

Supplemental data

Technical details

Data collection and software

In Brussels patient data were collected as csv-file by using a self-designed laboratory information system; in Ghent they were acquired as Access®-file from the General Laboratory Information Management System. The IQC data were obtained in Brussels as csv-file from Unity Real Time® (Bio-Rad), in Ghent as Excel®-file from

QC Today (Instrumentation Laboratory). Information about lot-to-lot changes and calibration events required manual input into Excel® tables and figures, as it was only available in paper version, directly printed from the instruments.

Note that before data treatment, the in Access® format supplied data were standardized by means of a MySQL 5.0 database. Calculations of percentiles were done with a Java application using the Apache Commons Mathematics Library 2.1. All other calculations were performed with Microsoft Access® and Excel®.

	Period patient data	System history	Reference interval ^a	Period QC data	Number of samples per working day	
					Start	End
Calcium						
A	2/01/1997–13/12/2010	Vitros 950IRC ^a was gradually replaced by 3 analyzers of Vitros Fusion 5, 1 FS ^a	2.15–2.45 mmol/L	19/01/2006–18/08/2010	160	257
B	3/12/2001–10/08/2010	Modular Analytics P800 ^b Hitachi 917 ^b (until 11/2006) Since 11/2006: Cobas 6000 ^b	2.12–2.62 mmol/L	2/01/2007–10/08/2010	470	538
Phosphate						
A	2/01/1997–6/09/2010	Vitros 950IRC ^a was gradually replaced by 3 analyzers of Vitros Fusion 5, 1 FS ^a	0.87–1.45 mmol/L	19/01/2006–18/08/2010	86	182
B	3/12/2001–10/08/2010	Modular Analytics P800 ^b Hitachi 917 ^b (until 11/2006) Since 11/2006: Cobas 6000 ^b	0.81–1.45 mmol/L	2/01/2007–10/08/2010	329	402
25OHD						
A	2/01/2004–11/12/2009	DiaSorin RIA	40–185 nmol/L ^c 40–130 nmol/L ^d	28/11/2005–16/09/2010	12	25
B	2/01/2004–20/08/2010	DiaSorin RIA	27–104 nmol/L ^c 20–86 nmol/L ^d	5/01/2004–8/06/2009	12	30
PTH						
A	5/01/2004–4/10/2010	DiaSorin RIA (since 1997) Since 02/2008: Cobas 6000 ^b Since 07/2008: Cobas E411 ^b Nichols RIA Since 04/2005: Modular E170 ^b	1.06–5.84 pmol/L ≥2/2008: 1.59–6.90 pmol/L	6/01/2004–4/10/2010	8	13
B	2/01/2004–26/08/2010		1.59–6.90 pmol/L	19/01/2005–26/04/2010	9	20
FT4						
A	1/02/2007–21/09/2010	Cobas 6000 ^b	12.0–21.9 pmol/L	1/02/2007–21/09/2010	55	67
B	2/01/2004–10/08/2010	Modular E170 ^b (increased to 3 modules)	11.6–21.9 pmol/L	2/10/2006–7/06/2010	55	78
TSH						
A	1/02/2007–21/09/2010	Cobas 6000 ^b	0.27–4.2 mIU/L	1/02/2007–21/09/2010	88	99
B	2/01/2004–10/08/2010	Modular E170 ^b (increased to 3 modules)	0.27–4.2 mIU/L	2/10/2006–7/06/2010	87	120

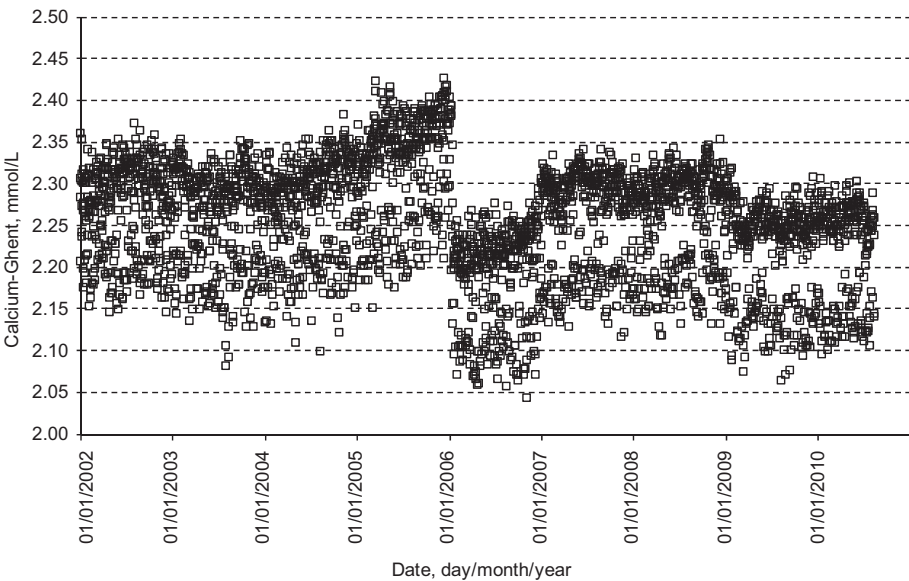
Supplemental Table 1 Time span covered by patient and IQC data, system history, used reference intervals and number of samples per working day at the beginning and end of the examined period.

A, Brussels University Hospital; B, Ghent University Hospital. ^aOrtho Clinical Diagnostics; ^bRoche Diagnostics; ^csummer data; ^dwinter data; ^enote that for certain analytes, e.g., 25OHD, the locally used reference intervals are different because the hospitals work with patients belonging to different ethnic groups and accommodate for that.

	Name QC material	Manufacturer	Level QC	Level 50P	Unit
Calcium					
A	Multiquel unassayed level 3	BioRad	3.13	2.26	mmol/L
B	Multiquel unassayed level 2	BioRad	3.02	2.28	mmol/L
Phosphate					
A	Multiquel unassayed level 1	BioRad	0.68	1.15	mmol/L
B	PreciPath universal control serum	Roche	2.15	1.20	mmol/L
25OHD					
A	Lyphocheck immunoassay plus level 2	BioRad	38.6	34.5	nmol/L
B	Serum pool (high)	—	96.8	50.4	nmol/L
PTH					
A	PreciControl bone level 1 ^a	Roche	8.51	5.39	pmol/L
B	Serum pool (low)	—	4.05	5.00	pmol/L
FT4					
A	Lyphocheck immunoassay plus	BioRad	33.6	16.2	pmol/L
B	Serum pool (low)	—	9.95	16.2	pmol/L
TSH					
A	PreciControl universal level 1	Roche	0.96	1.59	mIU/L
B	Serum pool (high)	—	8.60	1.45	mIU/L

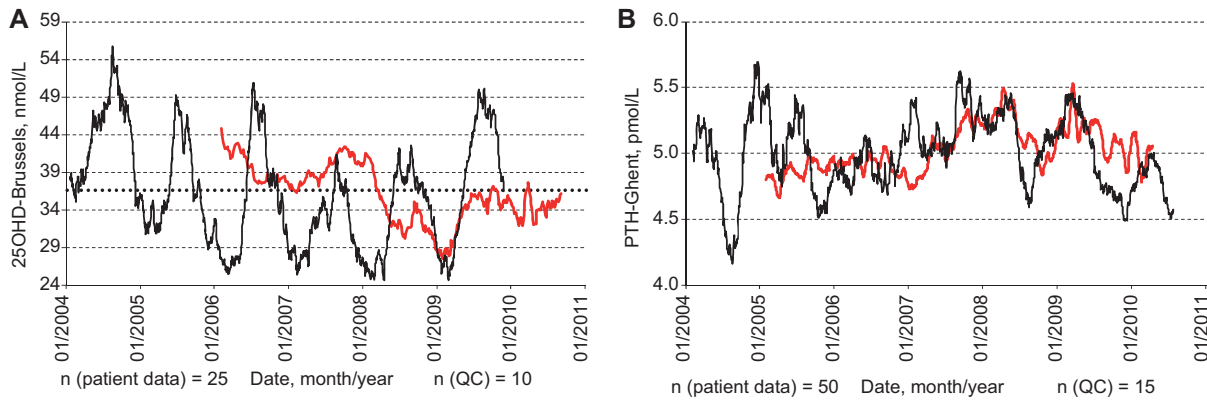
Supplemental Table 2 Characteristics of the used IQC-materials.

^aUsed from 13/02/2008 on, after the switch from DiaSorin to Roche assay.



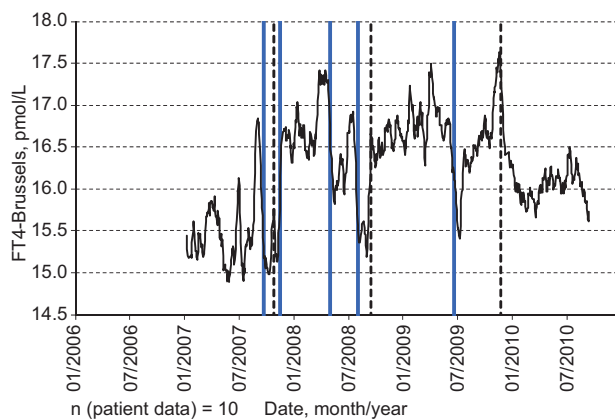
Supplemental Figure 1 Distribution of the daily 50th percentile for calcium in Ghent, including weekends

The Figure shows results from two distinct populations, the higher ones are from patients (typically a mixture of out- and inpatients; n>500) tested on working days, the lower results from patients (only inpatients; n ~200) tested during weekends. Based on the observation that a lower number of results associated with a changing ratio of out- to inpatients gives different distributions, we decided to omit data from weekends/holidays.



Supplemental Figure 2 Moving means of daily 50th percentiles of patient data (in black) and of daily means of IQC data (in red) for 25OHD-Brussels (A) and PTH-Ghent (B).

The long-term mean is indicated by a black dotted line. n (patient data), number of patient percentiles used for calculation of the moving means; n (QC), for the IQC data.



Supplemental Figure 3 Moving mean of the daily 50th percentiles for FT4-Brussels with indication of lot changes in reagent and/or calibrator (vertical 'full' lines in blue) and within-lot calibrations (vertical 'broken' lines in black).

n (patient data), number of patient percentiles used for calculation of the moving means.