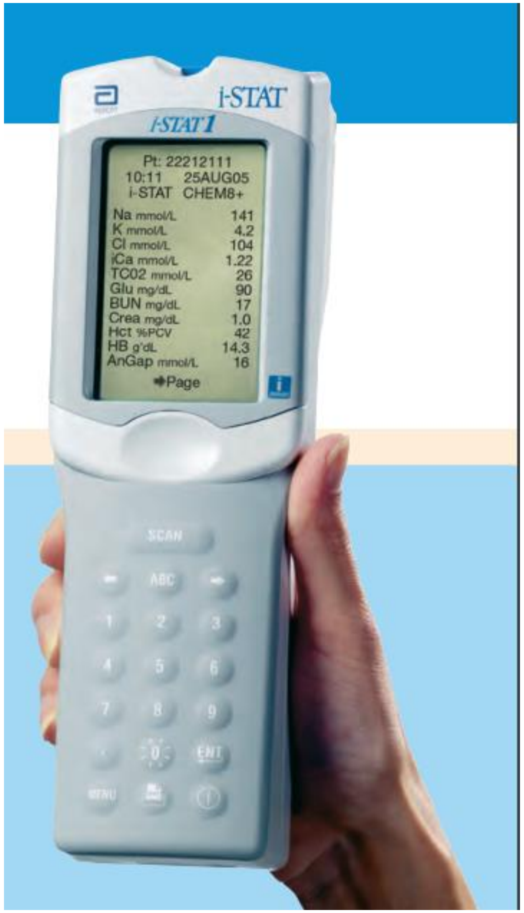
The percentage of total samples correctly classified into the eGFR groups of <60, 60–89 and >90 mL/min/ 1.73 m2 ranged from 41.7% (95% CI: 38.0–45.6) to 52.8% (95% CI: 45.9–59.7).

The POC creatinine eGFR equations correctly classified more samples into the correct eGFR groups than the respective laboratory creatinine equations

- The limitations of eGFR = equations (not the POC)
- We can expect an accuracy within 30% of 85-90% with creatinine based-equations (and less in Africa)
- Other POCs methods are available

StatSensor® et StatSensor Xpress™

nova biomedical



The i-STAT System

Abbott
Point of Care

SIEMENS
Healthineers

Clinica Chimica Acta 497 (2019) 13–19
Contents lists available at ScienceDirect
Clinica Chimica Acta
journal homepage: www.elsevier.com/locate/cca
ELSEVIER

Analytical and clinical performance of three hand-held point-of-care creatinine analyzers for renal function measurements prior to contrast-enhanced imaging

Catharina van der Heijden[a], Laurence Roosens[a], Hugo Cluckers[a], Amaryllis H. Van Craenenbroeck[b,c,d], Bart Peeters[a,*]

[a] Antwerp University Hospital, Laboratory Medicine, Wilrijkstraat 10, 2650 Edegem, Belgium
[b] Antwerp University Hospital, Nephrology, Wilrijkstraat 10, 2650 Edegem, Belgium
[c] Laboratory of Experimental Medicine and Pediatrics, University of Antwerp, Universiteitsplein 1, 2610 Antwerp, Belgium
[d] University Hospitals Leuven, Department of Nephrology, Herestraat 49, 3000 Leuven, Belgium

Don’t forget…

- Logistics, power, maintenance
- Skills transfer
- Costs…
- Is it used?

Renal Disaster Relief Task Force in Haiti earthquake

*Raymond Vanholder, *Noel Gibney, Valerie A Luyckx, Mehmet S Sever, for the Renal Disaster Relief Task Force*
ngibney@ualberta.ca

Departments of Internal Medicine and Nephrology, University Hospital, Ghent, Belgium (RV); Division of Critical Care Medicine (NG) and Division of Nephrology (VAL), University of Alberta, Edmonton, AB T6G 2B7, Canada; and Departments of Internal Medicine and Nephrology, Istanbul School of Medicine, Istanbul, Turkey (MSS)

www.thelancet.com **Vol 375** **April 3, 2010**

AFP/Getty Images

- iSTAT used (because creatinine but also potassium)
- « hyper speciliased » intervention

In camps of Refugees

- Depends on the situation and on the deployment
- Ebola or severe earthquakes: important deployment by different national or international organizations (USAID, BeFast, etc) => they come (and leave) with their own laboratories
- Syrian refugees in Jordan => the country has the ability to use their own laboratories (or gas analyzers)
- Syrian refugees in Syria: POC will be used
- But it is costly, not available locally
- It is just conceivable if logistical and financial support (NGO)

Which estimating equations to be used?

- Cockcroft
- MDRD
- CKD-EPI
- EKFC

Cockcroft Vs MDRD Vs CKD-EPI

	Cockcroft	MDRD	CKD-EPI
Population	Canada 1976	USA 1999	« International » 2009
N	249	1628	5504+2750+3896
Mean GFR	73	40	68
GFR	Creatinine clearance	Iothalamate	Diverse
Assay	« Jaffe »	Jaffe calibrated	Jaffe calibrated
% women	4	40	43-45%
% black	0 (?)	12	10-32%
Mean age	18-92	51	47-50
Mean weight	72	79.6	79-82
BSA indexation	No	Yes	Yes
Internal Validation	No	Yes	Yes

Cockcroft DW, Nephron, 1976, 16, p31
Levey AS, Ann Intern Med, 1999, 130, p461
Levey AS, Ann Intern Med, 2009, p604

Ann Intern Med. 2021;174:183-191.

Annals of Internal Medicine

ORIGINAL RESEARCH

Development and Validation of a Modified Full Age Spectrum Creatinine-Based Equation to Estimate Glomerular Filtration Rate

A Cross-sectional Analysis of Pooled Data

Hans Pottel, PhD*; Jonas Björk, PhD*; Marie Courbebaisse, MD, PhD; Lionel Couzi, MD, PhD; Natalie Ebert, MD, MPH; Björn O. Eriksen, MD, PhD; R. Neil Dalton, PhD; Laurence Dubourg, MD, PhD; François Gaillard, MD, PhD; Cyril Garrouste, MD; Anders Grubb, MD, PhD; Lola Jacquemont, MD, PhD; Magnus Hansson, MD, PhD; Nassim Kamar, MD, PhD; Edmund J. Lamb, PhD; Christophe Legendre, MD; Karin Littmann, MD; Christophe Mariat, MD, PhD; Toralf Melsom, MD, PhD; Lionel Rostaing, MD, PhD; Andrew D. Rule, MD; Elke Schaeffner, MD, PhD, MSc; Per-Ola Sundin, MD, PhD; Stephen Turner, MD, PhD; Arend Bökenkamp, MD; Ulla Berg, MD, PhD; Kajsa Åsling-Monemi, MD, PhD; Luciano Selistre, MD, PhD; Anna Åkesson, BSc; Anders Larsson, MD, PhD; Ulf Nyman, MD, PhD†; and Pierre Delanaye, MD, PhD†

- Subjects with measured GFR and standardized creatinine
- 11,251 development and internal validation
- 8,378 external validation
- 1,254 aged between 2 to 18 years
- 7 + 6 cohorts
- Only White people

Figure 1. The new EKFC equation.

Age	SCr/Q	Equation
2–40 y	<1	$107.3 \times (SCr/Q)^{-0.322}$
	≥1	$107.3 \times (SCr/Q)^{-1.132}$
>40 y	<1	$107.3 \times (SCr/Q)^{-0.322} \times 0.990^{(Age - 40)}$
	≥1	$107.3 \times (SCr/Q)^{-1.132} \times 0.990^{(Age - 40)}$

Q Values

For ages 2–25 y:

Males:

$\ln(Q) = 3.200 + 0.259 \times Age - 0.543 \times \ln(Age) - 0.00763 \times Age^2 + 0.0000790 \times Age^3$

Females:

$\ln(Q) = 3.080 + 0.177 \times Age - 0.223 \times \ln(Age) - 0.00596 \times Age^2 + 0.0000686 \times Age^3$

For ages >25 y:

Males:

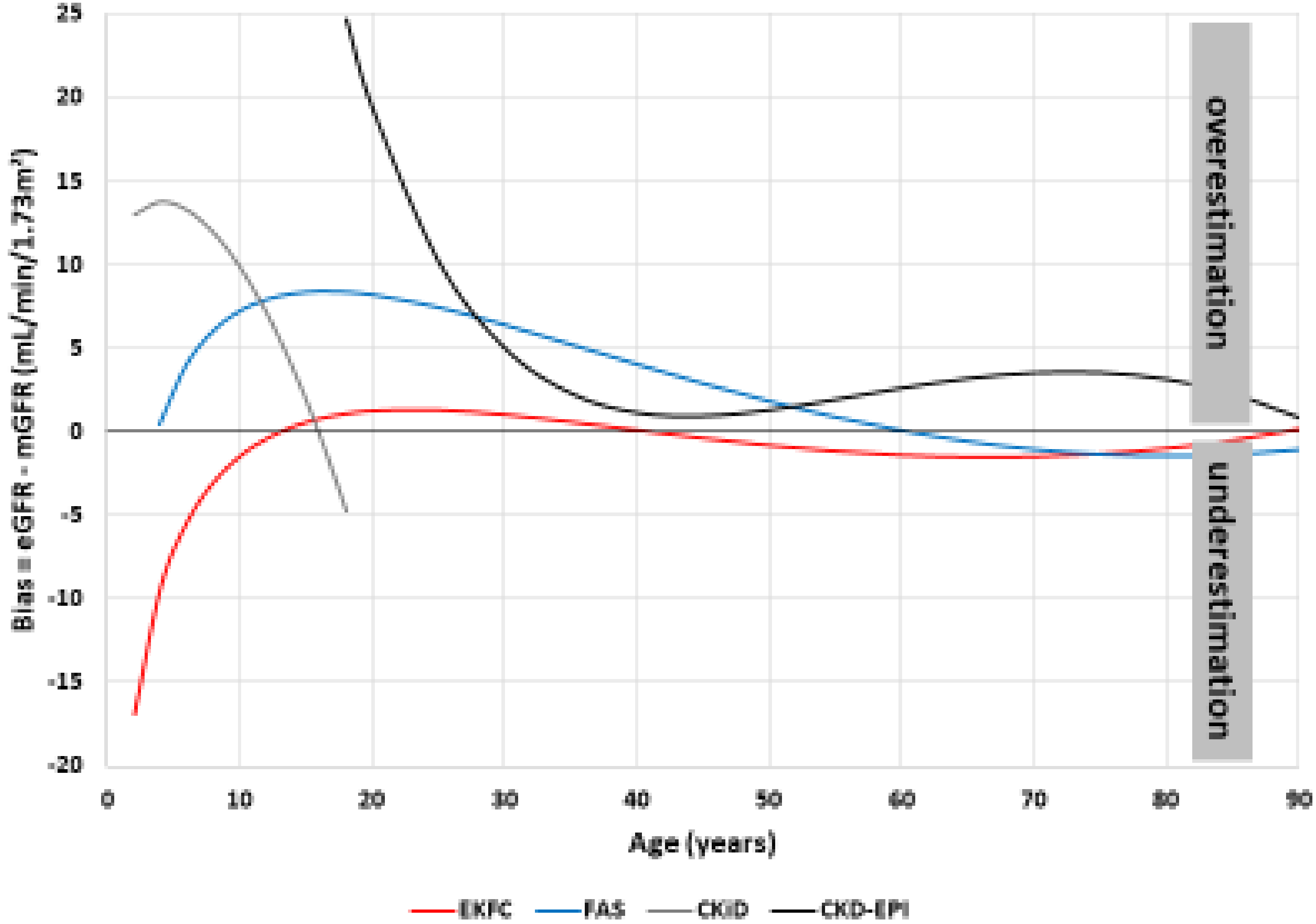
Q = 80 µmol/L (0.90 mg/dL)

Females:

Q = 62 µmol/L (0.70 mg/dL)

SCr and Q in µmol/L (to convert to mg/dL, divide by 88.4)

Q values (in µmol/L or mg/dL) correspond to the median SCr values for the age- and sex-specific populations. EKFC = European Kidney Function Consortium; SCr = serum creatinine.



25
20
15
10
5
0
-5
-10
-15
-20
Bias = eGFR - mGFR (mL/min/1.73m²)
0
10
20
30
40
50
60
70
80
90
Age (years)
overestimation
underestimation
EKFC
FAS
CKiD
CKD-EPI

MDRD	$GFR = 175 \times (S_{cr})^{-1.154} \times (Age)^{-0.203} \times (0.742 \text{ if female}) \times (1.212 \text{ if African American})$	+21%
CKD-EPI 2009	$GFR = 141 \times \min(S_{cr}/\kappa, 1)^{\alpha} \times \max(S_{cr}/\kappa, 1)^{-1.209} \times 0.993^{Age} \times (1.018 \text{ if female}) \times (1.159 \text{ if African American})$	+16%

*S_{cr} is serum creatinine in mg/dL
κ is 0.7 for females and 0.9 for males
α is -0.329 for females and -0.411 for males
min indicates the minimum of S_{cr}/κ or 1
max indicates the maximum of S_{cr}/κ or 1

A new creatinine-based CKD-EPI equation

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

New Creatinine- and Cystatin C–Based Equations to Estimate GFR without Race

L.A. Inker, N.D. Eneanya, J. Coresh, H. Tighiouart, D. Wang, Y. Sang, D.C. Crews, A. Doria, M.M. Estrella, M. Froissart, M.E. Grams, T. Greene, A. Grubb, V. Gudnason, O.M. Gutiérrez, R. Kalil, A.B. Karger, M. Mauer, G. Navis, R.G. Nelson, E.D. Poggio, R. Rodby, P. Rossing, A.D. Rule, E. Selvin, J.C. Seegmiller, M.G. Shlipak, V.E. Torres, W. Yang, S.H. Ballew, S.J. Couture, N.R. Powe, and A.S. Levey, for the Chronic Kidney Disease Epidemiology Collaboration*

› N Engl J Med. 2021 Nov 4;385(19):1737-1749.

Table 3. Accuracy of Current and New Approaches for GFR Estimation as Compared with Measured GFR in the Validation Data Set.

Filtration Marker and Equation*		Black Participants	Non-Black Participants	Difference between Black Participants and Non-Black Participants (95% CI)†
		Bias: Median Difference between Measured GFR and eGFR (95% CI)‡		
		milliliters per minute per 1.73 square meters		
Creatinine				
eGFRcr(ASR), current	2009	−3.7 (−5.4 to −1.8)	−0.5 (−0.9 to 0.0)	−3.2 (−5.0 to −1.3)
eGFRcr(ASR-NB), new		7.1 (5.9 to 8.8)	−0.5 (−0.9 to 0.0)	7.6 (6.1 to 9.0)
eGFRcr(AS), new	2021	3.6 (1.8 to 5.5)	−3.9 (−4.4 to −3.4)	7.6 (5.6 to 9.5)
Creatinine				
eGFRcr(ASR), current	2009	85.1 (82.2 to 87.9)	89.5 (88.5 to 90.4)	−4.4 (−7.6 to −1.2)
eGFRcr(ASR-NB), new		86.4 (83.4 to 89.1)	89.5 (88.5 to 90.4)	−3.1 (−6.2 to 0)
eGFRcr(AS), new	2021	87.2 (84.5 to 90.0)	86.5 (85.4 to 87.6)	0.7 (−2.4 to 3.8)

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Performance of creatinine-based equations to estimate glomerular filtration rate in White and Black populations in Europe, Brazil and Africa

Pierre Delanaye[1,2,*], Emmanuelle Vidal-Petiot[3,*], Jonas Björk[4,5], Natalie Ebert[6], Björn O. Eriksen[7], Laurence Dubourg[8], Anders Grubb[9], Magnus Hansson[10], Karin Littmann[11], Christophe Mariat[12], Toralf Melsom[7], Elke Schaeffner[6], Per-Ola Sundin[13], Arend Bökenkamp[14], Ulla B. Berg[15], Kajsa Åsling-Monemi[15], Anna Åkesson[4,5], Anders Larsson[16], Etienne Cavalier[17], R. Neil Dalton[18], Marie Courbebaisse[19], Lionel Couzi[20], Francois Gaillard[21], Cyril Garrouste[22], Lola Jacquemont[23], Nassim Kamar[24], Christophe Legendre[25], Lionel Rostaing[26], Thomas Stehlé[27,28], Jean-Philippe Haymann[29], Luciano da Silva Selistre[30], Jorge P. Strogoff-de-Matos[31], Justine B. Bukabau[32], Ernest K. Sumaili[32], Eric Yayo[33], Dagui Monnet[33], Ulf Nyman[34], Hans Pottel[35,†] and Martin Flamant[36,†]

Table S3: Method and patients characteristics

Mean and SD of age and measured glomerular filtration

Center	Country	Cohort	n	Method	Exogenous marker	Age	mGFR (mL/min/1.73m²)	Creatinine	% of female
	White populations								
Amsterdam	The Netherlands	CAPA-study[5] + referrals	48	Plasma clearance	Inulin	18.7±0.9	93.7±27.9	Enzymatic Roche	25.0
Berlin	Germany	BIS-Study[6]	657	Plasma clearance	Iohexol	78.4±6.1	60.3±21.5	Enzymatic Roche	41.7
France	France	Kidney Donor Study[7]	2,572	Plasma/renal clearance	Iohexol/ ^{51}Cr-EDTA/inulin	50.4±11.8	100.1±22.2	Varia[7]	61.9
Kent	UK	GFR in old adults[8]	394	Plasma clearance	Iohexol	80.4±4.6	55.3±20.5	Mass spectrometry	52.0
Leuven	Belgium	Referrals	21	Plasma clearance	^{51}Cr-EDTA	19.1±1.2	78.2±23.1	Enzymatic Roche	47.6
Lund	Sweden	CAPA-study[5]	2,847	Plasma clearance	Iohexol	60.1±16.5	62.5±34.1	Enzymatic Abbott	48.5
Lyon	France	Referrals	2,435	Plasma/renal clearance	Iohexol/inulin	31.3±16.7	84.5±32.7	Jaffe and enzymatic Roche	46.8
Örebro	Sweden	Referrals	2,051	Plasma clearance	Iohexol	56.5±16.3	64.3±36.0	Enzymatic Roche and Ortho-Clinical	41.7
Saint-Etienne	France	HIV-study[9]	203	Plasma clearance	Iohexol	48.7±10.3	100.3±27.3	Enzymatic Ortho-Clinical	48.7
Stockholm	Sweden	Referrals	856	Plasma clearance	Iohexol	72.9±14.1	48.7±27.6	Jaffe Beckman Enzymatic Roche	44.2
Tromsø	Norway	RENIS-T6 study[10]	1,627	Plasma clearance	Iohexol	58.1±3.8	101.5±19.9	Enzymatic Roche	50.8
Rio de Janeiro	Brazil	Brazilian study[12]	39	Plasma clearance	^{51}Cr-EDTA	60.0±13.5	41.9±23.4	Jaffe Roche	59.0
Paris	France	Referrals	3,465	Plasma clearance	^{51}Cr-EDTA	52.4±14.8	61.3±26.6	Jaffe and Enzymatic Roche and Siemens	41.1
	Black population								
Kinshasa/ Abidjan	DRC/Côte d'Ivoire	African Study[11]	508	Plasma clearance	Iohexol	41.8±14.3	80.5±28.9	Enzymatic Roche	46.7
Rio de Janeiro	Brazil	Brazilian study[12]	61	Plasma clearance	^{51}Cr-EDTA	55.9±13.8	49.8±32.2	Jaffe Roche	50.8
Paris	France	Referrals	964	Plasma clearance	^{51}Cr-EDTA	50.4±13.8	61.1±24.6	Jaffe and Enzymatic Roche and Siemens	41.1

EKFC

17321

White Europeans

4429

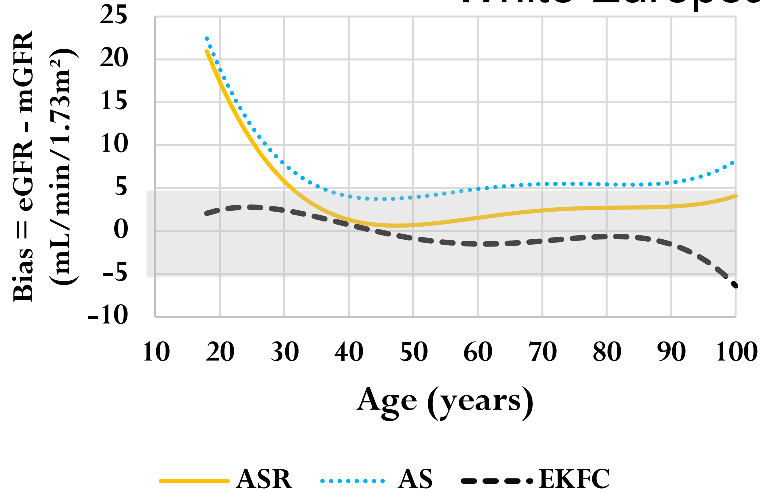
Black Europeans (Paris)

964

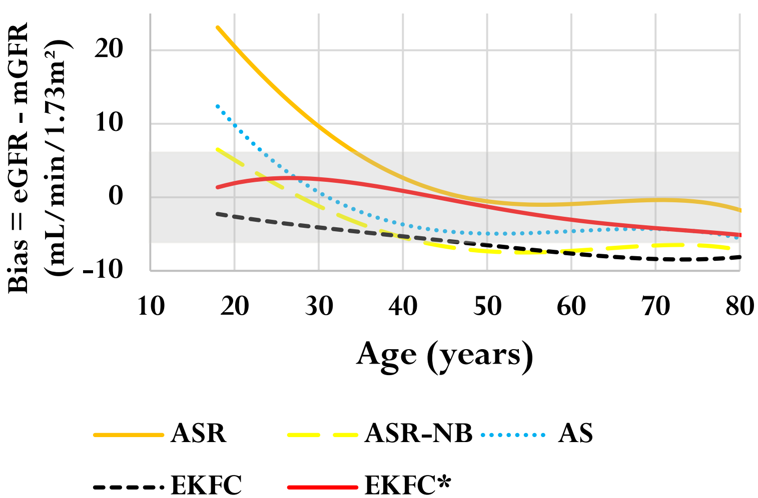
Africans

508

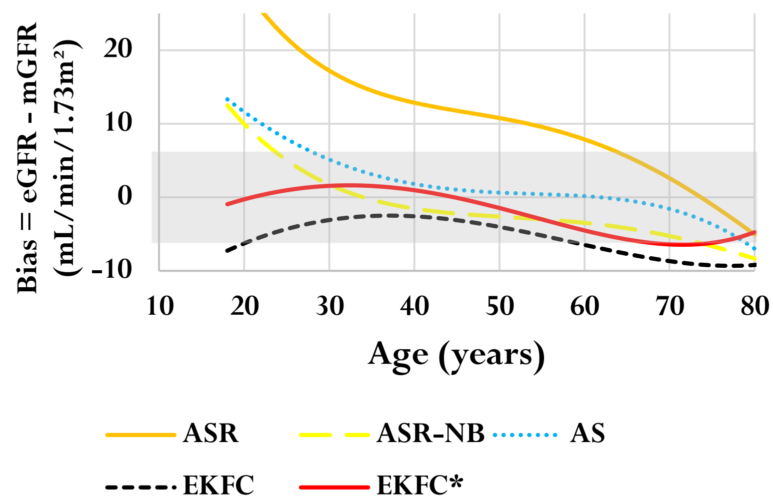
White Europeans (n=17,321)



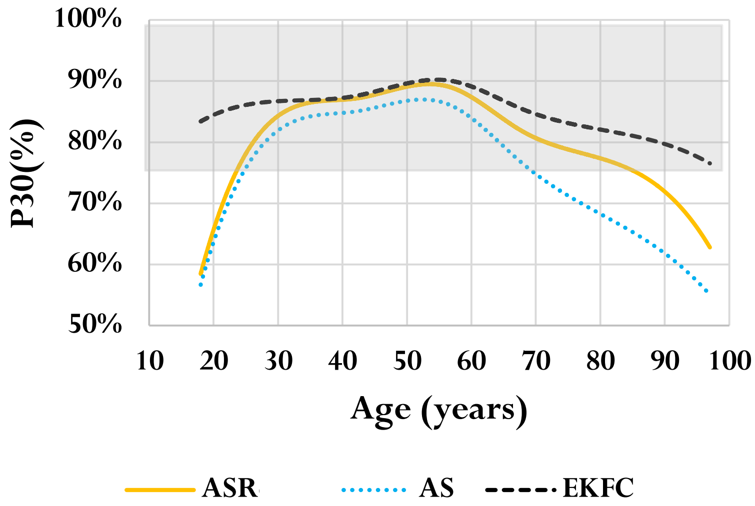
Black Europeans (n=964)



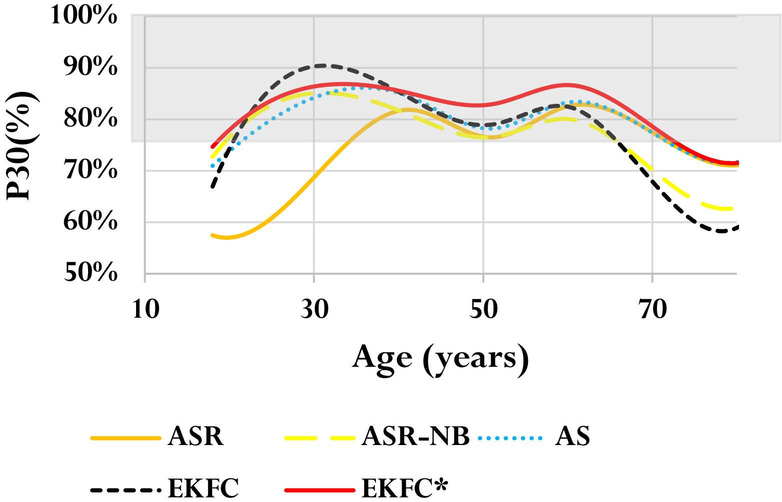
Black Africans (n=508)



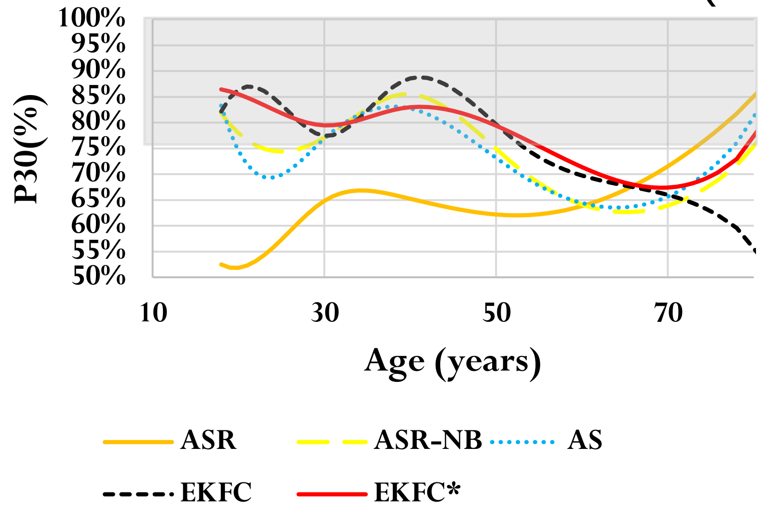
White Europeans (n=17,321)



Black Europeans (n=964)



Black Africans (n=508)



Ethnic, race factors in Africa and Europe

Flamant M et al

RESEARCH LETTER

Performance of GFR Estimating Equations in African Europeans: Basis for a Lower Race-Ethnicity Factor Than in African Americans

NO

PLOS | ONE

RESEARCH ARTICLE

Performance of glomerular filtration rate estimation equations in Congolese healthy adults: The inopportunity of the ethnic correction

Justine B. Bukabau[1]*, Ernest K. Sumaili[1], Etienne Cavalier[2], Hans Pottel[3], Bejos Kifakiou[1], Aliocha Nkodila[1], Jean Robert R. Makulo[1], Vieux M. Mokoli[1], Chantal V. Zinga[1], Augustin L. Longo[1], Yannick M. Engole[1], Yannick M. Nlandu[1], François B. Lepira[1], Nazaire M. Nseka[1], Jean Marie Krzesinski[4], Pierre Delanaye[4]

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Article original

Inadéquation du facteur ethnique pour l'estimation du débit de filtration glomérulaire en population générale noire-africaine : résultats en Côte d'Ivoire

Inadequacy of the African-American ethnic factor to estimate glomerular filtration rate in an African general population: Results from Côte d'Ivoire

Éric Sagou Yayo[a], Mireille Aye[a], Jean-Louis Konan[a], Arlette Emième[b], Marie-Laure Attoungbre[a], Appolinaire Gnionsahé[c], Étienne Cavalier[d], Dagui Monnet[a], Pierre Delanaye[e,*]

Performance of creatinine- or cystatin C–based equations to estimate glomerular filtration rate in sub-Saharan African populations

Check for updates

see commentary on page 1017

Justine B. Bukabau[1,7], Eric Yayo[2,7], Appolinaire Gnionsahé[3], Dagui Monnet[2], Hans Pottel[4], Etienne Cavalier[5], Aliocha Nkodila[1], Jean Robert R. Makulo[1], Vieux M. Mokoli[1], François B. Lepira[1], Nazaire M. Nseka[1], Jean-Marie Krzesinski[6], Ernest K. Sumaili[1,7] and Pierre Delanaye[6,7]

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Yayo ES, Nephrol Ther, 2016 , 12 , 454
Flamant M, Am J Kdiney Dis, 2013, 62, 179
Bukabau JB, Kidney Int, 2019, 95, 1181

Pierre Delanaye[1,2], Hans Pottel[3] and Richard J. Glassock[4]

Americentrism in estimation of glomerular filtration rate equations

Check for updates

Kidney International (2022) **101**, 856–858; https://doi.org/10.1016/j.kint.2022.02.022

KEYWORDS: glomerular filtration rate; race; serum creatinine

The new CKD-EPI equation is performing worse in Europe
The previous CKD-EPI equation had to be used without the correction in Europe and Africa

⇒ Use the CKD-EPI$_{2009}$ equation without the ethnic factor or the EKFC equation
⇒ All equations should be interpreted with caution in AKI
⇒ Finally, it is just a calculation
⇒ Probably not the most important in humanitarian situations

A few words about proteinuria/albuminuria measurement

- For CKD detection/staging
- not very useful in most AKI situations
- Help for urinary infection (leucocytes+, nitrites+, hematuria)
- Hematuria
- Glucose, Ketones
- Strips: Easy and cheap for the context

A few words about proteinuria/albuminuria measurement

- For CKD detection/staging
- not very useful in most AKI situations
- Help for urinary infection (leucocytes+, nitrites+, hematuria)
- Hematuria
- Glucose, Ketones
- Strips: Easy and cheap for the context

Limitations

Journal of Nephrology (2021) 34:411–432
https://doi.org/10.1007/s40620-020-00735-y

REVIEW

Check for updates

Urinary strips for protein assays: easy to do but difficult to interpret!

Guillaume Résimont[1] · Laurence Piéroni[2] · Edith Bigot-Corbel[3] · Etienne Cavalier[4] · Pierre Delanaye[1,5]

Received: 23 January 2020 / Accepted: 3 April 2020 / Published online: 23 April 2020

Abstract
Urine samples can be readily obtained from patients in everyday clinical practice. Therefore, the availability of urine allows physicians to obtain relevant clinical information in a timely manner. Since the measurement of urinary protein levels is essential in diagnosing and treating a host of diseases, the potential detection of urinary proteins by urinary strips in an easy, quick, and cheap way is very attractive. However, to ensure optimal use of urinary strips, one needs to be aware of their characteristics and their limitations. In this review, we discuss the characteristics of the urinary strips available for testing urinary protein levels and for detecting urinary albumin. We then consider their analytical performances in their most widely used clinical applications (e.g., in pregnancy, chronic kidney disease, diabetes, and screening of the general population).

Keywords Urinary strips · Urinary protein · Urinary albumin · Urinary dipstick · Proteinuria

Conclusions

- Renal diseases are potentially present in Refugees camps
- We lack of strong data regarding prevalence, incidence
- POC are of interest

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Clinical Practice: Review

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Serum Creatinine: Not So Simple!

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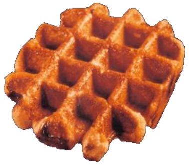
Liège












Questions?

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