



# Performance Assessment Report

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

**Distribution Numbers:** G59, G60, G61 and G62

**Sample Numbers:** G59A, G59B, G59C  
G60A, G60B, G60C  
G61A, G61B, G61C  
G62A, G62B, G62C

Distribution Date:	June 2008
Results Due:	11 July 2008
Report Date:	4 August 2008
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**This report accompanies the summary of results for *Legionella* Isolation Scheme Distribution G62. 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 – 12.

If you experienced problems with these examinations please refer to the 'Troubleshooting Section' on page 13 and request a repeat sample.

Please contact FEPTU staff for additional advice and information. Contact details are on page 14.

Information about other Health Protection Agency functions and services is available from the web-site [www.hpa.org.uk](http://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
<b>Total maximum score</b>	<b>10</b>

**Table 1:** Performance assessment for *Legionella* isolation for samples **G59 – G62**  
 NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL1	12	12	10	12	12	10	12	10	12	N/A	12	12	126	132	95.5	
EL2	11	12	11	12	12	12	12	12	12	N/A	12	12	130	132	98.5	
EL3	0	0	0	12	12	12	10	12	12	N/A	12	12	94	132	71.2	
EL4	11	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	35	36	97.2	
EL5	10	12	12	12	10	10	12	12	12	N/A	12	10	124	132	93.9	
EL6	12	12	10	12	10	12	10	12	12	N/A	12	1	115	132	87.1	
EL10	12	12	12	12	1	12	12	12	12	N/A	12	12	121	132	91.7	
EL13	12	12	10	12	12	12	12	12	12	N/A	12	12	130	132	98.5	
EL14	12	12	12	10	10	12	0	0	0	N/A	12	12	92	132	<b>69.7</b>	<ul style="list-style-type: none"> <li>Counts reported were lower than expected range for G60A and G60B.</li> <li>No report was returned for distribution G61.</li> </ul>
EL16	12	12	12	0	0	0	12	12	12	N/A	12	12	96	132	72.7	
EL21	8	6	8	12	12	12	0	0	0	N/A	12	10	80	132	<b>60.6</b>	<ul style="list-style-type: none"> <li><i>Legionella</i> sp. was not reported for all G59 samples.</li> <li>No report was returned for distribution G61.</li> <li><i>Legionella</i> sp. was not detected for G62A.</li> <li>Isolation of legionellae not reported for G62A.</li> </ul>
EL22	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
EL23	11	1	12	12	12	12	NE	NE	NE	NE	NE	NE	60	72	83.3	
EL24	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL30	11	10	12	12	10	12	12	12	12	N/A	12	10	125	132	94.7	
EL32	10	1	7	1	12	12	12	12	12	N/A	12	12	103	132	78.0	
EL34	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL35	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL36	NE	NE	NE	12	12	12	NE	NE	NE	N/A	12	10	58	60	96.7	
EL39	12	12	12	NE	NE	NE	5	12	12	N/A	12	5	82	96	85.4	
EL40	11	12	12	12	1	12	10	12	10	N/A	12	12	116	132	87.9	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples **G59 – G62**  
 NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL41	11	10	12	12	10	12	12	12	10	N/A	12	12	125	132	94.7	
EL42	11	12	12	12	12	12	11	12	12	N/A	0	0	106	132	80.3	
EL43	4	1	5	1	1	6	1	1	1	N/A	0	0	21	132	<b>15.9</b>	<ul style="list-style-type: none"> <li>Counts reported were lower than expected range for G59A and G59C.</li> <li>Censored value was reported for G59B.</li> <li>Species name and serogroup was not reported for G60C.</li> <li><i>Legionella</i> sp. was not reported for all G59 samples.</li> <li><i>Legionella</i> sp. was not detected for G60A, G60B and all G61 samples.</li> <li>No report was returned for distribution G62.</li> </ul>
EL47	11	6	12	10	12	10	12	10	12	N/A	12	10	117	132	88.6	
EL49	NE	NE	NE	10	12	12	NE	NE	NE	N/A	12	1	47	60	78.3	
EL50	11	10	12	12	10	12	12	12	12	N/A	0	0	103	132	78.0	
EL51	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
EL53	11	12	12	12	12	12	12	12	10	N/A	12	12	129	132	97.7	
EL54	12	12	12	12	12	12	12	12	12	N/A	12	5	125	132	94.7	
EL56	12	12	12	12	12	12	NE	NE	NE	NE	NE	NE	72	72	100	
EL57	NE	NE	NE	12	12	12	0	0	0	N/A	12	12	60	96	62.5	
EL60	10	12	12	12	12	12	8	8	8	N/A	12	1	107	132	81.1	
EL61	12	12	12	12	11	12	12	12	12	N/A	12	12	131	132	99.2	
EL63	11	11	8	12	12	10	8	10	11	N/A	NE	NE	93	108	86.1	
EL64	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL65	12	12	11	12	10	12	11	12	11	N/A	12	12	127	132	96.2	
EL66	12	12	12	1	12	12	12	12	12	N/A	12	12	121	132	91.7	
EL69	0	0	0	0	0	0	NE	NE	NE	NE	NE	NE	0	72	0.0	
EL71	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL72	12	12	12	12	12	12	NE	NE	NE	NE	NE	NE	72	72	100	
EL73	1	12	12	12	12	12	12	12	12	N/A	12	12	121	132	91.7	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples **G59 – G62**

NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL74	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL77	11	12	12	12	12	12	10	12	12	N/A	0	0	105	132	79.5	
EL86	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL87	11	12	12	8	12	12	NE	NE	NE	NE	NE	NE	67	72	93.1	
EL89	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL92	11	12	12	12	12	12	1	1	12	N/A	3	12	100.1	132	75.8	
EL93	12	12	12	NE	NE	NE	12	12	12	NE	NE	NE	72	72	100	
EL99	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
EL100	0	0	0	0	0	0	NE	NE	NE	NE	NE	NE	0	72	0.0	
EL101	12	12	12	12	12	12	NE	NE	NE	N/A	0	0	72	96	75.0	
EL105	11	12	12	12	10	12	NE	NE	NE	NE	NE	NE	69	72	95.8	
EL107	0	0	0	12	12	12	12	10	12	N/A	12	12	94	132	71.2	
EL108	11	12	12	NE	NE	NE	NE	NE	NE	N/A	12	12	59	60	98.3	
EL110	12	12	12	12	12	12	NE	NE	NE	N/A	12	12	96	96	100	
EL114	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	2	6	8	24	33.3	
EL116	NE	NE	NE	12	12	12	NE	NE	NE	NE	NE	NE	36	36	100	
EL119	0	0	0	12	12	12	NE	NE	NE	NE	NE	NE	36	72	50.0	
EL124	12	12	12	NE	NE	NE	12	12	12	N/A	0	12	84	96	87.5	
EL126	9	12	11	12	1	10	11	12	12	N/A	12	12	114	132	86.4	
EL131	11	12	12	12	12	12	12	12	12	N/A	12	10	129	132	97.7	
EL133	12	12	12	12	12	12	NE	NE	NE	NE	NE	NE	72	72	100	
EL134	12	12	11	NE	NE	NE	12	10	12	NE	NE	NE	69	72	95.8	
EL136	12	7	12	12	10	12	12	10	12	N/A	12	12	123	132	93.2	
EL137	11	12	12	12	12	12	0	0	0	N/A	0	0	71	132	<b>53.8</b>	• No reports were returned for distributions G61 and G62.
EL139	0	0	0	12	12	12	NE	NE	NE	NE	NE	NE	36	72	50.0	
EL140	12	12	11	12	12	12	0	0	0	N/A	0	0	71	132	<b>53.8</b>	• Count reported was higher than expected range for G59C. • No reports were returned for distribution G61 and G62.
EL143	11	12	12	12	12	12	12	12	10	N/A	0	0	105	132	79.5	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples G59 – G62  
 NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL145	11	12	12	10	10	12	12	12	12	N/A	12	12	127	132	96.2	
EL146	12	12	10	12	10	12	10	12	12	N/A	12	12	126	132	95.5	
EL149	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL150	11	6	12	12	1	12	1	12	11	N/A	12	11	101	132	76.5	
EL151	NE	NE	NE	NE	NE	NE	12	12	12	NE	NE	NE	36	36	100	
EL153	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
EL154	11	12	12	NE	NE	NE	11	12	11	NE	NE	NE	69	72	95.8	
EL155	NE	NE	NE	12	12	12	NE	NE	NE	N/A	12	12	60	60	100	
EL156	12	11	12	10	12	12	NE	NE	NE	N/A	0	0	69	96	71.9	
EL158	11	12	12	12	10	10	12	12	12	N/A	12	12	127	132	96.2	
EL160	11	6	12	NE	NE	NE	12	12	12	NE	NE	NE	65	72	90.3	
EL166	12	10	12	NE	NE	NE	12	12	12	NE	NE	NE	70	72	97.2	
EL167	11	7	12	NE	NE	NE	12	12	11	NE	NE	NE	65	72	90.3	
EL168	12	10	12	12	12	12	12	12	12	N/A	12	12	130	132	98.5	
EL169	11	12	12	10	10	12	8	10	10	N/A	12	12	119	132	90.2	
EL170	12	NE	11	12	12	12	0	0	0	N/A	12	12	83	120	69.2	
EL174	11	12	12	12	10	12	11	10	12	N/A	12	12	126	132	95.5	
EL175	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL176	12	12	11	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
EL177	11	12	12	12	12	12	NE	NE	NE	NE	NE	NE	71	72	98.6	
EL178	12	1	10	10	10	12	12	12	12	N/A	12	1	104	132	78.8	
EL180	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL182	11	10	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	33	36	91.7	
EL185	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
EL187	11	12	12	12	12	12	12	12	11	N/A	NE	NE	106	108	98.1	
EL188	12	12	10	12	12	12	12	12	12	N/A	12	1	119	132	90.2	
EL190	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
EL191	0	0	0	12	12	12	12	12	12	N/A	12	12	96	132	72.7	
EL192	12	10	11	12	10	12	12	12	12	N/A	12	12	127	132	96.2	
EL193	12	12	12	12	12	12	NE	NE	NE	NE	NE	NE	72	72	100	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples **G59 – G62**

NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL196	11	12	12	12	10	12	12	12	12	N/A	12	10	127	132	96.2	
EL199	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	NE	NE				
EL200	10	10	12	12	12	12	0	0	0	NE	NE	NE	68	108	63.0	
EL202	12	12	12	12	12	12	NE	NE	NE	NE	NE	NE	72	72	100	
EL206	0	0	0	12	10	12	10	1	12	N/A	12	10	79	132	<b>59.8</b>	<ul style="list-style-type: none"> <li>No report was returned for distribution G59.</li> <li>Counts reported were lower than expected range for G60B, G61A and G62C.</li> <li><i>Legionella</i> sp. was not detected for G61B.</li> </ul>
EL207	11	12	10	NE	NE	NE	NE	NE	NE	NE	NE	NE	33	36	91.7	
EL208	12	12	12	NE	NE	NE	NE	NE	NE	N/A	12	12	60	60	100	
EL209	NE	NE	NE	0	0	0	10	1	10	NE	NE	NE	21	72	29.2	
EL210	10	12	12	12	12	12	10	12	10	N/A	12	12	126	132	95.5	
EL212	10	12	11	12	10	10	12	12	10	NE	NE	NE	99	108	91.7	
EL213	11	10	12	12	12	12	12	12	12	N/A	12	12	129	132	97.7	
EL214	12	12	12	12	12	12	10	10	10	N/A	12	10	124	132	93.9	
EL215	0	0	0	12	12	12	NE	NE	NE	NE	NE	NE	36	72	50.0	
EL216	11	12	12	12	10	12	12	12	10	N/A	12	12	127	132	96.2	
EL217	10	10	11	12	12	12	NE	NE	NE	NE	NE	NE	67	72	93.1	
EL218	10	10	12	10	10	12	1	1	12	N/A	12	12	102	132	77.3	
EL220	12	10	10	12	12	12	12	12	10	N/A	12	1	115	132	87.1	
EL221	11	1	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	24	36	66.7	
EL222	12	12	10	0	0	0	12	12	11	N/A	12	11	92	132	<b>69.7</b>	<ul style="list-style-type: none"> <li>Counts reported were lower than expected range for G59C, G61C and G62C.</li> <li>No report was returned for distribution G60.</li> </ul>
EL223	0	0	0	12	12	12	12	12	12	N/A	12	12	96	132	72.7	
EL225	12	12	12	12	12	12	12	1	12	N/A	12	11	120	132	90.9	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples G59 – G62  
 NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL226	0	0	0	NE	NE	NE	1	5	1	NE	NE	NE	7	72	9.7	
EL227	11	12	12	12	12	12	12	12	12	NE	NE	NE	107	108	99.1	
EL228	9	1	11	0	0	0	NE	NE	NE	NE	NE	NE	21	72	29.2	
EL230	12	12	12	12	12	12	5	12	5	N/A	12	12	118	132	89.4	
EL231	9	10	12	12	12	12	12	12	10	N/A	12	12	125	132	94.7	
EL232	12	7	12	12	11	12	NE	NE	NE	NE	NE	NE	66	72	91.7	
EL233	11	12	12	NE	NE	NE	NE	NE	NE	NE	NE	NE	35	36	97.2	
EL235	0	0	0	0	0	0	NE	NE	NE	NE	NE	NE	0	72	0.0	
EL236	8	1	8	10	8	10	NE	NE	NE	NE	NE	NE	45	64	70.3	
EL250	NE	NE	NE	NE	NE	NE	1	12	12	N/A	12	11	48	60	80.0	
EL257	12	12	12	12	12	12	NE	NE	NE	NE	NE	NE	72	72	100	
EL258	6	4	6	8	8	8	1	6	8	N/A	8	1	64	82	78.0	
EL300	10	10	11	12	12	12	6	12	12	N/A	12	12	121	132	91.7	
EL301	11	12	11	12	12	10	12	10	12	N/A	12	12	126	132	95.5	
EL302	11	1	12	0	0	0	1	1	12	N/A	0	0	38	132	28.8	<ul style="list-style-type: none"> <li>• <i>Legionella</i> sp. was not detected for G59B, G61A and G61B.</li> <li>• Only one serogroup was reported for G59A.</li> <li>• No reports were returned for distribution G60 and G62.</li> </ul>
EL303	12	12	12	11	12	12	NE	NE	NE	N/A	0	0	71	96	74.0	
EL304	9	1	10	12	12	12	12	12	8	NE	NE	NE	88	108	81.5	
EL306	10	10	12	12	5	7	10	12	10	N/A	12	10	110	132	83.3	
EL307	NE	NE	NE	12	12	10	NE	NE	NE	NE	NE	NE	34	36	94.4	
EL308	NE	NE	NE	12	10	10	NE	NE	NE	NE	NE	NE	32	36	88.9	
EL309	NE	NE	NE	12	12	10	NE	NE	NE	NE	NE	NE	34	36	94.4	
EL310	NE	NE	NE	0	0	0	NE	NE	NE	NE	NE	NE	0	36	0.0	
EL311	NE	NE	NE	7	1	10	11	12	12	NE	NE	NE	53	72	73.6	
EL312	NE	NE	NE	12	12	12	10	10	10	N/A	12	12	90	96	93.8	
EL313	NE	NE	NE	10	12	12	NE	NE	NE	N/A	12	1	47	60	78.3	
EL314	NE	NE	NE	NE	NE	NE	12	7	12	NE	NE	NE	31	36	86.1	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples G59 – G62

NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL315	NE	NE	NE	1	8	8	8	1	1	NE	NE	NE	27	72	37.5	
EL316	NE	NE	NE	12	12	12	12	8	12	N/A	12	12	92	96	95.8	
EL317	NE	NE	NE	8	12	8	12	12	12	N/A	12	12	88	96	91.7	
EL318	NE	NE	NE	NE	NE	NE	12	1	12	N/A	12	12	49	60	81.7	
EL319	NE	NE	NE	NE	NE	NE	0	0	0	NE	NE	NE	0	36	0.0	
EL320	NE	NE	NE	NE	NE	NE	1	12	12	N/A	3	1	29.3	60	48.8	
EL321	NE	NE	NE	NE	NE	NE	1	12	12	N/A	12	12	49	60	81.7	
EL322	NE	NE	NE	NE	NE	NE	12	1	1	NE	NE	NE	14	36	38.9	
EL323	NE	NE	NE	NE	NE	NE	0	0	0	NE	NE	NE	0	36	0.0	
EL324	NE	NE	NE	NE	NE	NE	0	0	0	N/A	12	12	24	60	40.0	
EL326	NE	NE	NE	NE	NE	NE	12	12	12	N/A	12	10	58	60	96.7	
EL328	NE	NE	NE	NE	NE	NE	12	12	12	N/A	12	12	60	60	100	
EL329	NE	NE	NE	NE	NE	NE	12	10	12	N/A	12	10	56	60	93.3	
EL330	NE	NE	NE	NE	NE	NE	11	1	12	N/A	12	1	37	60	61.7	
EL331	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL332	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	8	20	24	83.3	
EL336	NE	NE	NE	NE	NE	NE	12	10	12	NE	NE	NE	34	36	94.4	
EL339	NE	NE	NE	NE	NE	NE	8	10	10	NE	NE	NE	28	36	77.8	
EL340	NE	NE	NE	NE	NE	NE	12	12	12	NE	NE	NE	36	36	100	
EL341	NE	NE	NE	NE	NE	NE	12	12	12	NE	NE	NE	36	36	100	
EL342	NE	NE	NE	NE	NE	NE	12	12	12	N/A	12	1	49	60	81.7	
EL343	NE	NE	NE	NE	NE	NE	0	0	0	N/A	4	8	11.7	60	19.5	
EL344	NE	NE	NE	NE	NE	NE	NE	12	12	N/A	12	7	43	48	89.6	
EL345	NE	NE	NE	NE	NE	NE	12	12	12	NE	NE	NE	36	36	100	
EL346	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	0	5	5	24	20.8	
EL347	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL348	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL349	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL351	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	10	22	24	91.7	
EL355	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples G59 – G62

NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
EL356	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	0	0	0	24	0.0	
EL358	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	0	0	0	24	0.0	
EL359	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	1	13	24	54.2	
EL361	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL362	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL363	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL364	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	1	13	24	54.2	
EL365	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL366	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	2	1	3.2	24	13.3	
EL367	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	7	19	24	79.2	
EL369	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL370	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL371	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL372	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	1	13	24	54.2	
EL373	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	1	13	24	54.2	
EL374	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
EL383	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	12	12	24	24	100	
L1	11	12	12	0	0	0	NE	NE	NE	NE	NE	NE	35	72	48.6	
L3	12	12	12	12	11	12	12	12	12	N/A	12	12	131	132	99.2	
L4	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L8	9	12	12	12	12	12	12	12	12	N/A	12	12	129	132	97.7	
L12	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L13	10	12	12	10	1	10	NE	NE	NE	N/A	NE	NE	55	72	76.4	
L15	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L22	12	12	12	12	12	12	1	10	12	N/A	12	12	119	132	90.2	
L26	11	12	12	12	12	12	NE	NE	NE	N/A	12	12	95	96	99.0	
L28	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L29	12	12	12	10	12	12	12	12	12	N/A	12	12	130	132	98.5	
L36	12	12	12	12	12	12	10	10	10	N/A	12	12	126	126	100	
L40	11	12	11	12	12	12	12	12	12	N/A	0	0	106	132	80.3	

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples **G59 – G62**

NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
L43	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L45	12	12	12	12	12	12	10	12	12	N/A	12	12	130	132	98.5	
L47	12	12	10	12	12	12	10	12	12	N/A	12	12	128	132	97.0	
L49	12	12	12	12	10	12	12	12	12	N/A	12	12	130	132	98.5	
L50	12	12	12	12	1	12	12	12	12	N/A	12	12	121	132	91.7	
L53	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L56	12	12	12	12	12	12	11	12	12	N/A	12	12	131	132	99.2	
L58	12	12	10	12	12	12	12	12	12	N/A	12	12	130	132	98.5	
L59	12	12	12	0	0	0	12	12	12	N/A	12	12	96	132	72.7	
L70	12	6	12	12	12	12	12	12	12	N/A	12	12	126	132	95.5	
L71	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L73	0	0	0	0	0	0	0	0	0	N/A	0	0	0	132	<b>0.0</b>	• No reports were returned for distributions G59, G60, G61 and G62.
L74	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L77	11	12	12	12	12	12	12	12	12	N/A	3	1	111	114	97.4	
L80	11	12	12	12	12	12	8	12	12	N/A	12	12	127	130	97.7	
L82	11	12	12	12	12	12	11	12	12	N/A	12	9	127	132	96.2	
L89	12	12	12	12	12	12	12	12	12	N/A	12	1	121	132	91.7	
L90	9	1	1	12	12	12	12	12	12	N/A	12	6	101	132	76.5	
L94	12	12	12	10	10	12	12	12	12	N/A	12	12	128	132	97.0	
L95	NE	NE	NE	12	12	12	NE	NE	NE	NE	NE	NE	36	36	100	
L102	0	0	0	0	0	0	0	0	0	N/A	0	0	0	132	<b>0.0</b>	• No reports were returned for distributions G59, G60, G61 and G62.
L103	12	1	12	12	12	12	12	12	12	N/A	12	12	121	132	91.7	
L104	0	0	0	12	12	12	12	12	12	N/A	12	12	96	132	72.7	
L108	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L109	11	12	12	12	12	12	12	12	10	N/A	12	10	127	132	96.2	
L111	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L112	11	1	12	12	12	12	12	12	12	N/A	12	12	120	132	90.9	
L116	0	0	0	0	0	0	0	0	0	N/A	0	0	0	132	<b>0.0</b>	• No reports were returned for distributions G59, G60, G61 and G62.

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples **G59 – G62**  
 NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
L127	12	12	12	12	12	12	12	1	12	N/A	12	12	121	132	91.7	
L132	12	6	12	12	12	12	11	12	12	N/A	12	1	114	132	86.4	
L147	11	12	11	1	1	8	8	8	1	N/A	12	12	85	132	<b>64.4</b>	<ul style="list-style-type: none"> <li>• <i>Legionella</i> sp. was not detected for any G60 samples and G61C.</li> <li>• Only one serogroup was reported for G59A.</li> <li>• Count reported was lower than expected range for G59C.</li> <li>• <i>L.pneumophila</i> was not detected for G61A and G61B.</li> </ul>
L164	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L172	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L175	12	12	12	0	0	0	12	12	12	N/A	3	8	83.25	132	<b>63.1</b>	<ul style="list-style-type: none"> <li>• No report was returned for distribution G60.</li> <li>• Incorrect species was reported for G62A and G62C.</li> <li>• Incorrect result was reported for G62B.</li> <li>• Incorrect serogroup was reported for G62C.</li> </ul>
L197	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L207	12	12	12	12	12	10	12	12	11	N/A	12	12	129	132	97.7	
L226	12	12	12	12	12	12	12	12	12	N/A	12	1	121	132	91.7	
L242	1	12	12	12	12	12	12	12	12	N/A	12	12	121	132	91.7	
L247	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L249	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L251	12	12	12	12	12	12	12	1	12	N/A	12	12	121	132	91.7	
L252	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L254	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L259	11	10	12	12	10	10	12	12	12	N/A	0	0	101	132	76.5	
L273	12	12	7	12	12	12	12	12	12	N/A	12	12	127	132	96.2	
L274	0	0	0	0	0	0	0	0	0	N/A	0	0	0	132	<b>0.0</b>	<ul style="list-style-type: none"> <li>• No reports were returned for distributions G59, G60, G61 and G62.</li> </ul>

**Table 1 (cont'd):** Performance assessment for *Legionella* isolation for samples **G59 – G62**  
 NE = not examined, N/A = not applicable

Lab number	G59			G60			G61			G62			Cumulative score	Max possible score	%	Comments
	A	B	C	A	B	C	A	B	C	A	B	C				
L275	12	12	12	12	12	12	12	12	12	N/A	12	12	132	132	100	
L276	11	12	12	8	8	8	8	8	8	N/A	8	8	99	100	99.0	
L277	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L278	11	12	12	10	12	12	11	12	1	N/A	12	12	117	132	88.6	
L279	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L280	11	12	12	12	12	12	12	1	11	N/A	12	12	119	132	90.2	
L281	0	0	0	0	0	0	NE	NE	NE	NE	NE	NE	0	72	0.0	
L282	11	12	12	0	0	0	NE	NE	NE	NE	NE	NE	35	72	48.6	
L285	11	12	12	12	12	12	12	12	12	N/A	12	12	131	132	99.2	
L286	11	6	12	12	12	12	12	12	12	N/A	12	1	114	132	86.4	
L287	6	7	7	7	7	7	7	7	7	N/A	7	1	70	75	93.3	
L288	12	12	12	NE	NE	NE	12	12	12	NE	NE	NE	72	72	100	

## 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**

Carly Glowotz or 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**

**Fax: +44 (0)20 8200 8264**

**E-mail: [legionellaeqa@hpa.org.uk](mailto: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/legionella](http://www.hpa.org.uk/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 log<sub>10</sub> 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 11<sup>th</sup> and 89<sup>th</sup> percentile values is determined. The expected range is defined as the wider range of either i) counts within the 11<sup>th</sup> to 89<sup>th</sup> percentiles or ii) counts equivalent to the median  $\pm$  0.75 log<sub>10</sub> 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 log<sub>10</sub> units of the participants' median result. An investigation will be undertaken if the FEPTU and participants' medians differ by more than  $\pm$  0.5 log<sub>10</sub> 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
<b>Maximum score</b>	<b>12</b>

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	
<b>Total maximum score</b>		<b>12</b>

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

Expected range	Median $\pm$ 0.75 log <sub>10</sub> unit or counts within 11 <sup>th</sup> to 89 <sup>th</sup> percentiles
Outlying results (1)	Median $\pm$ >0.75 log <sub>10</sub> units and in 6 <sup>th</sup> to 10 <sup>th</sup> or 90 <sup>th</sup> to 95 <sup>th</sup> percentiles
Outlying results (2)	Median $\pm$ >0.75 log <sub>10</sub> units and in 0 <sup>th</sup> to 5 <sup>th</sup> or 96 <sup>th</sup> to 100 <sup>th</sup> 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 log<sub>10</sub> 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 2008.*