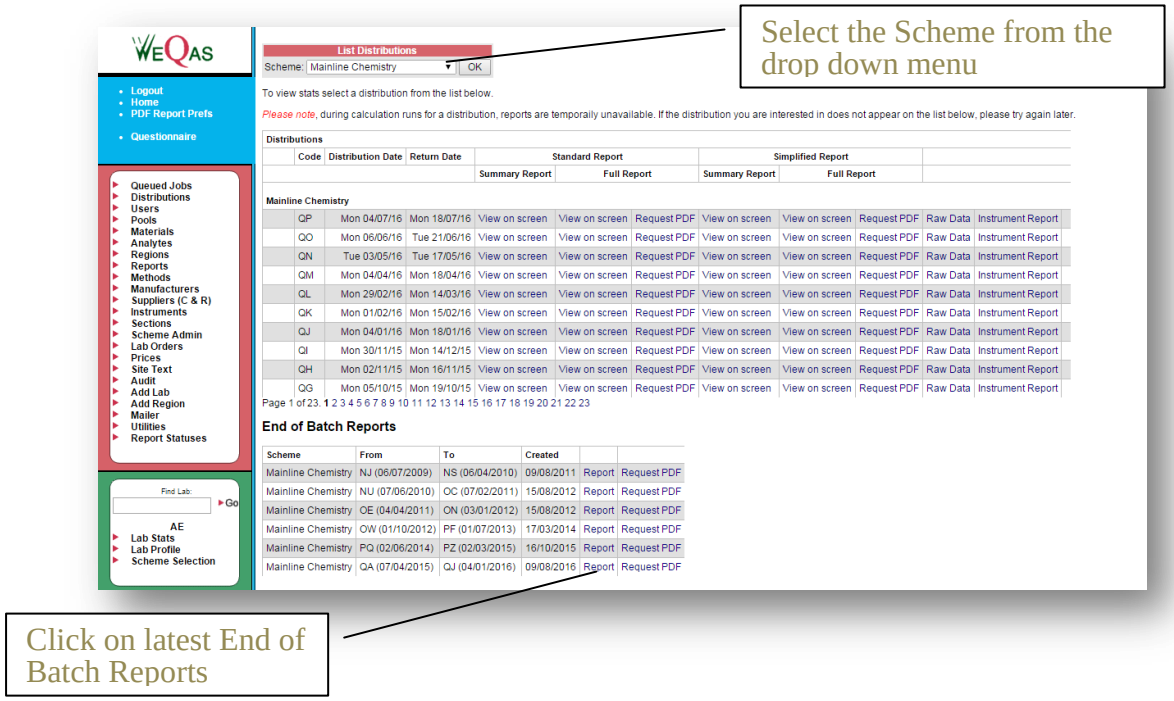
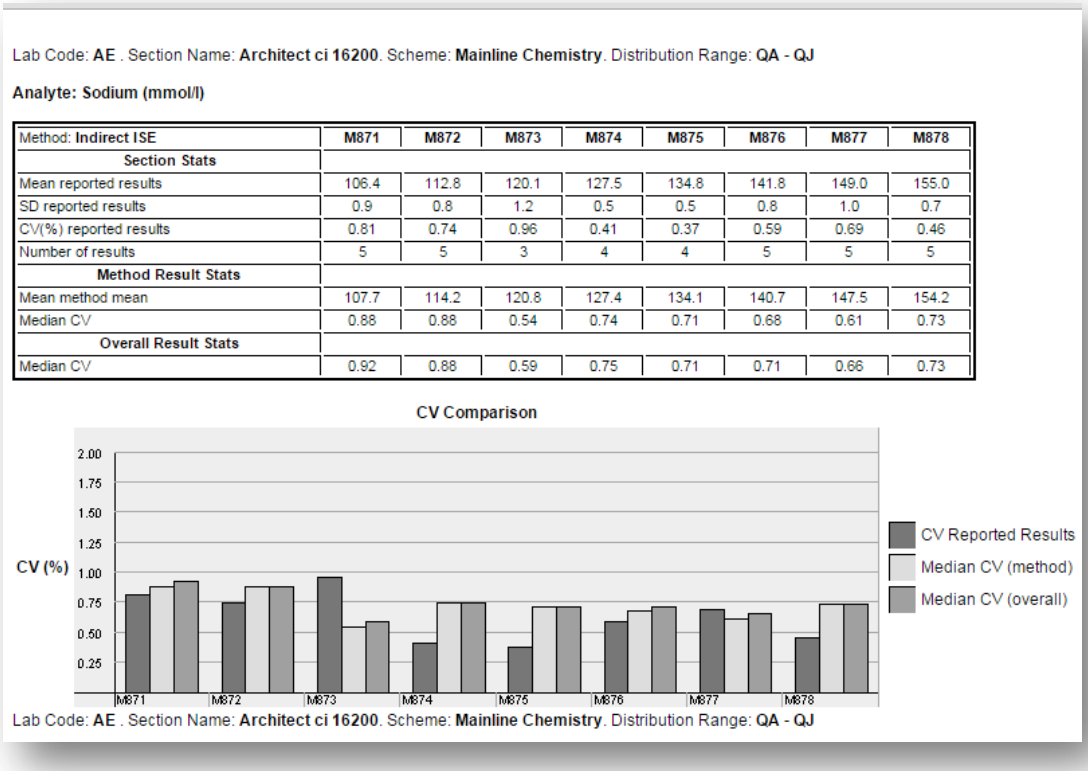
How to calculate your long term bias for your uncertainty calculation?

The following is an example on how to calculate the long term bias and between batch imprecision for serum sodium for samples analysed between 7/04/2015 and 14/01/2016.
The information is available from your "End of batch report". These reports are listed at the end of your Distribution table and accessed via Lab Stats.



The following table will be provided for each measurand for each Section (analyser) registered with us.



Lab Code: **AE** . Section Name: **Architect ci 16200**. Scheme: **Mainline Chemistry**. Distribution Range: **QA - QJ**

Analyte: Sodium (mmol/l)

Method: **Indirect ISE**	**M871**	**M872**	**M873**	**M874**	**M875**	**M876**	**M877**	**M878**
Section Stats								
Mean reported results	106.4	112.8	120.1	127.5	134.8	141.8	149.0	155.0
SD reported results	0.9	0.8	1.2	0.5	0.5	0.8	1.0	0.7
CV(%) reported results	0.81	0.74	0.96	0.41	0.37	0.59	0.69	0.46
Number of results	5	5	3	4	4	5	5	5
Method Result Stats								
Mean method mean	107.7	114.2	120.8	127.4	134.1	140.7	147.5	154.2
Median CV	0.88	0.88	0.54	0.74	0.71	0.68	0.61	0.73
Overall Result Stats								
Median CV	0.92	0.88	0.59	0.75	0.71	0.71	0.66	0.73

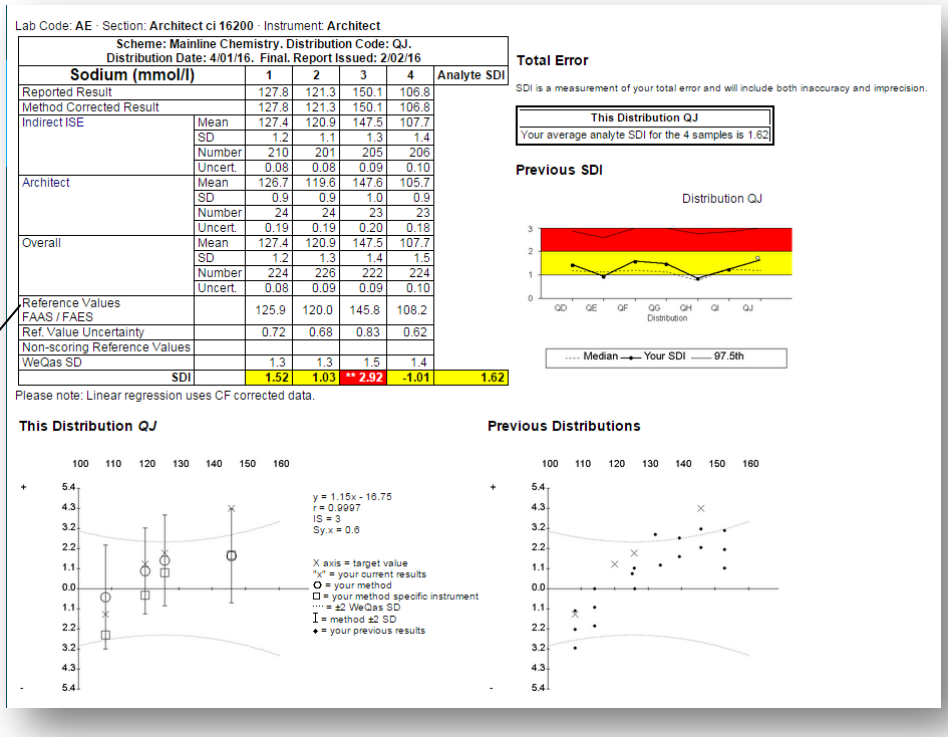
Lab Code: **AE** . Section Name: **Architect ci 16200**. Scheme: **Mainline Chemistry**. Distribution Range: **QA - QJ**

The End of Batch report

For a large number of our Schemes, material is prepared and distributed on more than one distribution, e.g. a batch of Serum chemistry samples consists of 8 levels and each level is distributed on 4 or 5 occasions over a 10 month period. This allows calculation of your overall bias and between batch imprecision over this period.

The report provides the mean, SD and coefficient of variation (CV%) of your results for each level over this time period. Reference Target values for your measurands (where provided) are available from your Standard reports.

Reference values for samples M874, M873, M877 and M 871 respectively



Lab Code: **AE** · Section: **Architect ci 16200** · Instrument: **Architect**

Scheme: Mainline Chemistry. Distribution Code: QJ.
Distribution Date: 4/01/16. Final. Report Issued: 2/02/16

Sodium (mmol/l)		1	2	3	4	Analyte SDI
Reported Result		127.8	121.3	150.1	106.8	
Method Corrected Result		127.8	121.3	150.1	106.8	
Indirect ISE	Mean	127.4	120.9	147.5	107.7	
	SD	1.2	1.1	1.3	1.4	
	Number	210	201	205	206	
	Uncert.	0.08	0.08	0.09	0.10	
Architect	Mean	126.7	119.6	147.6	105.7	
	SD	0.9	0.9	1.0	0.9	
	Number	24	24	23	23	
	Uncert.	0.19	0.19	0.20	0.18	
Overall	Mean	127.4	120.9	147.5	107.7	
	SD	1.2	1.3	1.4	1.5	
	Number	224	226	222	224	
	Uncert.	0.08	0.09	0.09	0.10	
Reference Values FAAS / FAES		125.9	120.0	145.8	108.2	
Ref. Value Uncertainty		0.72	0.68	0.83	0.62	
Non-scoring Reference Values						
WeQas SD		1.3	1.3	1.5	1.4	
SDI		1.52	1.03	** 2.92	-1.01	1.62

Please note: Linear regression uses CF corrected data.

Total Error

SDI is a measurement of your total error and will include both inaccuracy and imprecision.

This Distribution QJ
Your average analyte SDI for the 4 samples is 1.62

Previous SDI

Distribution QJ

This Distribution *QJ*

Previous Distributions

Sodium	Pools								
Method: Indirect ISE	**M871**	**M872**	**M873**	**M874**	**M875**	**M876**	**M877**	**M878**	**Units**
Your results									
Mean reported results	106.4	112.8	120.1	127.5	134.8	141.8	149.0	155.0	mmol/L
SD reported results	0.9	0.8	1.2	0.5	0.5	0.8	1.0	0.7	mmol/L
CV reported results	0.81	0.74	0.96	0.41	0.37	0.59	0.69	0.46	%
Number of results	5	5	3	4	4	5	5	5	
Reference Target	108.2	114	120	125.9	132.1	139.3	145.8	152.9	mmol/L
Method Result Stats									
Mean method mean	107.7	114.2	120.8	127.4	134.1	140.7	147.5	154.2	mmol/L
Median CV	0.88	0.88	0.54	0.74	0.71	0.68	0.61	0.73	%
Overall Result Stats									
Median CV	0.92	0.88	0.59	0.75	0.71	0.71	0.66	0.73	%

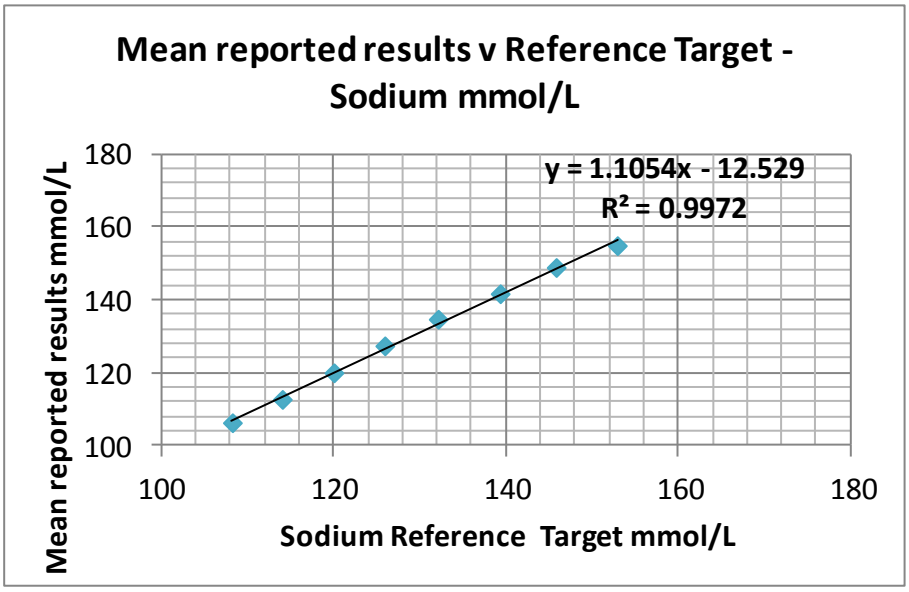
How to calculate bias

Compare your Mean reported results with the Reference targets or if these are not available your Mean method mean and calculate the linear regression equation of your results (y) on the Reference target (x). This will be available on the End of batch report on the next software release, however, meanwhile, this can easily be achieved in Excel.

Copy and paste the table into Excel and calculate y=mx+c. For the above example this produced the equation:

y =1.1054 x- 12.529

Mean reported results	106.4	112.8	120.1	127.5	134.8	141.8	149	155	**mmol/L**
Reference Target	108.2	114	120	125.9	132.1	139.3	145.8	152.9	mmol/L
Mean method mean	107.7	114.2	120.8	127.4	134.1	140.7	147.5	154.2	mmol/L



Decide on your critical points for expressing bias (x) e.g. sodium of 130mmol/L

Apply in the equation:

Y = 130 * 1.1054 -12.529 = 131.17 mmol/L

Bias =(x-y)/ x * 100 %

Bias = (130-131.17)/ 130 * 100% =+ 0.9%