



Performance Assessment Report

External Quality Assessment for: *Legionella* Isolation from Water Samples

Distribution Numbers: G60, G61, G62 and G63

Sample Numbers: G60A, G60B, G60C
G61A, G61B, G61C
G62A, G62B, G62C
G63A, G63B, G63C

Distribution Date:	October 2008
Results Due:	31 October 2008
Report Date:	14 November 2008
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This report accompanies the summary of results for *Legionella* Isolation Scheme Distribution G63. Please refer to the relevant summaries for individual sample details.

Performance assessments are designed to identify laboratories with ongoing problems with their examinations and are undertaken after every distribution.

Scores are allocated to results reported for every sample to help participants assess their performance. Cumulative scores are calculated for every participant for *Legionella* examinations for the current and previous three distributions. Participants' cumulative scores are compared with the maximum possible scores after every distribution.

Reporting an incomplete, incorrect or misleading identification of *Legionella* spp. from water samples may have serious public health implications. Correct reporting of the serogroup is essential for outbreak investigations. Outlying result may give a misleading impression of the severity of the risk associated with the water-source.

Individual comments are included in this report for those participants who achieved <70% of the maximum possible score over four distributions, which is deemed to indicate on-going problems with examinations for *Legionella* organisms.

A summary of the performance assessments and our comments is included on pages 2 – 13.

If you experienced problems with these examinations please refer to the 'Troubleshooting Section' on page 14 and request a repeat sample.

Please contact FEPTU staff for additional advice and information. Contact details are on page 15.

Information about other Health Protection Agency functions and services is available from the web-site www.hpa.org.uk

Sample specific comments:

Please note that we have not included any comments in this report relating to performance with sample G62A. We did not allocate scores for that sample because it was used to raise participants' awareness of the *Legionella* species included in the sample. We remind participants that this type of sample may occur in nature and we may allocate scores for similar samples in the future.

Note: Participants who can not perform one or more of the examinations requested are required to indicate this by writing 'NE' (not examined) in the appropriate area of the results form. Scores will not be allocated for these tests and the maximum possible score will be adjusted accordingly.

For Example:

Return of report	1
Isolation of a <i>Legionella</i> sp.	2
Correct identification of <i>L.pneumophila</i>	2
Correct serogroup	NE
Enumeration within the expected range	5
Total maximum score	10

Table 1: Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL1	12	12	10	12	10	12	N/A	12	12	12	12	12	128	132	97.0	
EL2	12	12	12	12	12	12	N/A	12	12	10	12	12	130	132	98.5	
EL3	12	12	12	10	12	12	N/A	12	12	0	0	0	94	132	71.2	
EL5	12	10	10	12	12	12	N/A	12	10	11	9	12	122	132	92.4	
EL6	12	10	12	10	12	12	N/A	12	1	12	12	12	117	132	88.6	
EL10	12	1	12	12	12	12	N/A	12	12	12	11	12	120	132	90.9	
EL13	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL14	10	10	12	0	0	0	N/A	12	12	12	11	12	91	132	68.9	<ul style="list-style-type: none"> Counts reported were lower than expected range for G60A, G60B and G63B. No report was returned for distribution G61.
EL16	0	0	0	12	12	12	N/A	12	12	1	11	12	84	132	63.6	<ul style="list-style-type: none"> <i>Legionella</i> sp. was not detected for G63A. <i>L.bozemanii</i> was not detected for G63B. No report was returned for distribution G60.
EL21	12	12	12	0	0	0	N/A	12	10	12	12	12	94	132	71.2	
EL22	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL23	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL24	12	12	12	12	12	12	N/A	12	12	8	12	12	128	132	97.0	
EL30	12	10	12	12	12	12	N/A	12	10	12	12	12	128	132	97.0	
EL32	1	12	12	12	12	12	N/A	12	12	1	12	12	110	132	83.3	
EL34	12	12	12	12	12	12	N/A	12	12	10	12	12	130	132	98.5	
EL35	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL36	12	12	12	NE	NE	NE	N/A	12	10	NE	NE	NE	58	60	96.7	
EL39	NE	NE	NE	5	12	12	N/A	12	5	1	12	12	71	96	74.0	
EL40	12	1	12	10	12	10	N/A	12	12	12	12	12	117	132	88.6	
EL41	12	10	12	12	12	10	N/A	12	12	7	7	12	118	132	89.4	
EL42	12	12	12	11	12	12	N/A	0	0	12	10	12	105	132	79.5	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL43	1	1	6	1	1	1	N/A	0	0	1	1	12	25	132	18.9	<ul style="list-style-type: none"> Species name and serogroup was not reported for G60C. <i>Legionella</i> sp. was not detected for G60A, G60B, all G61 samples, G63A and G63B. No report was returned for distribution G62.
EL47	10	12	10	12	10	12	N/A	12	10	NE	NE	NE	88	96	91.7	
EL49	10	12	12	NE	NE	NE	N/A	12	1	NE	NE	NE	47	60	78.3	
EL50	12	10	12	12	12	12	NE	NE	NE	12	11	12	105	108	97.2	
EL51	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL53	12	12	12	12	12	10	N/A	12	12	11	12	12	129	132	97.7	
EL54	12	12	12	12	12	12	N/A	12	5	1	9	12	111	132	84.1	
EL56	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL57	12	12	12	0	0	0	N/A	12	12	NE	NE	NE	60	96	62.5	
EL60	12	12	12	8	8	8	N/A	12	1	12	12	12	109	132	82.6	
EL61	12	11	12	12	12	12	N/A	12	12	12	12	12	131	132	99.2	
EL63	12	12	10	8	10	11	N/A	NE	NE	12	12	12	99	108	91.7	
EL64	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL65	12	10	12	11	12	11	N/A	12	12	10	12	12	126	132	95.5	
EL66	1	12	12	12	12	12	N/A	12	12	12	12	12	121	132	91.7	
EL69	0	0	0	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	36	0.0	
EL71	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL72	12	12	12	NE	NE	NE	NE	NE	NE	12	12	12	72	72	100	
EL73	12	12	12	12	12	12	N/A	12	12	7	12	12	127	132	96.2	
EL74	12	12	12	12	12	12	N/A	12	12	8	9	1	114	132	86.4	
EL77	12	12	12	10	12	12	N/A	0	0	10	12	12	104	132	78.8	
EL86	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL87	8	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	32	36	88.9	
EL89	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL92	12	12	12	1	1	12	N/A	3	12	8	12	12	97.1	132	73.6	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**
 NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL93	NE	NE	NE	12	12	12	NE	NE	NE	10	11	12	69	72	95.8	
EL99	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL100	0	0	0	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	36	0.0	
EL101	12	12	12	NE	NE	NE	NE	NE	NE	12	10	12	70	72	97.2	
EL105	12	10	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	34	36	94.4	
EL107	12	12	12	12	10	12	N/A	12	12	12	9	12	127	132	96.2	
EL108	NE	NE	NE	NE	NE	NE	N/A	12	12	12	12	12	60	60	100	
EL110	12	12	12	NE	NE	NE	N/A	12	12	1	12	12	85	96	88.5	
EL114	NE	NE	NE	NE	NE	NE	N/A	2	6	NE	NE	NE	8	24	33.3	
EL116	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL119	12	12	12	NE	NE	NE	NE	NE	NE	12	12	12	72	72	100	
EL124	NE	NE	NE	12	12	12	N/A	0	12	6	12	12	78	96	81.3	
EL126	12	1	10	11	12	12	N/A	12	12	12	12	12	118	132	89.4	
EL131	12	12	12	12	12	12	N/A	12	10	10	12	12	128	132	97.0	
EL133	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL134	NE	NE	NE	12	10	12	NE	NE	NE	11	12	12	69	72	95.8	
EL136	12	10	12	12	10	12	N/A	12	12	12	10	12	126	132	95.5	
EL137	12	12	12	0	0	0	N/A	0	0	NE	NE	NE	36	96	37.5	
EL139	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL140	12	12	12	0	0	0	N/A	0	0	NE	NE	NE	36	96	37.5	
EL143	12	12	12	12	12	10	N/A	0	0	1	11	12	94	132	71.2	
EL145	10	10	12	12	12	12	N/A	12	12	12	9	12	125	132	94.7	
EL146	12	10	12	10	12	12	N/A	12	12	1	12	12	117	132	88.6	
EL149	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples G60 – G63

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL150	12	1	12	1	12	11	N/A	12	11	0	0	0	72	132	54.5	<ul style="list-style-type: none"> • <i>L.pneumophila</i> was not detected for G60B. • <i>Legionella</i> sp. was not detected for G61A. • Counts reported were lower than expected range for G61C and G62C. • No report was returned for distribution G63.
EL151	NE	NE	NE	12	12	12	NE	NE	NE	12	12	12	72	72	100	
EL153	12	12	12	12	12	12	N/A	12	12	1	12	12	121	132	91.7	
EL154	NE	NE	NE	11	12	11	NE	NE	NE	7	6	12	59	62	95.2	
EL155	12	12	12	NE	NE	NE	N/A	12	12	NE	NE	NE	60	60	100	
EL156	10	12	12	NE	NE	NE	N/A	0	0	6	12	12	64	96	66.7	
EL158	12	10	10	12	12	12	N/A	12	12	12	12	12	128	132	97.0	
EL160	NE	NE	NE	12	12	12	NE	NE	NE	1	12	12	61	72	84.7	
EL166	NE	NE	NE	12	12	12	NE	NE	NE	7	10	12	65	72	90.3	
EL167	NE	NE	NE	12	12	11	NE	NE	NE	12	12	12	71	72	98.6	
EL168	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL169	10	10	12	8	10	10	N/A	12	12	11	12	12	119	132	90.2	
EL170	12	12	12	0	0	0	N/A	12	12	12	12	12	96	132	72.7	
EL174	12	10	12	11	10	12	N/A	12	12	12	9	12	124	132	93.9	
EL175	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL176	12	12	12	12	12	12	N/A	12	12	1	12	12	121	132	91.7	
EL177	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL178	10	10	12	12	12	12	N/A	12	1	10	7	12	110	132	83.3	
EL180	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL182	NE	NE	NE	NE	NE	NE	NE	NE	NE	3	10	12	25	36	69.4	
EL185	12	12	12	12	12	12	N/A	12	12	10	10	12	128	132	97.0	
EL187	12	12	12	12	12	11	N/A	NE	NE	NE	NE	NE	71	72	98.6	
EL188	12	12	12	12	12	12	N/A	12	1	12	12	12	121	132	91.7	
EL190	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL191	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL192	12	10	12	12	12	12	N/A	12	12	12	12	12	130	132	98.5	
EL193	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL196	12	10	12	12	12	12	N/A	12	10	12	9	1	114	132	86.4	
EL199	NE	NE	NE	NE	NE	NE	N/A	NE	NE	NE	NE	NE				
EL200	12	12	12	0	0	0	NE	NE	NE	12	12	12	72	108	66.7	
EL202	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL206	12	10	12	10	1	12	N/A	12	10	5	9	12	105	132	79.5	
EL208	NE	NE	NE	NE	NE	NE	N/A	12	12	12	12	12	60	60	100	
EL209	0	0	0	10	1	10	NE	NE	NE	NE	NE	NE	21	72	29.2	
EL210	12	12	12	10	12	10	N/A	12	12	1	12	12	117	132	88.6	
EL212	12	10	10	12	12	10	NE	NE	NE	1	10	12	89	108	82.4	
EL213	12	12	12	12	12	12	N/A	12	12	0	0	0	96	132	72.7	
EL214	12	12	12	10	10	10	N/A	12	10	0	0	0	88	132	66.7	<ul style="list-style-type: none"> • <i>L.pneumophila</i> was not reported for any G61 samples. • Count reported was higher than expected range for G62C. • No report was returned for distribution G63.
EL215	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL216	12	10	12	12	12	10	N/A	12	12	12	12	12	128	132	97.0	
EL217	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL218	10	10	12	1	1	12	N/A	12	12	1	10	12	93	132	70.5	
EL220	12	12	12	12	12	10	N/A	12	1	12	NE	NE	95	108	88.0	
EL221	NE	NE	NE	NE	NE	NE	NE	NE	NE	12	11	12	35	36	97.2	
EL222	0	0	0	12	12	11	N/A	12	11	10	12	12	92	132	69.7	<ul style="list-style-type: none"> • Counts reported were lower than expected range for G61C and G62C. • Count reported was higher than expected range for G63A. • No report was returned for distribution G60.

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL223	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
EL225	12	12	12	12	1	12	N/A	12	11	1	12	12	109	132	82.6	
EL226	NE	NE	NE	1	5	1	NE	NE	NE	NE	NE	NE	7	36	19.4	
EL227	12	12	12	12	12	12	NE	NE	NE	NE	NE	NE	72	72	100	
EL228	0	0	0	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	36	0.0	
EL230	12	12	12	5	12	5	N/A	12	12	12	9	12	115	132	87.1	
EL231	12	12	12	12	12	10	N/A	12	12	12	12	12	130	132	98.5	
EL232	12	11	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	35	36	97.2	
EL233	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	0	0	0	36	0.0	
EL235	0	0	0	NE	NE	NE	NE	NE	NE	0	0	0	0	72	0.0	
EL236	10	8	10	NE	NE	NE	NE	NE	NE	NE	NE	NE	28	32	87.5	
EL250	NE	NE	NE	1	12	12	N/A	12	11	1	9	12	70	96	72.9	
EL257	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
EL258	8	8	8	1	6	8	N/A	8	1	1	8	8	65	88	73.9	
EL300	12	12	12	6	12	12	N/A	12	12	0	0	0	90	132	68.2	<ul style="list-style-type: none"> • <i>Legionella</i> sp. was not detected for G61A. • No report was returned for distribution G63.
EL301	12	12	10	12	10	12	N/A	12	12	12	12	12	128	132	97.0	
EL302	0	0	0	1	1	12	N/A	0	0	0	0	0	14	132	10.6	<ul style="list-style-type: none"> • <i>Legionella</i> sp. was not detected for G61A and G61B. • No reports were returned for distribution G60, G62 and G63.
EL303	11	12	12	NE	NE	NE	N/A	0	0	NE	NE	NE	35	60	58.3	
EL304	12	12	12	12	12	8	NE	NE	NE	1	12	12	93	108	86.1	
EL306	12	5	7	10	12	10	N/A	12	10	10	12	12	112	132	84.8	
EL307	12	12	10	NE	NE	NE	NE	NE	NE	NE	NE	NE	34	36	94.4	
EL308	12	10	10	NE	NE	NE	NE	NE	NE	NE	NE	NE	32	36	88.9	
EL309	12	12	10	NE	NE	NE	NE	NE	NE	NE	NE	NE	34	36	94.4	
EL310	0	0	0	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	36	0.0	
EL311	7	1	10	11	12	12	NE	NE	NE	NE	NE	NE	53	72	73.6	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL312	12	12	12	10	10	10	N/A	12	12	12	12	12	126	132	95.5	
EL313	10	12	12	NE	NE	NE	N/A	12	1	NE	NE	NE	47	60	78.3	
EL314	NE	NE	NE	12	7	12	NE	NE	NE	3	11	12	57	72	79.2	
EL315	1	8	8	8	1	1	NE	NE	NE	NE	NE	NE	27	72	37.5	
EL316	12	12	12	12	8	12	N/A	12	12	1	9	1	103	132	78.0	
EL317	8	12	8	12	12	12	N/A	12	12	12	10	12	122	132	92.4	
EL318	NE	NE	NE	12	1	12	N/A	12	12	1	4	12	66	96	68.8	
EL319	NE	NE	NE	0	0	0	NE	NE	NE	1	8	12	21	72	29.2	
EL320	NE	NE	NE	1	12	12	N/A	3	1	1	11	12	53.3	96	55.5	
EL321	NE	NE	NE	1	12	12	N/A	12	12	0	0	0	49	96	51.0	
EL322	NE	NE	NE	12	1	1	NE	NE	NE	1	1	12	28	72	38.9	
EL323	NE	NE	NE	0	0	0	NE	NE	NE	NE	NE	NE	0	36	0.0	
EL324	NE	NE	NE	0	0	0	N/A	12	12	12	11	12	59	96	61.5	
EL326	NE	NE	NE	12	12	12	N/A	12	10	12	12	12	94	96	97.9	
EL328	NE	NE	NE	12	12	12	N/A	12	12	0	0	0	60	96	62.5	
EL329	NE	NE	NE	12	10	12	N/A	12	10	0	0	0	56	96	58.3	
EL330	NE	NE	NE	11	1	12	N/A	12	1	0	0	0	37	96	38.5	
EL331	NE	NE	NE	NE	NE	NE	N/A	12	12	12	10	12	58	60	96.7	
EL332	NE	NE	NE	NE	NE	NE	N/A	12	8	1	9	12	42	60	70.0	
EL336	NE	NE	NE	12	10	12	NE	NE	NE	1	9	12	56	72	77.8	
EL339	NE	NE	NE	8	10	10	NE	NE	NE	7	9	12	56	72	77.8	
EL340	NE	NE	NE	12	12	12	NE	NE	NE	8	11	12	67	72	93.1	
EL341	NE	NE	NE	12	12	12	NE	NE	NE	1	12	12	61	72	84.7	
EL342	NE	NE	NE	12	12	12	N/A	12	1	12	11	12	84	96	87.5	
EL343	NE	NE	NE	0	0	0	N/A	4	8	0	0	0	11.7	96	12.2	
EL344	NE	NE	NE	NE	12	12	N/A	12	7	1	12	12	68	84	81.0	
EL345	NE	NE	NE	12	12	12	NE	NE	NE	NE	NE	NE	36	36	100	
EL346	NE	NE	NE	NE	NE	NE	N/A	0	5	0	0	0	5	60	8.3	
EL347	NE	NE	NE	NE	NE	NE	N/A	12	12	NE	NE	NE	24	24	100	
EL348	NE	NE	NE	NE	NE	NE	N/A	12	12	12	12	12	60	60	100	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL349	NE	NE	NE	NE	NE	NE	N/A	12	12	0	0	0	24	60	40.0	
EL351	NE	NE	NE	NE	NE	NE	N/A	12	10	10	12	12	56	60	93.3	
EL355	NE	NE	NE	NE	NE	NE	N/A	12	12	12	1	12	49	60	81.7	
EL356	NE	NE	NE	NE	NE	NE	N/A	0	0	0	0	0	0	60	0.0	
EL357	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	0	0	0	36	0.0	
EL358	NE	NE	NE	NE	NE	NE	N/A	0	0	0	0	0	0	60	0.0	
EL359	NE	NE	NE	NE	NE	NE	N/A	12	1	0	0	0	13	60	21.7	
EL361	NE	NE	NE	NE	NE	NE	N/A	12	12	1	12	12	49	60	81.7	
EL362	NE	NE	NE	NE	NE	NE	N/A	12	12	1	11	12	48	60	80.0	
EL363	NE	NE	NE	NE	NE	NE	N/A	12	12	12	12	12	60	60	100	
EL364	NE	NE	NE	NE	NE	NE	N/A	12	1	1	12	12	38	60	63.3	
EL365	NE	NE	NE	NE	NE	NE	N/A	12	12	12	9	12	57	60	95.0	
EL366	NE	NE	NE	NE	NE	NE	N/A	2	1	12	9	12	36.2	60	60.3	
EL367	NE	NE	NE	NE	NE	NE	N/A	12	7	1	6	8	34	48	70.8	
EL369	NE	NE	NE	NE	NE	NE	N/A	12	12	1	11	12	48	60	80.0	
EL370	NE	NE	NE	NE	NE	NE	N/A	12	12	12	12	12	60	60	100	
EL371	NE	NE	NE	NE	NE	NE	N/A	12	12	12	12	12	60	60	100	
EL372	NE	NE	NE	NE	NE	NE	N/A	12	1	10	10	12	45	60	75.0	
EL373	NE	NE	NE	NE	NE	NE	N/A	12	1	12	9	1	35	60	58.3	
EL374	NE	NE	NE	NE	NE	NE	N/A	12	12	8	12	12	56	60	93.3	
EL375	NE	NE	NE	NE	NE	NE	NE	NE	NE	1	9	12	22	36	61.1	
EL376	NE	NE	NE	NE	NE	NE	NE	NE	NE	8	9	12	29	34	85.3	
EL377	NE	NE	NE	NE	NE	NE	NE	NE	NE	12	12	12	36	36	100	
EL378	NE	NE	NE	NE	NE	NE	NE	NE	NE	12	10	12	34	36	94.4	
EL379	NE	NE	NE	NE	NE	NE	NE	NE	NE	12	11	1	24	36	66.7	
EL380	NE	NE	NE	NE	NE	NE	NE	NE	NE	1	12	12	25	36	69.4	
EL381	NE	NE	NE	NE	NE	NE	NE	NE	NE	10	9	12	31	36	86.1	
EL382	NE	NE	NE	NE	NE	NE	NE	NE	NE	1	1	1	3	36	8.3	
EL383	NE	NE	NE	NE	NE	NE	N/A	12	12	12	12	12	60	60	100	
L1	0	0	0	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	36	0.0	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
L3	12	11	12	12	12	12	N/A	12	12	12	12	12	131	132	99.2	
L4	12	12	12	12	12	12	N/A	12	12	12	11	12	131	132	99.2	
L8	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L12	12	12	12	12	12	12	N/A	12	12	5	12	12	125	132	94.7	
L13	10	1	10	NE	NE	NE	N/A	NE	NE	NE	NE	NE	21	36	58.3	
L15	12	12	12	12	12	12	N/A	12	12	10	11	12	129	132	97.7	
L22	12	12	12	1	10	12	N/A	12	12	12	12	12	119	132	90.2	
L26	12	12	12	NE	NE	NE	N/A	12	12	11	12	12	95	96	99.0	
L28	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L29	10	12	12	12	12	12	N/A	12	12	12	12	12	130	132	98.5	
L36	12	12	12	10	10	10	N/A	12	12	12	11	12	125	126	99.2	
L40	12	12	12	12	12	12	N/A	0	0	12	12	12	108	132	81.8	
L43	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L45	12	12	12	10	12	12	N/A	12	12	10	12	12	128	132	97.0	
L47	12	12	12	10	12	12	N/A	12	12	12	12	12	130	132	98.5	
L49	12	10	12	12	12	12	N/A	12	12	12	12	12	130	132	98.5	
L50	12	1	12	12	12	12	N/A	12	12	12	12	12	121	132	91.7	
L53	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L56	12	12	12	11	12	12	N/A	12	12	12	12	12	131	132	99.2	
L58	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L59	0	0	0	12	12	12	N/A	12	12	1	11	12	84	132	63.6	<ul style="list-style-type: none"> • <i>Legionella</i> sp. was not detected for G63A. • <i>L.bozemanii</i> was not detected for G63B. • No report was returned for distribution G60.
L70	12	12	12	12	12	12	N/A	12	12	12	9	12	129	132	97.7	
L71	12	12	12	12	12	12	N/A	12	12	1	9	12	118	132	89.4	
L73	0	0	0	0	0	0	N/A	0	0	0	0	0	0	132	0.0	<ul style="list-style-type: none"> • No reports were returned for distributions G60, G61, G62 and G63.
L74	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
L77	12	12	12	12	12	12	N/A	3	1	12	12	12	112	114	98.2	
L80	12	12	12	8	12	12	N/A	12	12	12	12	12	128	130	98.5	
L82	12	12	12	11	12	12	N/A	12	9	1	12	12	117	132	88.6	
L89	12	12	12	12	12	12	N/A	12	1	11	12	12	120	132	90.9	
L90	12	12	12	12	12	12	N/A	12	6	12	9	12	123	132	93.2	
L94	10	10	12	12	12	12	N/A	12	12	11	11	12	126	132	95.5	
L95	12	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	36	36	100	
L102	0	0	0	0	0	0	N/A	0	0	0	0	0	0	132	0.0	<ul style="list-style-type: none"> No reports were returned for distributions G60, G61, G62 and G63.
L103	12	12	12	12	12	12	N/A	12	12	5	9	12	122	132	92.4	
L104	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L108	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L109	12	12	12	12	12	10	N/A	12	10	12	12	12	128	132	97.0	
L111	12	12	12	12	12	12	N/A	12	12	NE	NE	NE	96	96	100	
L112	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L116	0	0	0	0	0	0	N/A	0	0	NE	NE	NE	0	96	0.0	
L127	12	12	12	12	1	12	N/A	12	12	NE	NE	NE	85	96	88.5	
L132	12	12	12	11	12	12	N/A	12	1	0	0	0	84	132	63.6	<ul style="list-style-type: none"> Count reported was lower than expected range for G61A. <i>Legionella</i> sp. was not detected for G62C. No report was returned for distribution G63.
L147	1	1	8	8	8	1	N/A	12	12	1	10	12	74	132	56.1	<ul style="list-style-type: none"> <i>Legionella</i> sp. was not detected for any G60 samples, G61C and G63A. <i>L.pneumophila</i> was not detected for G61A and G61B. <i>L.bozemanii</i> was not detected for G63B. Count reported was lower than expected range for G63B.
L164	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**
 NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
L172	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L175	0	0	0	12	12	12	N/A	3	8	12	12	12	83.25	132	63.1	<ul style="list-style-type: none"> • Incorrect species was reported for G62A and G62C. • Incorrect result was reported for G62B. • Incorrect serogroup was reported for G62C. • No report was returned for distribution G60.
L197	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L207	12	12	10	12	12	11	N/A	12	12	1	12	12	118	132	89.4	
L226	12	12	12	12	12	12	N/A	12	1	12	12	12	121	132	91.7	
L242	12	12	12	12	12	12	N/A	12	12	0	0	0	96	132	72.7	
L247	12	12	12	12	12	12	N/A	12	12	12	9	12	129	132	97.7	
L249	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L251	12	12	12	12	1	12	N/A	12	12	12	12	12	121	132	91.7	
L252	12	12	12	12	12	12	N/A	12	12	1	11	12	120	132	90.9	
L254	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L259	12	10	10	12	12	12	N/A	0	0	10	10	1	89	132	67.4	<ul style="list-style-type: none"> • Incorrect serogroup was reported for G60B and G60C. • Counts reported were higher than expected range for G63A and G63B. • Incorrect result was reported for G63C. • No report was returned for distribution G62.
L273	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	

Table 1 (cont'd): Performance assessment for *Legionella* isolation for samples **G60 – G63**

NE = not examined, N/A = not applicable

Lab number	G60			G61			G62			G63			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
L274	0	0	0	0	0	0	N/A	0	0	1	9	1	11	132	8.3	<ul style="list-style-type: none"> • <i>Legionella</i> sp. was not detected for G63A. • <i>L.pneumophila</i> and serogroup one was not detected for G63B. • Incorrect result was reported for G63C. • No reports were returned for distributions G60, G61 and G62.
L275	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L276	8	8	8	8	8	8	N/A	8	8	8	8	8	88	88	100	
L277	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L278	10	12	12	11	12	1	N/A	12	12	12	12	12	118	132	89.4	
L279	12	12	12	12	12	12	N/A	12	12	11	12	12	131	132	99.2	
L280	12	12	12	12	1	11	N/A	12	12	1	12	12	109	132	82.6	
L281	0	0	0	NE	NE	NE	NE	NE	NE	0	0	0	0	72	0.0	
L282	0	0	0	NE	NE	NE	NE	NE	NE	NE	NE	NE	0	36	0.0	
L285	12	12	12	12	12	12	N/A	12	12	12	12	12	132	132	100	
L286	12	12	12	12	12	12	N/A	12	1	0	0	0	85	132	64.4	<ul style="list-style-type: none"> • <i>Legionella</i> sp. was not detected for G62C. • No report was returned for distributions G63.
L287	7	7	7	7	7	7	N/A	7	1	1	7	7	65	75	86.7	
L288	NE	NE	NE	12	12	12	NE	NE	NE	1	12	12	61	72	84.7	
L289	NE	NE	NE	NE	NE	NE	NE	NE	NE	12	9	12	33	36	91.7	

Troubleshooting

Checklist for Quality:

1. **Methods**
Are you using standard or validated, clearly documented methods for isolation, identification and enumeration of Legionella spp.?
2. **Culture media**
Is your culture media allowing optimal isolation of Legionella spp.? Do you have sufficiently challenging quality control procedures for your culture media?
3. **Control strains**
Do you use control strains, at appropriate levels, for all the processing procedures?
4. **Processing**
*Is the percentage recovery of legionellae as expected following heat and acid treatments?
Do you undertake trend analyses for these processes? Are you aware of the limitations of the method used?*
5. **Equipment**
Is all the equipment used for the procedures (incubators, refrigerators, measuring instruments, waterbaths etc.) calibrated and monitored regularly?
6. **Staff Training**
Are the staff who perform the examinations fully trained and familiar with all the procedural steps?
7. **Internal Quality Control (IQC)**
Do you have adequate IQC procedures in place with documented guidelines for dealing with IQC failures?
8. **Good Laboratory Practice (GLP)**
*Do staff adhere to GLP at all times?
If cross-contamination has occurred with EQA samples it can also occur with routine water samples.*
9. **Clerical Procedures**
*Are your laboratory numbering and clerical procedures adequate?
If you have reported EQA results incorrectly this may also happen with routine water samples*

Identification of *Legionella* spp.

There are at least 50 species of *Legionella* of which at least 20 have been associated with human disease. The species that is most commonly isolated both from the environment and from infections is *L.pneumophila*; this species can be divided into at least 16 serogroups on the basis of surface antigens. *L.pneumophila* serogroup 1 is the most common cause of outbreaks of Legionnaires' disease and, within serogroup 1, the strains most commonly associated with disease share a common epitope, as revealed by monoclonal subtyping. It is important, because of the risks to human health, to differentiate routinely between *L.pneumophila* and the other *Legionella* species and to be able to distinguish serogroup 1 from the other serogroups of *L.pneumophila*. However, monoclonal subtyping is normally performed only by specialist reference laboratories. Participants who do not identify *Legionella* spp. other than *L.pneumophila* should, where appropriate, report their results as '*Legionella* sp. not *L.pneumophila*' rather than '*Legionella* sp.'

Incomplete or misleading identification of *Legionella* spp. from water samples may have serious public health implications. Correct reporting of the serogroup is essential for outbreak investigations.

False Positive Results - *Legionella* sp. reported incorrectly as present

False positive results may arise due to cross-contamination, either from other test samples or control strains, mis-identification of background micro-organisms that are present in the sample, or sample-handling and clerical errors. False positive results may result in unnecessary treatment of the water-source with serious financial implications.

False Negative Results - *Legionella* sp. reported incorrectly as not detected

There are many reasons for false negative results including failures with processing, culture media or equipment, insufficiently sensitive methods, inadequately trained staff or sample-handling or clerical errors. False negative results may have serious public health implications.

Outlying Results for Enumerations

Outlying results may be due to errors such as preparation of dilutions, selectivity of culture media, errors in counting, mis-calculation, mis-identification, mis-reporting or sample-handling or clerical errors. Laboratories are advised to investigate the reasons for any anomalous results, particularly if they are occurring repeatedly. Participants who report consistently low levels should audit all stages of their procedure that might allow organisms to be lost, e.g. filtration, centrifugation and pre-treatment. Participants reporting consistently high counts should assess their identification processes but should consider also whether they use methods that differ from those used by the majority of other participants. Incorrect results for enumerations can give a misleading impression of the severity of the risk associated with the sample.

Repeat Samples

Participants should, where possible, determine the reason(s) for mis-identification, false positive and false negative results and outlying counts for enumerations. Repeat samples should be requested to ensure that causes of error have been eradicated. Repeat samples are free of charge, provided they are dispatched with the next distribution of samples. A handling fee will be charged for immediate dispatch.

Help and Advice

The Scheme Organisers will help participants to resolve issues relating to the testing of environmental water samples for *Legionella* spp. Participants should also contact FEPTU to discuss any issues relating to the schemes in general, data analysis or performance assessments.

Contact Details

Repeat samples

Data analysis

Microbiological advice

General comments and complaints

Carmen Gomes

Heena Shah or Dr Nicola Lang

Dr Nicola Lang or Julie Russell

Dr Nicola Lang or Julie Russell

Tel: +44 (0)20 8327 7119

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E-mail: legionellaeqa@hpa.org.uk

Scheme Consultant

Dr John V. Lee

General Information

Scheme: Water EQA for *Legionella* Isolation

Sample Type: LENTICULE disc in screw-cap plastic vial (with desiccant)

Safety Data Sheet: Contact the organisers or www.hpa.org.uk/eqa/legionella

Examinations:

Legionella spp. - presence/absence

Legionella spp. - identification (species and serogroup where appropriate)

Legionella spp. - enumeration (semi - quantitative estimation)

FEPTU Quality Control: A minimum of 10 LENTICULE discs, selected randomly from the batch, are examined for *Legionella* spp. at the dilutions indicated on the request/report forms. The Health Protection Agency (HPA) National Standard Method W12, Detection and enumeration of *Legionella* species by filtration and centrifugation, is used to determine the FEPTU results.

The FEPTU enumeration results are analysed statistically and must not show a variation in excess of 0.75 log₁₀ units. The variation is calculated as (2 x standard deviation) for the 10 FEPTU samples.

The FEPTU results are used for guidance in the 'intended results' letters dispatched immediately after every distribution.

Expected Results: The expected results for the identification of *Legionella* spp. are determined by the FEPTU laboratory in collaboration with the HPA's Atypical Pneumonia Unit (APU). The APU is accredited by Clinical Pathology Accreditation (UK) Ltd (CPA).

Expected Results: The expected results for the identification of *Legionella* spp. are determined by the FEPTU laboratory in collaboration with the HPA's Atypical Pneumonia Unit (APU). The APU is accredited by Clinical Pathology Accreditation (UK) Ltd (CPA).

The expected range for the enumeration of legionellae is determined using a percentile method. The use of percentiles is a non-parametric approach appropriate for data that is unlikely to show a normal distribution. Semi-quantitative methods such as those used for estimating levels of legionellae may not show a normal distribution even after the data has been log-transformed.

The expected range for enumeration results is a 'consensus range' determined from results submitted by participants. The reported counts are ranked from lowest to highest, the median count is calculated and the range between the 11th and 89th percentile values is determined. The expected range is defined as the wider range of either i) counts within the 11th to 89th percentiles or ii) counts equivalent to the median \pm 0.75 log₁₀ units. This criteria reflects that methods for estimating the levels of legionellae in environmental water samples are complex and only semi-quantitative so are not directly comparable with simple enumeration methods such as aerobic colony counts where narrower criteria may be applied.

The expected range may, on occasion, differ from the 'intended result' initially reported by the FEPTU laboratory. However, the median FEPTU result should be within \pm 0.5 log₁₀ units of the participants' median result. An investigation will be undertaken if the FEPTU and participants' medians differ by more than \pm 0.5 log₁₀ units and participants will be informed about this in the sample-specific comments.

Results Analysis and Scores: Scores are allocated to participants' results submitted for every sample as follows:

	Points
Return of Report	1
Correct Result	11
Maximum score	12

The purpose of scoring is to draw attention to incorrect or outlying results. Participants who report outlying results for the enumeration of legionellae on single occasions only should not be alarmed although they should still assess the reason(s) for the outlying result. The allocation of scores helps participants to assess their performance with examinations for *Legionella* spp. over time and identify trends in the results that they are reporting.

Samples containing *Legionella* spp.

The points awarded for a correct result for samples containing *Legionella* spp. are allocated as follows:

Result	Points	Maximum Points
Return of report	1	1
Isolation of a <i>Legionella</i> spp.	2	2
Correct identification of <i>L.pneumophila</i>	2	4
Correct serogroup	2	
Or		
Correct identification of <i>Legionella</i> sp. (not <i>L.pneumophila</i>)	4	
Enumeration within the expected range	5	5
Or		
Outlying result (1)	4	
Or		
Outlying result (2)	3	
Total maximum score		12

Enumerations: Scores are allocated for enumeration results by determining the expected range and the percentile values:

Expected range	Median \pm 0.75 log ₁₀ unit or counts within 11 th to 89 th percentiles
Outlying results (1)	Median \pm >0.75 log ₁₀ units and in 6 th to 10 th or 90 th to 95 th percentiles
Outlying results (2)	Median \pm >0.75 log ₁₀ units and in 0 th to 5 th or 96 th to 100 th percentiles

Dealing with Censored Values (< or > Values): It is difficult to assess enumeration results when participants report censored values. The results form that is provided with the EQA samples indicates the dilutions required to help participants obtain a definitive enumeration result.

Scoring of Other Results:

	Points Allocated
Examination not performed (NE)	No score allocated
No results returned	0
Results reported after the specified return date (Late results)	0
<i>Legionella</i> sp. reported incorrectly as present (i.e. false positive result)	1
<i>Legionella</i> sp. reported incorrectly as not detected (i.e. false negative result)	1
Negative result reported correctly for <i>Legionella</i> sp.	12

Results Charts: Bar charts summarising participants' results for parameters requiring enumeration are included where appropriate.

Results Tables: Tables summarising all the results reported by participants are included for every report.

Conversion Table: Results reported for enumerations are transformed to log₁₀ values prior to analysis. A conversion table is included (Appendix 1).

Performance Assessments:

- Examine participants' results over four distributions
- Identify participants achieving less than 70% of the maximum possible cumulative score
- Indicate laboratories with ongoing problems with their examinations
- Are provided in a separate report

Accreditation: The HPA Legionella Isolation EQA Scheme is accredited by the United Kingdom Accreditation Service (UKAS) to ISO/IEC Guide 43-1:1997 through assessment against ILAC G13: 2007



References:

ISO; International Organization for Standardization (1998). Water Quality – Detection and enumeration of *Legionella*. ISO 11731:1998 BS 6068-4.12:1998

ISO; International Organization for Standardization (2004). Water Quality – Detection and enumeration of *Legionella* Part 2: Direct membrane filtration methods for waters with low bacterial counts BS ISO 11731-2:2004

Please note that ISO 11731:1998 is under revision. The expected date for publication of the revised document, ISO 11731 (Part 1), is 2009.