

VDSP Reference Measurement System: The Role of Accuracy-Based EQA/PT Schemes

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DEQAS and the VDSP

- The ODS has funded NIST to assign values to DEQAS samples.
- DEQAS is an 'accuracy' based Proficiency Testing scheme (from April 2013)

The Role of Accuracy based 25-OHD EQA/PT Schemes

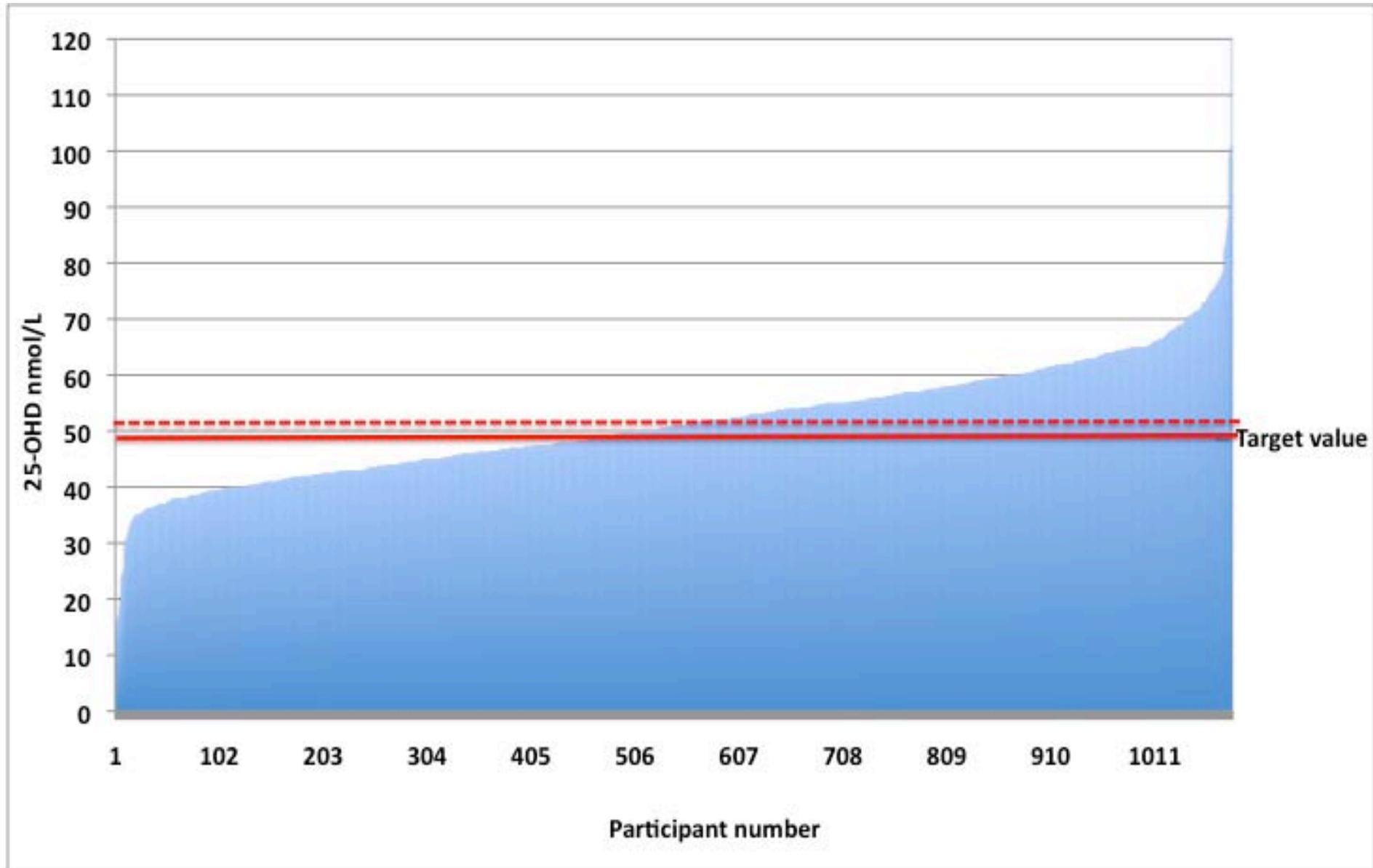
To monitor over time:

- The accuracy of individual results
- Inter-laboratory imprecision
- Trueness of 25-OHD methods

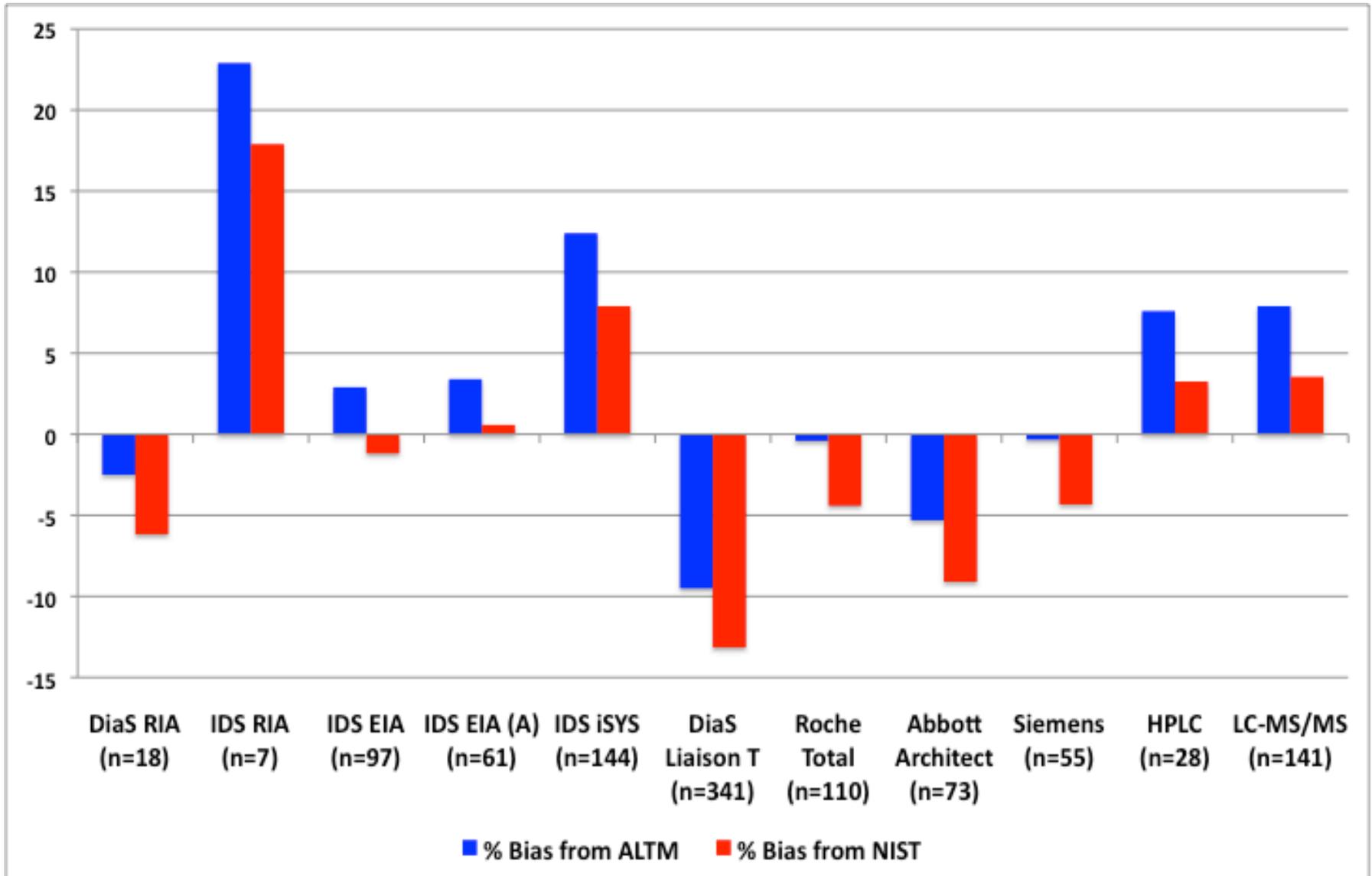
EQA/PT samples must be commutable

Accuracy of results: DEQAS sample 440 (July 2013)

Target value 48.4 nmol/L (ALTM 51.3 nmol/L)



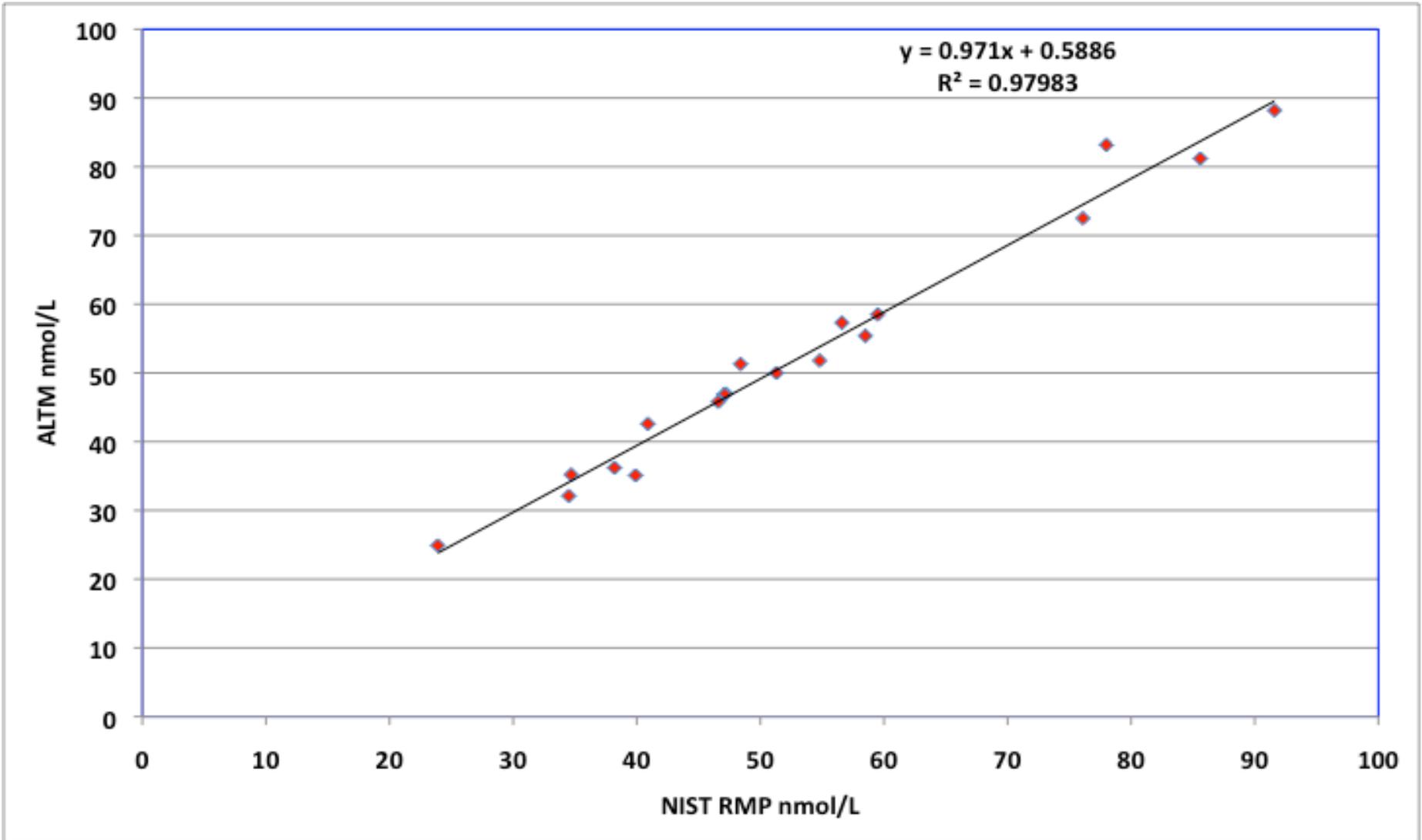
DEQAS October 2012; Effect on Mean % Bias of Switching Performance target from ALTM to NIST assigned values



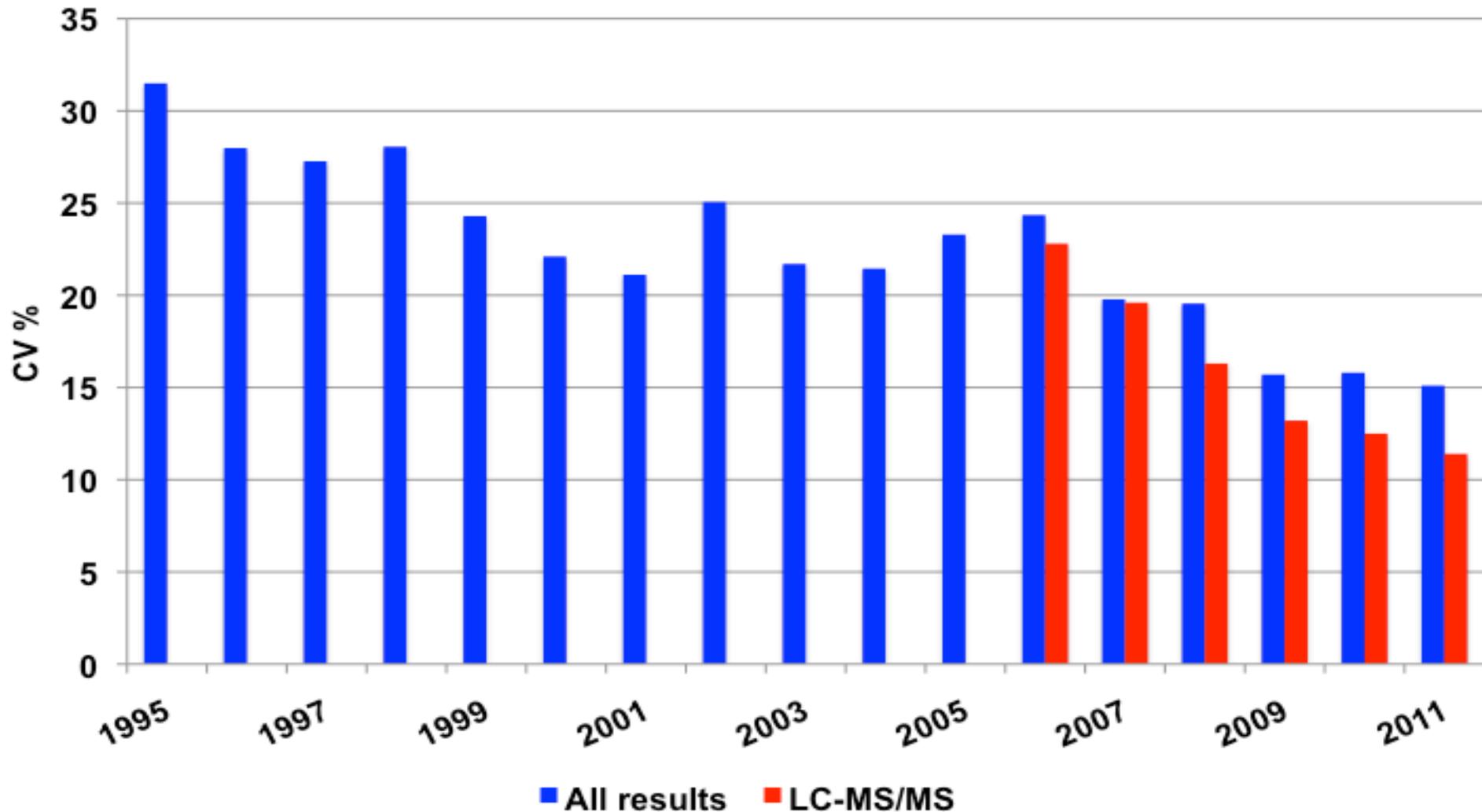
DEQAS results; October 2012 –July 2013

	NIST	NIST	NIST	NIST	DEQAS	
	3-epi-25-OHD3	25-OHD2	25-OHD3	Total 25-OHD	ALTM	% Difference
Sample No	nmol/L	nmol/	nmol/	nmol/L	nmol/L	
421	2.33	0.96	57.5	58.5	55.4	-5.3
422	1.7	1.66	36.58	38.2	36.2	-5.2
423	5.68	0.98	84.62	85.6	81.2	-5.1
424	2.58	0.98	46.2	47.2	47	-0.4
425	2.5	0.96	46.18	47.1	46.9	-0.42
426	0.4	1.06	33.4	34.5	32.1	-7
427	4.5	0.88	75.2	76.1	72.5	-4.7
428	2.8	2.45	52.3	54.8	51.8	-5.5
429	3	0.55	58.9	59.5	58.5	-1.7
430	0.8	22.3	17.6	39.9	35.1	-12
431	1.2	1.25	22.6	23.9	24.9	4.2
432	2.9	2.69	48.6	51.3	50	-2.5
433	11.7	1.18	90.4	91.6	88.2	-3.7
434	2.4	4.42	74.2	78.6	67.2	-14.5
435	2.4	0.53	46.1	46.6	45.8	-1.7
436	4	1.25	76.7	78	83.2	6.7
437	1.4	1.38	33.3	34.7	35.2	1.4
438	2.7	1.81	54.8	56.6	57.3	1.2
439	2.3	1.18	39.7	40.9	42.6	4.2
440	2.3	1.31	47.1	48.4	51.3	6.0

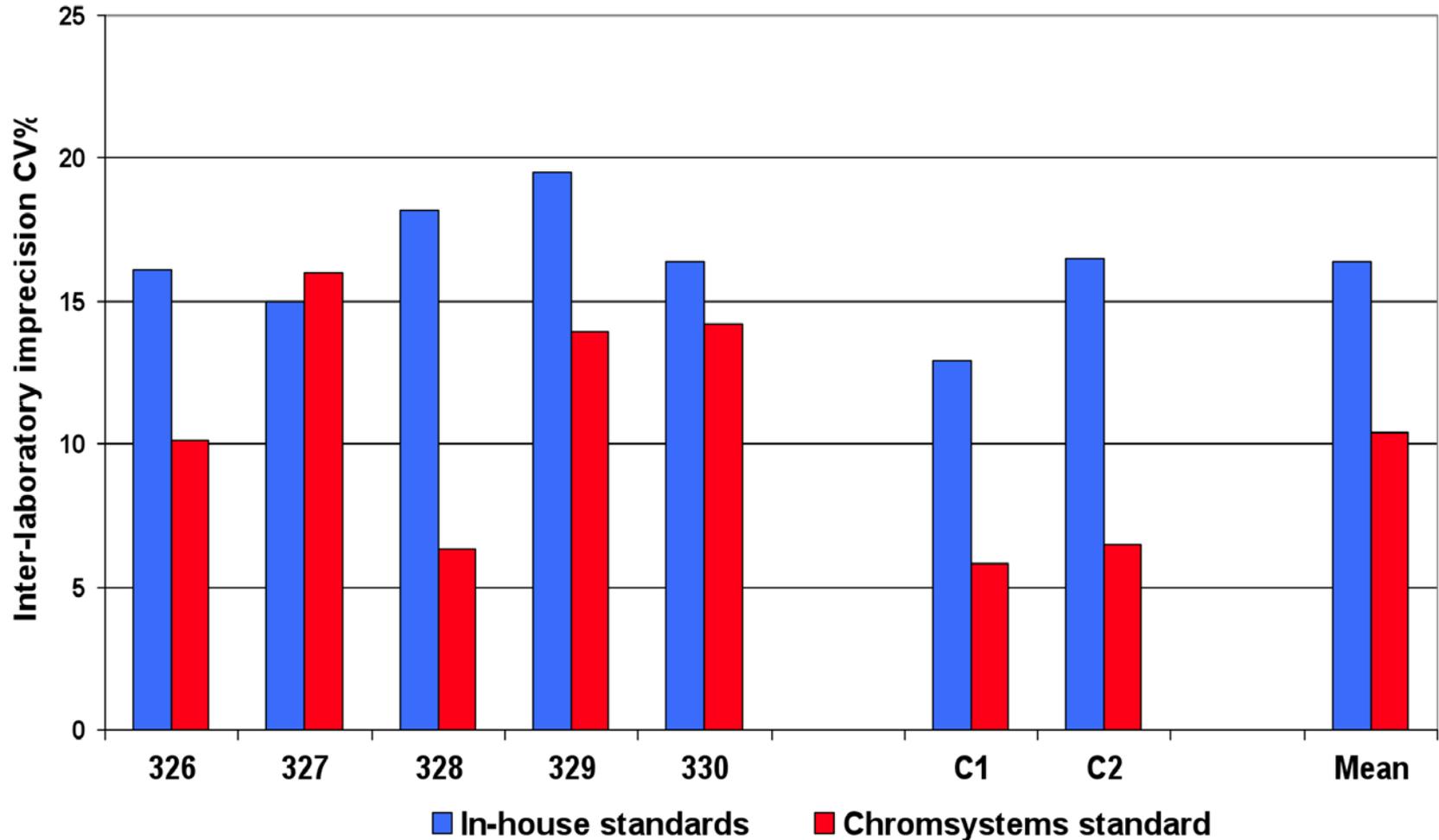
ALTM vs NIST; October 2012 – July 2013



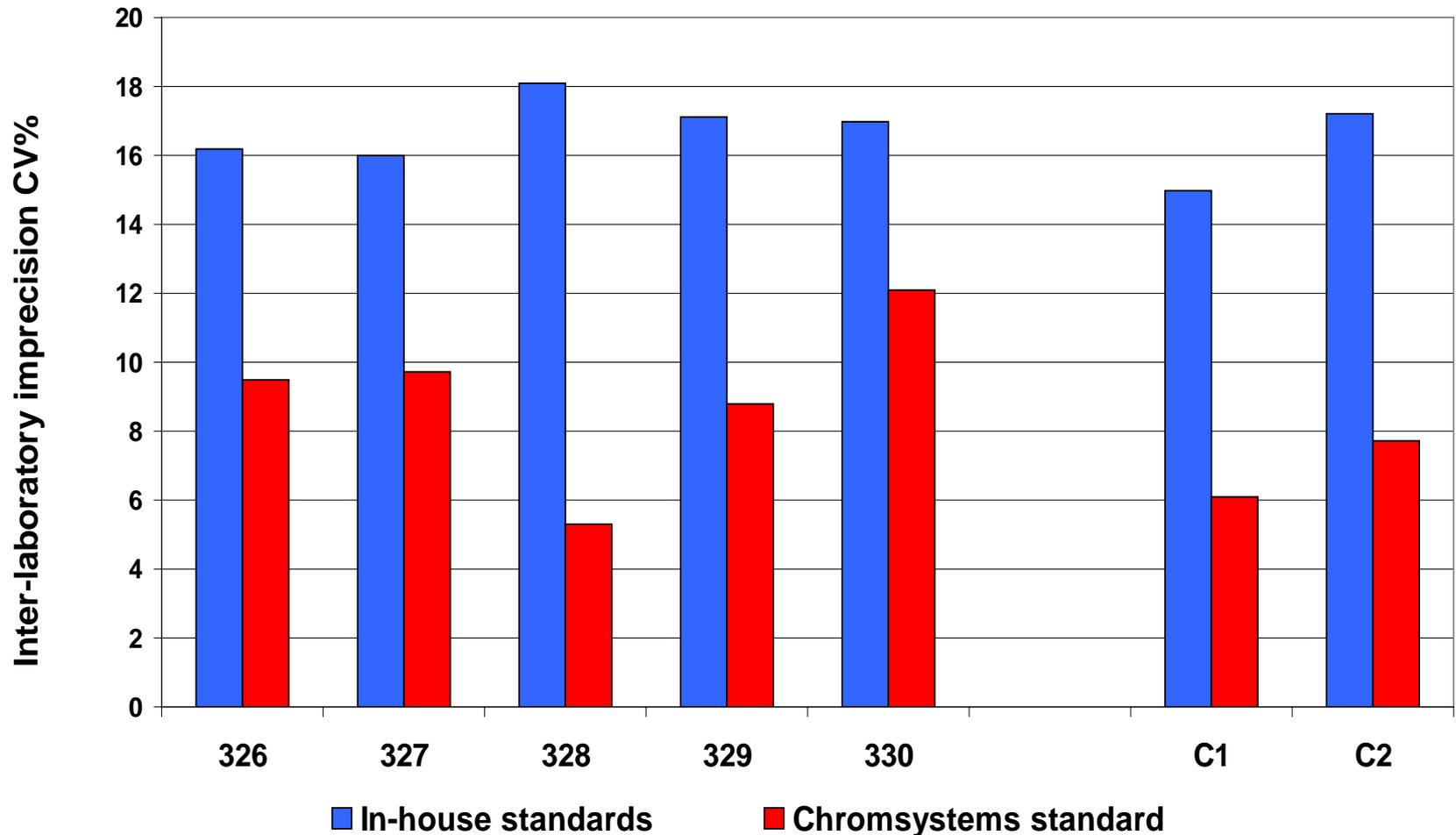
Mean inter-laboratory imprecision (CV%) of 25OHD results; distribution cycles since 1995



Use of a common standard by LC-MS/MS users; effect on inter-laboratory imprecision (CV%) Total 25-OHD



Use of a common standard in LC-MS/MS assays – effect on inter-laboratory imprecision (CV%) 25-OHD3



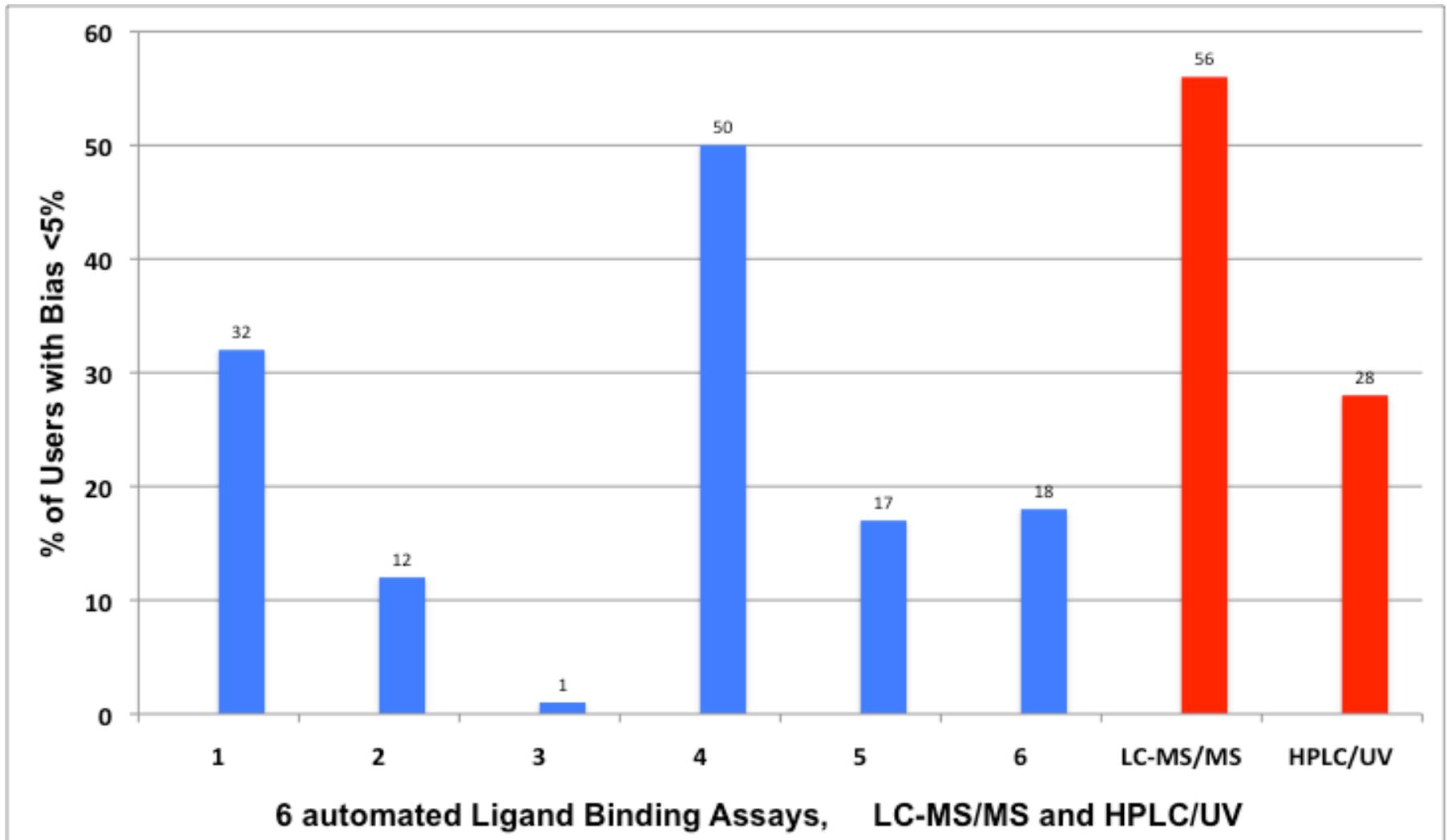


Suggested Assay Performance Limits Based on Biological Variation*

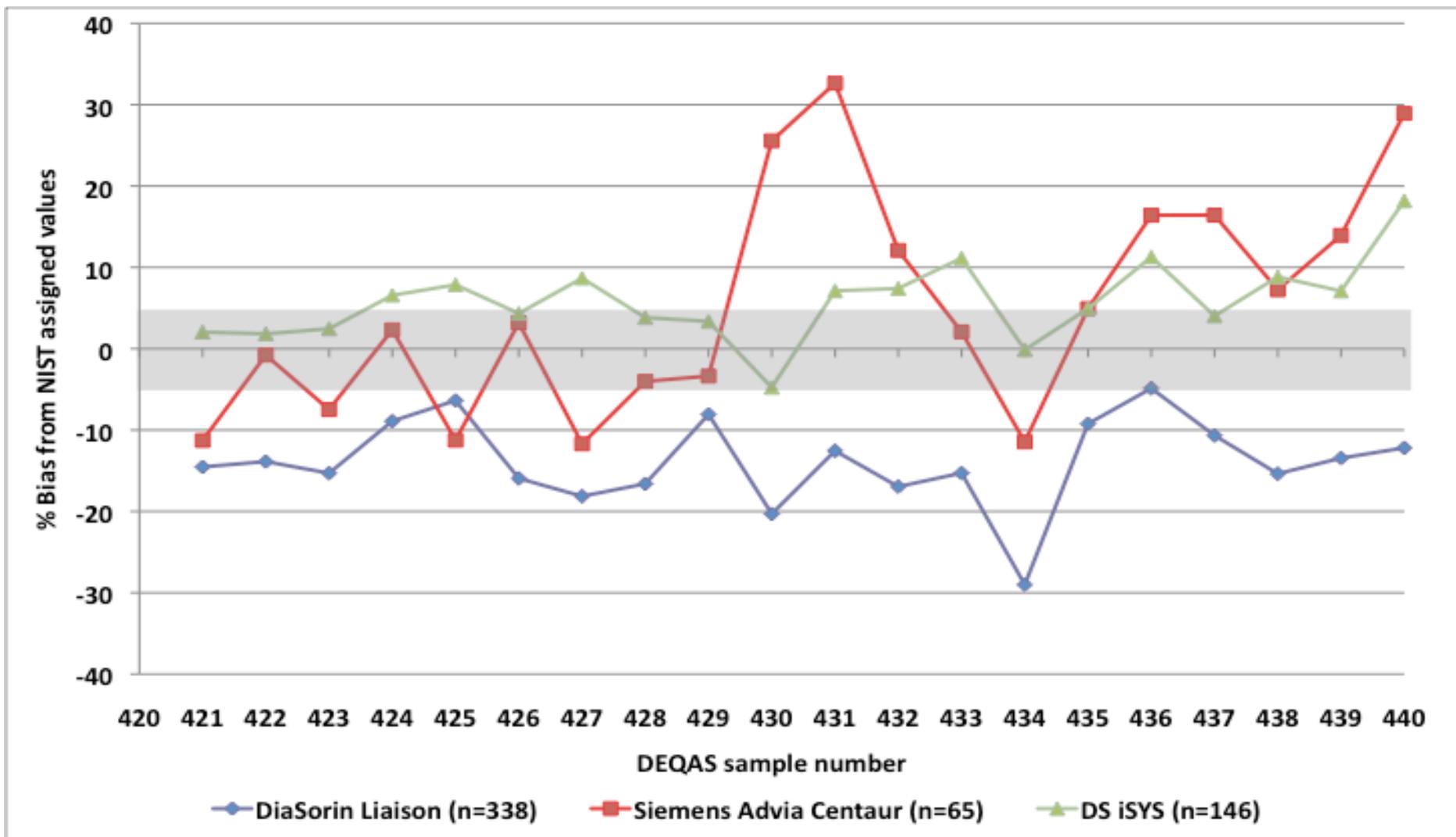
Measurements	CV (%)	Bias (%)
Reference Labs	$\leq 5\%$	$\leq 1.7\%$
“Routine” Labs	$\leq 10\%$	$\leq 5\%$

*Stöckl D et al. Clin Chim Acta 2009;408:8-13

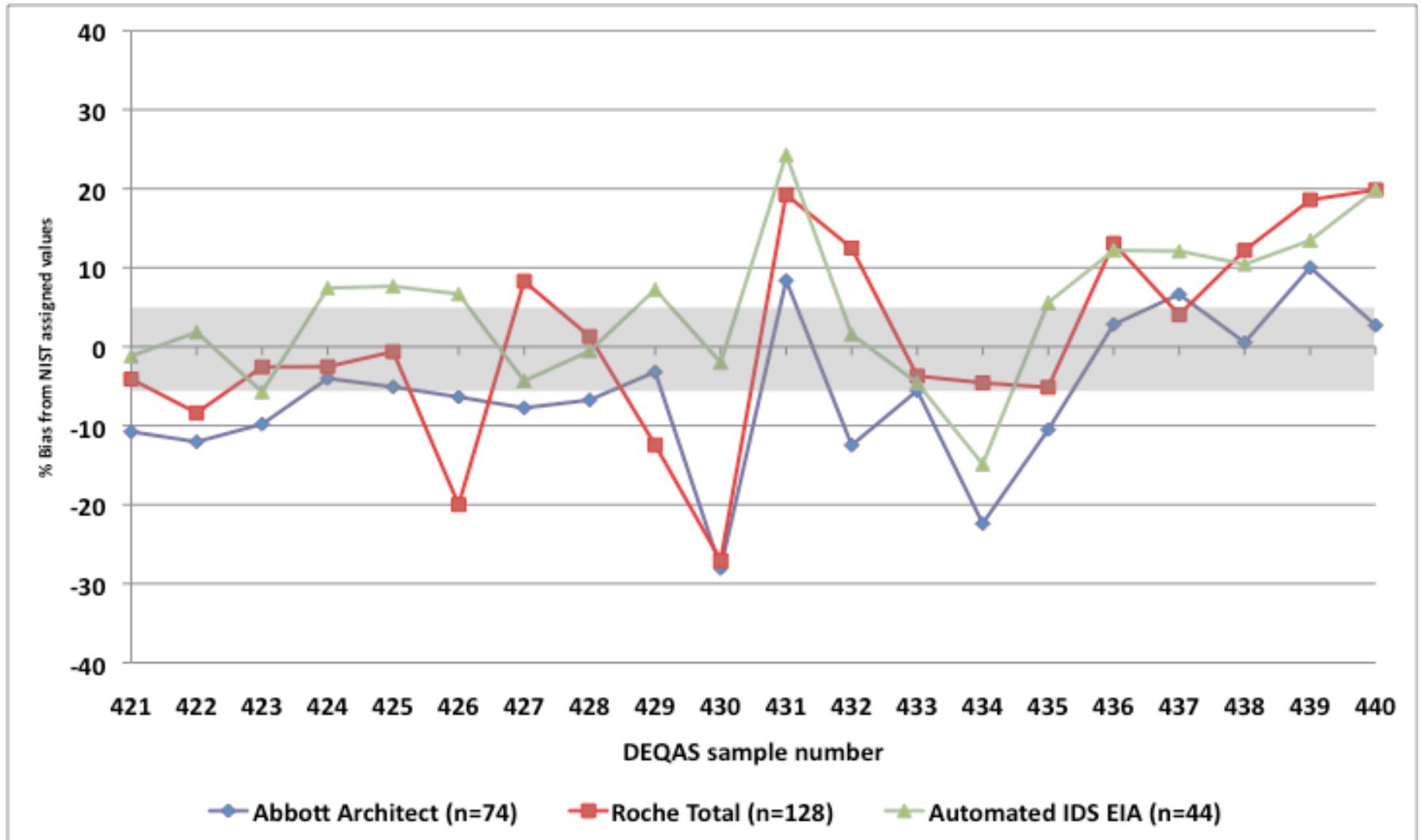
25-OHD Methods; % of users submitting results within the suggested bias limits of $\pm 5\%$ (Sample 436, July 2013)



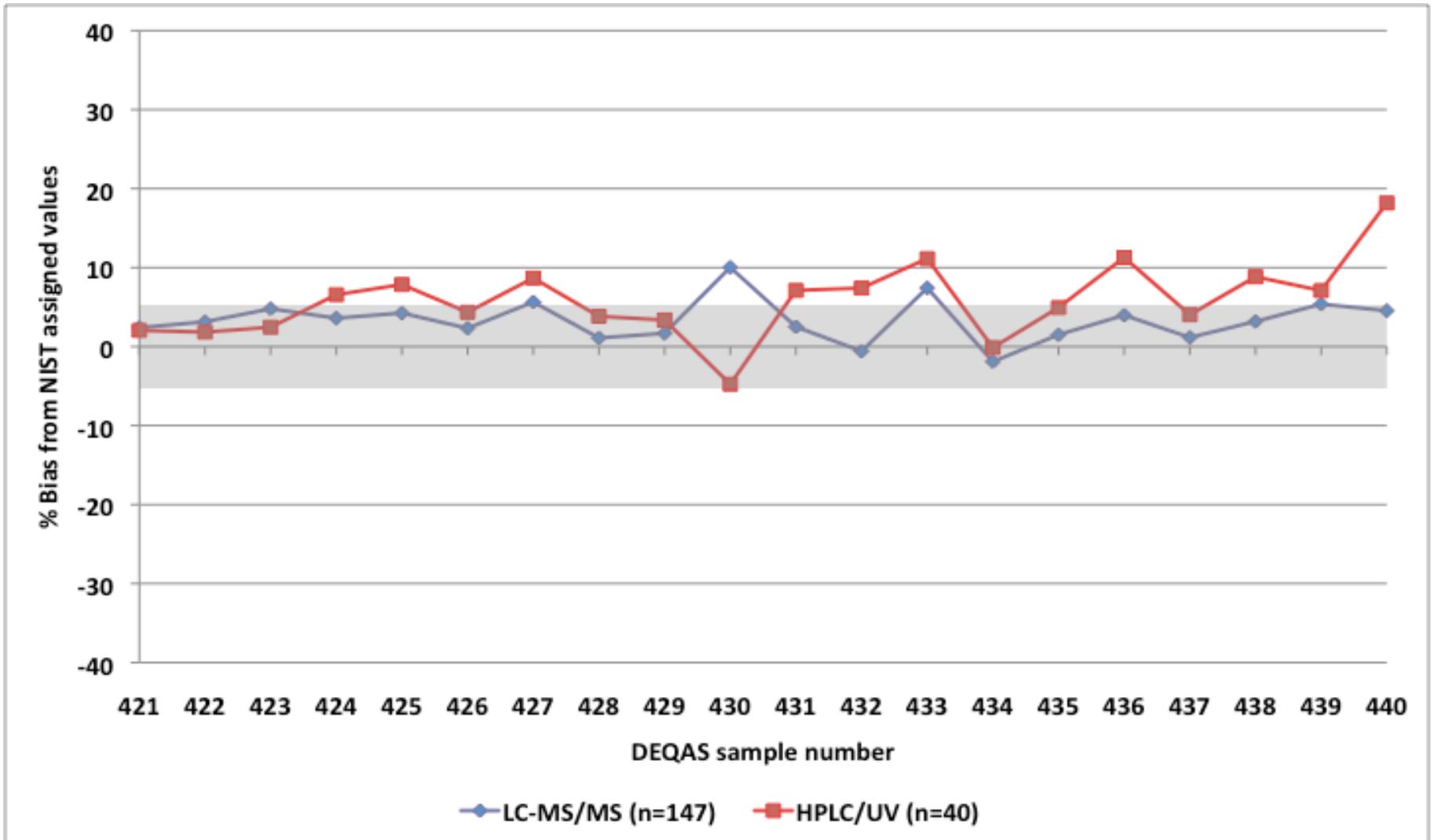
Trueness (%Bias) of automated Competitive Binding Assays for 25-OHD (1)



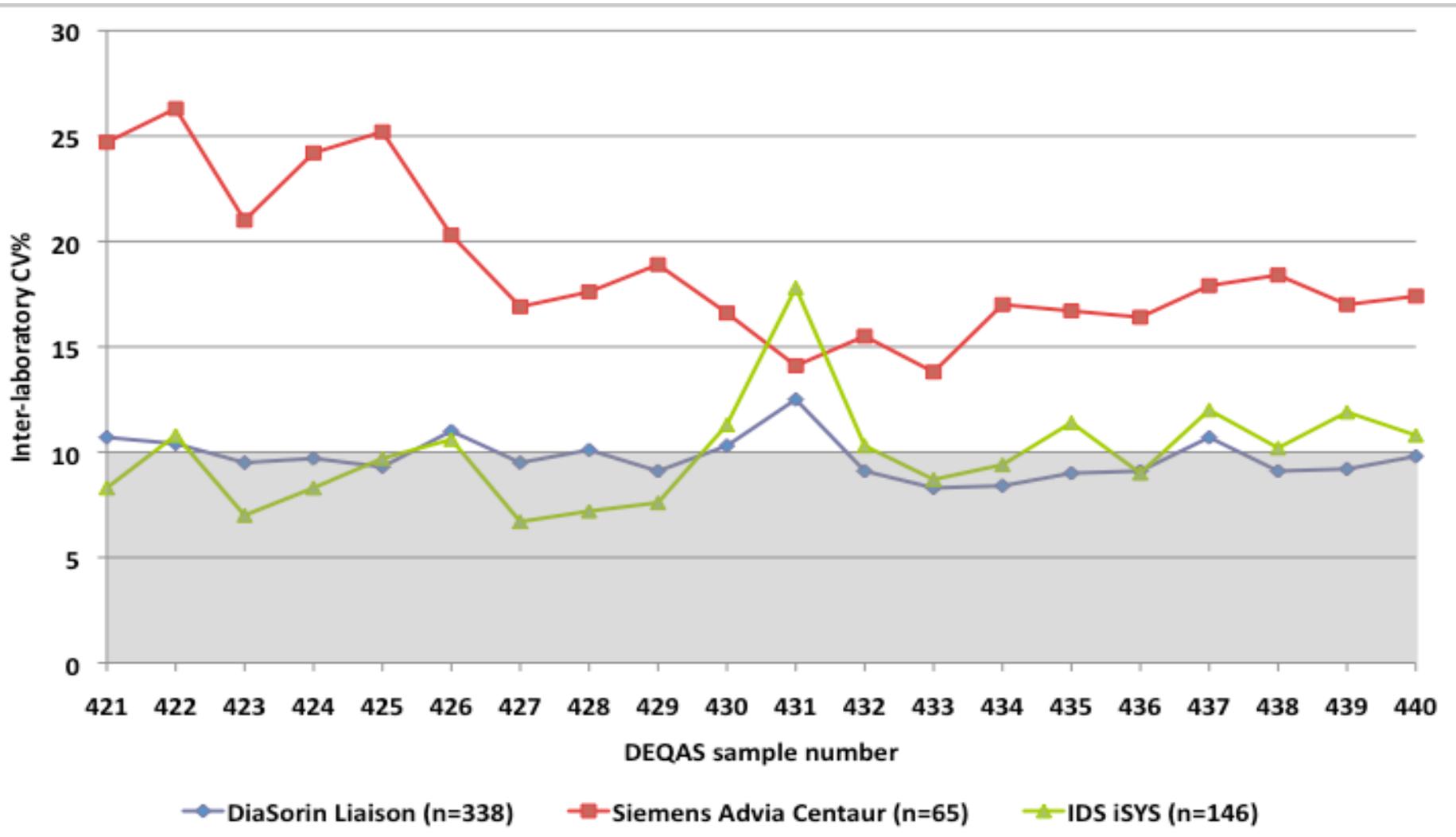
Trueness (% Bias) of automated Competitive Binding Assays for 25-OHD (2)



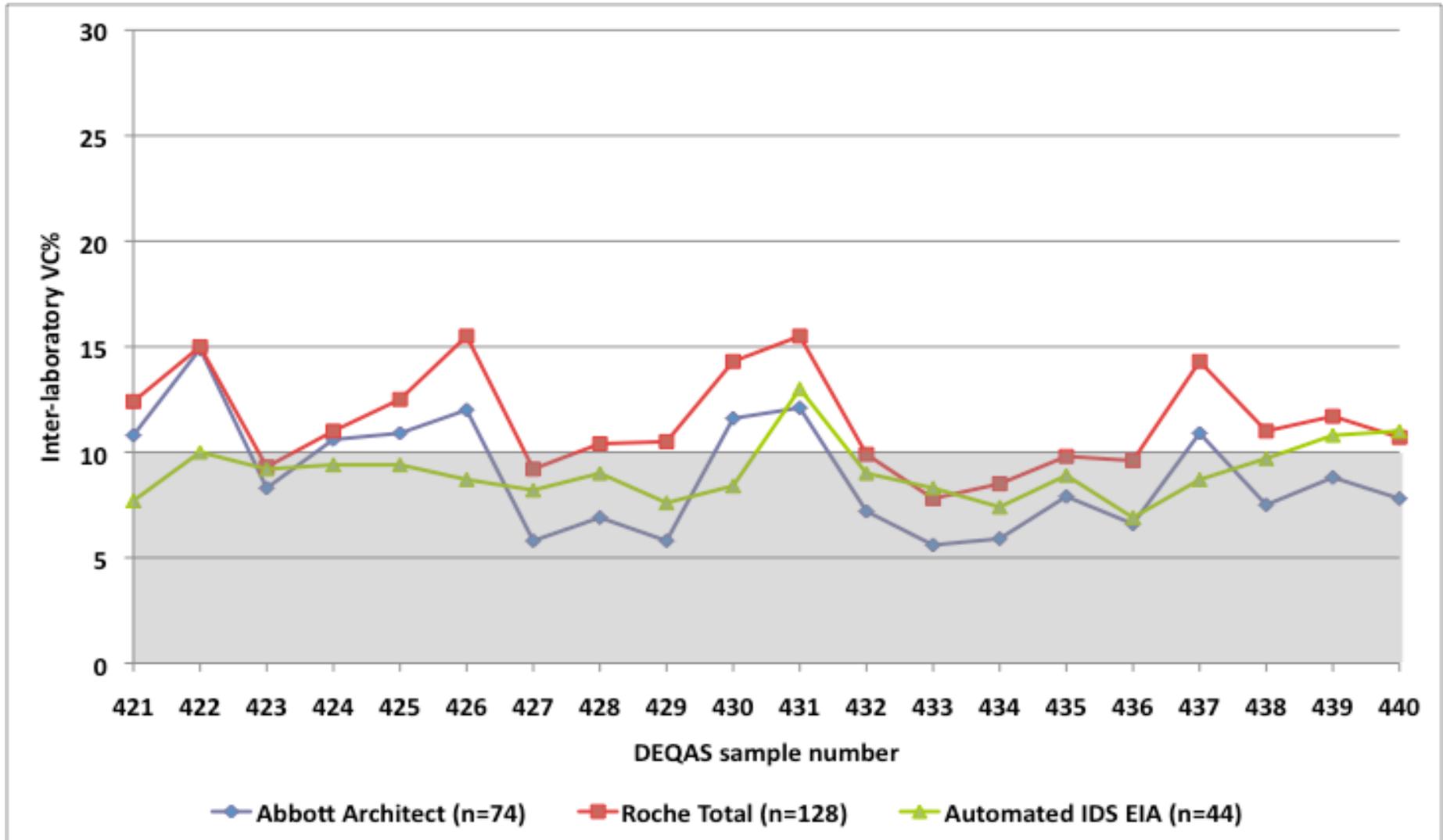
Trueness (% Bias) of LC-MS/MS and HPLC/UV



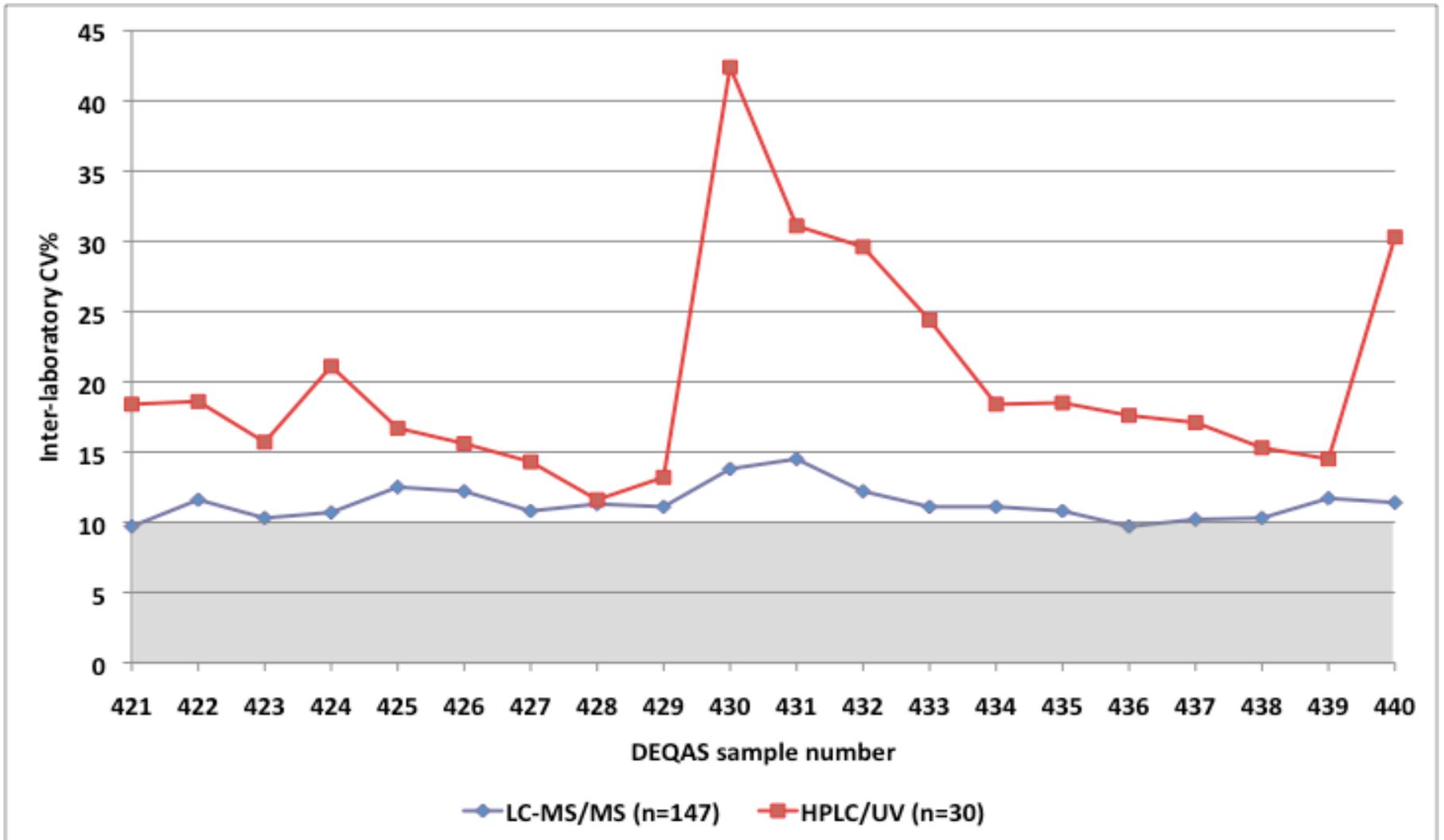
Imprecision of automated Competitive Binding Assays for 25-OHD (1)



Imprecision of automated Competitive Binding Assays for 25-OHD (2)



Imprecision of LC-MS/MS and HPLC/UV



Summary

- The VDSP is designed to standardize 25-OHD results to the true value (RMP)
- Accuracy based PT schemes can (should?) be used to monitor:
 - Accuracy of individual 25-OHD results
 - Inter-laboratory imprecision
 - Trueness of 25-OHD methods

But can we ever guarantee the accuracy of an individual result?

Thank you!



Acknowledgements

- DEQAS: Jayne Shannon, Julia Jones
- ODS: Christopher Sempos, Paul Coates
- NIST: Johanna Camara, Lane Sander, Karen Phinney, Stephen Wise,

DEQAS: an accuracy based Proficiency Testing Scheme for 25-OHD assays

Aim of DEQAS is to **monitor/improve** performance of 25-OHD assays through:

- Quarterly distribution of **unadulterated human serum** samples (from haemochromatosis patients).
- Calculation of **%Bias** from a Target value (ALTM until January 2013, **NIST values from April 2013**)
- Educational/investigative exercises