

<b>NHS Greater Glasgow &amp; Clyde Immunology and Neuroimmunology</b>		
<b>QF_20</b>	<b>Uncertainty of measurement summary table for cells (flow cytometry)</b>	<b>Version: 1</b>
<b>Author: Lauren Hennessy</b>	<b>Authoriser: Sylvia Arthur</b>	<b>Date of Issue: 12/10/2021</b>

### Uncertainty of Measurement: Summary table for cells (flow cytometry)

Uncertainty of measurement (UoM) is calculated using internal quality control (IQC)

The raw data and calculations can be found at the following location: <\\xggc-fsrv-04\GGC Biochemistry\South Glasgow\Immunology Common\COMMON\1IMM&NI\Quality\Uncertainty of Measurement>

Analyte	Absolute Lymphocyte Count (cells/cmm)	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	1294.1	1317.2
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	54.70	68.56
Coefficient of Variance (%CV)	4.23%	5.20%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 8.5%</b>	<b>± 10.4%</b>
Uncertainty of measurement <b>example</b> (using IQC)	1294.1 ± 109.40 cells/cmm (1184.7 – 1403.5 cells/cmm)	1317.2 ± 137.12 cells/cmm (1180.1 – 1456.3 cells/cmm)

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Analyte	% CD3 <sup>+</sup> T cells	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	70.1%	70.2%
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	1.25	0.79
Coefficient of Variance (%CV)	1.78%	1.12%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 3.6%</b>	<b>± 2.2 %</b>
Uncertainty of measurement <b>example</b> (using IQC)	70.1 ± 2.5% (67.6 – 72.6%)	70.2 ± 1.57% (68.7 – 71.8 %)

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Analyte	<b>CD3<sup>+</sup> T cells absolute count (cells/cmm)</b>	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	908.5	924.1
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	40.36	48.10
Coefficient of Variance (%CV)	4.44%	5.20%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 8.9%</b>	<b>± 10.4%</b>
Uncertainty of measurement <b>example</b> (using IQC)	908.5 ± 80.73 cells/cmm (827.7 – 989.2 cells/cmm)	924.1 ± 96.20 cells/cmm (827.9 – 1020.3 cells/cmm)

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Analyte	% CD3 <sup>+</sup> CD4 <sup>+</sup> T cells	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	47.2	47.0
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	1.17	0.94
Coefficient of Variance (%CV)	2.47%	2.01%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 4.9%</b>	<b>± 4.0%</b>
Uncertainty of measurement <b>example</b> (using IQC)	47.2 ± 2.33% (44.9 – 49.6%)	47.0 ± 1.89% (45.1 – 48.9%)

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Analyte	<b>CD3<sup>+</sup> CD4<sup>+</sup> T cell absolute count (cells/cmm)</b>	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	610.1	620.1
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	29.95	36.98
Coefficient of Variance (%CV)	4.91%	5.96%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 9.8%</b>	<b>± 11.9%</b>
Uncertainty of measurement <b>example</b> (using IQC)	610.1 ± 59.9 cells/cmm (550.2 – 670.0 cells/cmm)	620.1 ± 73.96 cells/cmm (546.1 – 694.1 cells/cmm)

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Analyte	% CD3 <sup>+</sup> CD8 <sup>+</sup> T cells	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	20.5	20.6
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	0.97	0.83
Coefficient of Variance (%CV)	4.71%	4.03%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 9.4%</b>	<b>± 8.1%</b>
Uncertainty of measurement <b>example</b> (using IQC)	20.5 ± 1.94% (18.6 – 22.5%)	20.6 ± 1.65% (18.9 – 22.2%)

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Analyte	<b>CD3<sup>+</sup> CD8<sup>+</sup> T cell absolute count (cells/cmm)</b>	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	265.9	270.3
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	14.83	14.35
Coefficient of Variance (%CV)	5.58%	5.31%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 11.2%</b>	<b>± 10.6%</b>
Uncertainty of measurement <b>example</b> (using IQC)	265.9 ± 29.65 cells/cmm (236.3 – 295.6 cells/cmm)	270.3 ± 28.70 cells/cmm (241.6 – 299.0 cells/cmm)

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Analyte	% CD19 <sup>+</sup> B cells	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	14.6	14.6
Number of measurements (n)	45	26
Estimated Standard Deviation (s)	0.83	0.7
Coefficient of Variance (%CV)	5.7%	4.77%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 11.4%</b>	<b>± 9.5%</b>
Uncertainty of measurement <b>example</b> (using IQC)	14.6 ± 1.67% (13.0 – 16.3%)	14.6 ± 1.39% (13.2 – 16.0%)

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Analyte	<b>CD19<sup>+</sup> B cell absolute count (cells/cmm)</b>	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	189.3	193.4
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	12.26	13.87
Coefficient of Variance (%CV)	6.47%	7.17%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 12.9%</b>	<b>± 14.3%</b>
Uncertainty of measurement <b>example</b> (using IQC)	189.3 ± 24.51 cells/cmm (164.8 –213.8 cells/cmm)	193.4 ± 27.74 cells/cmm (165.7– 221.1 cells/cmm)

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Analyte	<b>% CD16<sup>+</sup> /56<sup>+</sup> NK cells</b>	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	13.6	13.9
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	0.89	0.79
Coefficient of Variance (%CV)	6.59%	5.69%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 13.2%</b>	<b>± 11.4%</b>
Uncertainty of measurement <b>example</b> (using IQC)	13.6 ± 1.79% (11.8 – 15.3%)	13.9 ± 1.58% (12.3 – 15.4%)

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Analyte	<b>CD16<sup>+</sup>/56<sup>+</sup> NK cell absolute count (cells/cmm)</b>	
	IQC on Integrated Lyric	IQC on Stand Alone Lyric
Mean (x)	176.3	182.5
Number of measurements (n)	45	29
Estimated Standard Deviation (s)	12.78	13.52
Coefficient of Variance (%CV)	7.25%	7.41%
Coverage factor (k) to define a confidence level of 95%	2	2
<b>Relative standard expanded uncertainty (U)</b>	<b>± 14.5%</b>	<b>± 14.8%</b>
Uncertainty of measurement <b>example</b> (using IQC)	176.3 ± 25.56 cells/cmm (150.8 – 201.9 cells/cmm)	182.5 ± 27.04 cells/cmm (155.5 – 209.6 cells/cmm)

For the details of the calculation and UoM protocol please refer to document QP\_5: Uncertainty of Measurement Protocol.