Summary of Results

External Quality Assessment of Water Microbiology

Legionella Isolation from Water Samples

Distribution Number: G137   **Sample Numbers: G137A, G137B**

Distribution Date:	**January 2025**
Results Due:	**14 February 2025**
Report Date:	**20 February 2025**
Samples prepared and quality control tested by:	**Divya George** **Afifa Halim** **Nafeesa Hussain** **Sabine Naujokat** **Zak Prior** **Jake Videlefsky**
Data analysed by:	**Joanna Donn** **Nita Patel**
Report compiled by:	**Joanna Donn** **Nita Patel**
Authorised by:	**Nita Patel**

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For further information on the scheme please refer to:

Scheme Guide: https://www.feptu.org.uk/schemes/scheme-guide/
Scoring Guide: https://www.feptu.org.uk/schemes/scoring/

General guidance for z-scores:
Participants' enumeration results are converted into z-scores using the following formula:

$$Z = \frac{(x_i - X_{pt})}{\sigma_{pt}}$$

x_i = participants' result expressed (expressed as a $\log_{10}$ value)

X_{pt} = assigned value (participants' consensus median (expressed as a $\log_{10}$ value))

σ_{pt} = the fixed standard deviation for the examination (calculated by FEPTU)

The σ_{pt}-value expresses the acceptable difference between the individual participant's result and the participants' consensus median. The σ_{pt}-value used for calculating z-scores for all parameters in the Legionella Scheme is 0.55. A guide to interpreting z-scores follows, although laboratories must interpret their scores in the context of their own laboratory situation.

z = -1.99 to +1.99	satisfactory
z = -2 to -2.99 or +2 to +2.99	questionable
z = < -3.00 or > + 3.00	unsatisfactory

It is usually recommended that z-scores exceeding +/-2.0 are investigated to establish the possible cause. As a general rule, UKHSA recommends that all questionable and unsatisfactory results are investigated.

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 FEPTU results are determined using a method based on ISO 11731:2017 Water quality - Enumeration of *Legionella,* and are included in the 'intended results' letters which provide guidance for participants regarding the assigned values. Intended results letters are posted on the website immediately after every distribution; electronic notification of their availability is sent to all participants.

Refer to section 19.0 of the Scheme Guide if you have experienced difficulties with any of the examinations.

https://www.feptu.org.uk/schemes/scheme-guide/

All participants are reminded that reporting incorrect or false negative results for water samples could have serious public health implications.

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 other *Legionella* species and to be able to distinguish serogroup 1 from the other serogroups of *L.pneumophila*. However, monoclonal subtying is normally performed only by specialist reference laboratories. Participants who do not identity *Legionella* spp. other than *L.pneumophila* should where appropriate, report their results as '*Legionella* spp. not *L.pneumophila*' rather than '*Legionella* spp.'

Results as summarised in the performance assessment sheet included in this report, provide a more effective indication of on-going problems with Legionella examinations.

Please contact FEPTU staff for advice and information:

Repeat samples	Carmen Gomes or Kermin Daruwalla	**Tel: +44 (0)20 8327 7119**
Data Analysis	Nita Patel	**Fax:**
Microbiological advice	Nita Patel or Zak Prior	**Email: foodeqa@ukhsa.gov.uk**
General comments and complaints	Nita Patel or Zak Prior	
Scheme consultants		FEPTU's website
Scheme Co-ordinator	Nita Patel	

Sample: G137A

Contents:

- *Legionella pneumophila* serogroup 1, sequence type 20 (1.9x10⁵) (wild strain)
- *Aerococcus viridans* (1.4x10³) (NCTC 8251)
- *Acinetobacter junii* (60) (wild strain)
- *Micrococcus luteus* (4.0x10²) (NCTC 4819)

Expected Results:

	Expected Result	Your Result	Score	Z-Score	Comments
Isolation of legionellae	Detected				
Identification	*L.pneumophila*				
Serogroup	1				
Enumeration	$2.22 \times 10^4 - 8.44 \times 10^5$ cfu L^{-1}				
	Results Returned				
	Total score out of N/A				

Background Flora:

Actinetobacter junii, Aerococcus viridans and Micrococcus luteus did not form colonies on GVPC after processing.

Comments on Performance:

Total participants reporting results	126
Participants reporting detected	122 (97%)

Participants reporting *L.pneumophila*	108 (89%)
Participants reporting not examined	9 (7%)

Serogroups for *L.pneumophila*	
Participants reporting serogroup 1	104 (85%)
Participants reporting serogroup not examined	11 (9%)
Participants reporting no serogroup result	5 (4%)
Participants reporting serogroups 2-14	1 (1%)
Participants reporting serogroups 2 - 15	1 (1%)

Sample: G137A (cont)

Total participants enumerating legionellae	125
Participants reporting a high censored value	2

Assigned value (participants' median)	1.50×10^5 cfu L^{-1}
Uncertainty of assigned value ($U(x_{pt})$=log$_{10}$ cfu L^{-1})	0.05
No.of outlying counts	13 (13 low / 0 high)
Participants' mean	1.24×10^5 cfu L^{-1}
Standard deviation of participants' results *	0.4 log$_{10}$ unit per cfu L^{-1}

FEPTU median	1.90×10^5 cfu L^{-1}

Total sent sample	133
Non-returns	5
Not examined	2

The fixed standard deviation value (σ_{pt} value) used for calculation of the z-scores is **0.55** for all parameters.

* Robust S^* based on median absolute deviation about the participants' median (*MADe*).

Sample: G137B

Contents:

- *Legionella longbeachae* (4.1x10³) (wild strain)
- *Enterococcus faecalis* (1.1x10³) (wild strain)
- *Pseudomonas fluorescens* (6.7x10³) (NCTC 3756)

Expected Results:

	Expected Result	Your Result	Score	Z-Score	Comments
Isolation of legionellae	Detected				
Identification	*L.longbeachae*				
Serogroup	N/A				
Enumeration	6.20x10² - 3.09x10⁴ cfu L $^{-1}$				
		Results Returned			
		Total score out of N/A			

Background Flora:

Enterococcus faecalis and Pseudomonas fluorescens did not form colonies on GVPC after processing.

Comments on Performance:

Total participants reporting results	126
Participants reporting detected	117 (93%)

Participants reporting *L.longbeachae*	25 (21%)
Participants reporting *Legionella* spp. not *L.pneumophila*	58 (50%)
Participants reporting *Legionella* spp.	22 (19%)
Participants reporting Other	1 (1%)
Participants reporting not examined	7 (6%)

Serogroups for *L.longbeachae*	
Participants reporting serogroup not applicable	98 (84%)

Sample: G137B (cont)

Total participants enumerating legionellae	125
Participants reporting a low censored value	2

Assigned value (participants' median)	5.50×10^3 cfu L^{-1}
Uncertainty of assigned value ($U(x_{pt})$=$\log_{10}$ cfu L^{-1})	0.06
No.of outlying counts	21 (13 low / 8 high)
Participants' mean	5.32×10^3 cfu L^{-1}
Standard deviation of participants' results *	0.51 $\log_{10}$ unit per cfu L^{-1}

FEPTU median	4.05×10^3 cfu L^{-1}

Total sent sample	133
Non-returns	5
Not examined	2

The fixed standard deviation value (σ_{pt} value) used for calculation of the z-scores is **0.55** for all parameters.

* Robust S^* based on median absolute deviation about the participants' median (*MADe*).
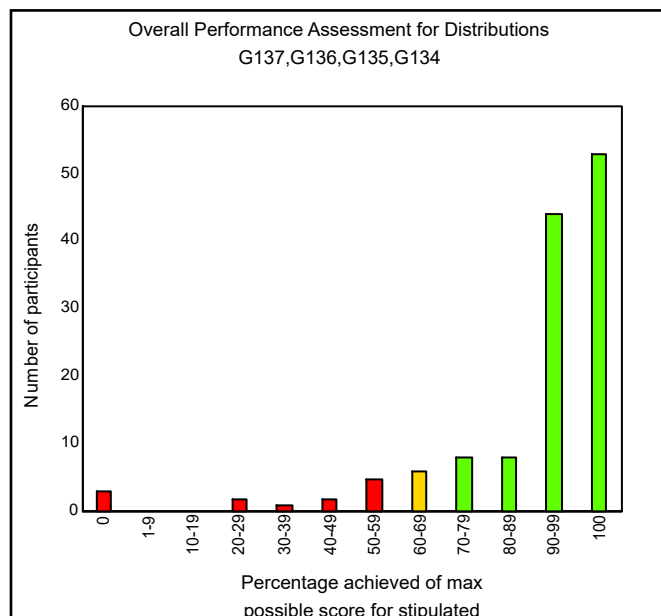
Performance Assessment Sheet

Participants are reminded that to take advantage of the performance assessment overtime tool provided in the reports they need to take part in more than one distribution a year.

Performance assessments are designed to identify laboratories with on-going problems with their examinations and are undertaken after every distribution. Scores are allocated to results reported for every sample to help assess participants' performance.

Cumulative scores are calculated for every participant, for all examination types, for the current and previous three distributions. Participants' cummulative scores for each of the examination types are compared with the maximum possible

Distribution	Sample	Your score	Your %
G137	G137B		
	G137A		
G136	G136A		
	G136B		
G135	G135A		
	G135B		
G134	G134A		
	G134B		

Overall Performance Assessment for Distributions G137,G136,G135,G134

Performance Assessment Comment:
Laboratories that achieve less than 70% of the maximum possible score are likely to be experiencing significant problems
with their examinations and are advised to
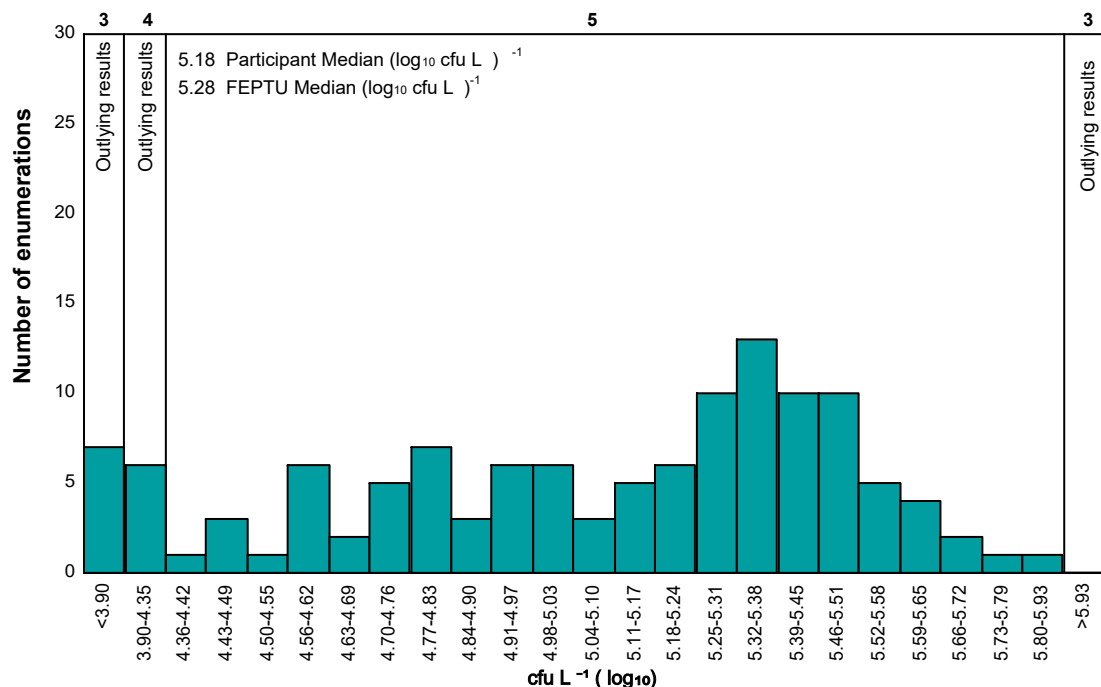a) refer to the relevant sample reports for specific comments
b) refer to the website guidance documents:

Scheme Guide - FEPTU   and   Scoring - FEPTU

c) contact the organisers for advice.

Legionella counts reported by participants - Sample G137A

Culture based presentation

G137A

FEPTU Culture: GVPC

Culture	Number of Results	Excluded Results	Percentage of the total	Median	Robust *S**	Range Reported	
						Log 10	
GVPC	98	2	79	5.13	0.42	2.78 -	5.79
BCYE with antibiotics	4	0	3			-	
BCYE agar without antibiotics	10	0	8	5.36	0.30	3.08 -	5.66
Other	11	0	8	5.45	0.28	4.73 -	5.73

G137A: *Legionella* counts reported by participants - Sample G137A

Legionella counts reported by participants - Sample G137B

Histogram with title "*Legionella* counts reported by participants - Sample G137B". Y-axis: Number of enumerations (0 to 30). X-axis: cfu L^{-1} (log$_{10}$).

Outlying results markers: 3, 4, (main region) 5, 4, 3

3.74 Participant Median (log$_{10}$ cfu L^{-1})
3.61 FEPTU Median (log$_{10}$ cfu L^{-1})

X-axis categories: <1.75, 1.75-2.79, 2.80-2.87, 2.88-2.95, 2.96-3.03, 3.04-3.10, 3.11-3.18, 3.19-3.26, 3.27-3.33, 3.34-3.41, 3.42-3.49, 3.50-3.57, 3.58-3.64, 3.65-3.72, 3.73-3.80, 3.81-3.87, 3.88-3.95, 3.96-4.03, 4.04-4.10, 4.11-4.18, 4.19-4.26, 4.27-4.34, 4.35-4.49, 4.49-4.51, >4.51
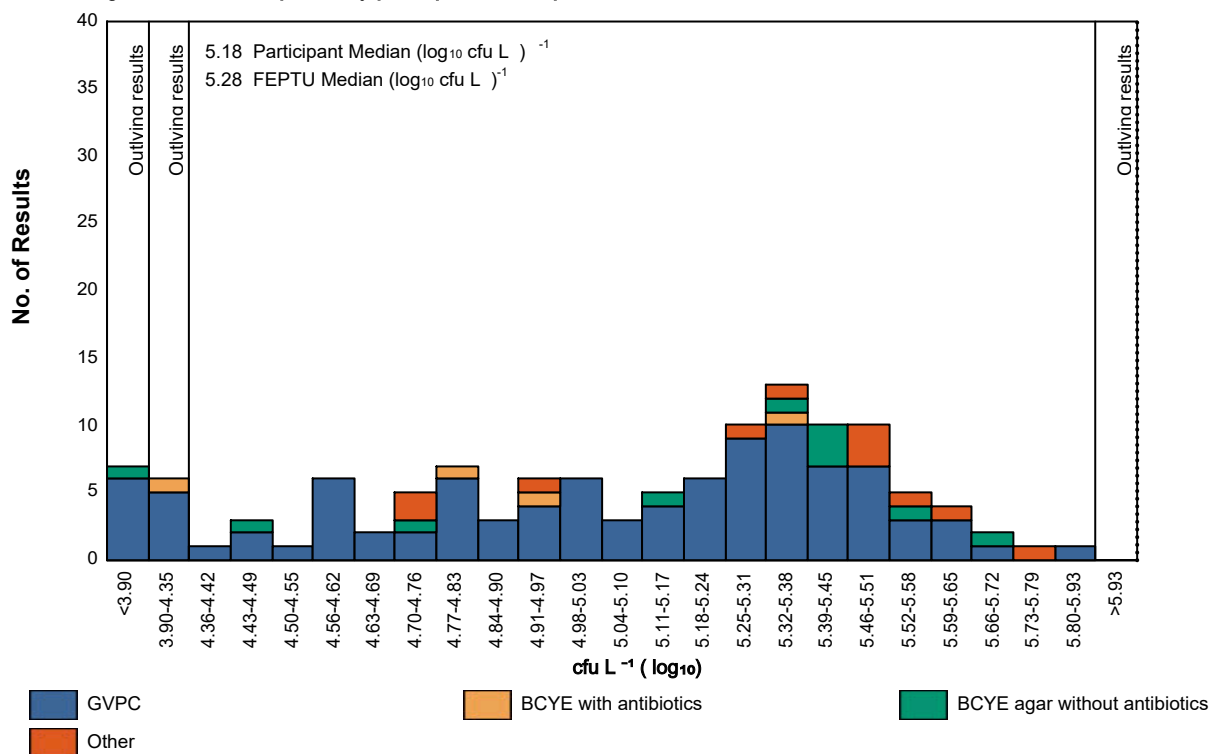
Culture based presentation

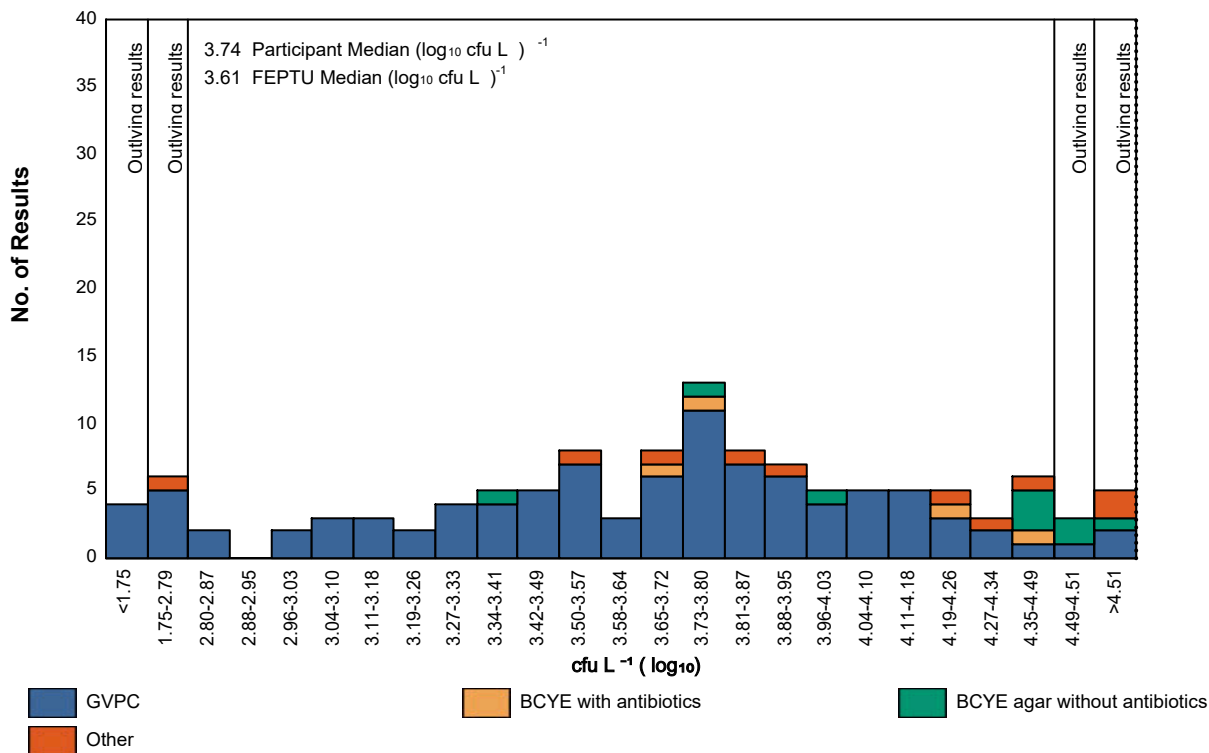**G137B**   FEPTU Culture: GVPC

Culture	Number of Results	Excluded Results	Percentage of the total	Median	Robust *S**	Range Reported	
				Log 10			
GVPC	98	2	79	3.69	0.45	0.00	- 4.60
BCYE with antibiotics	4	0	3			-	
BCYE agar without antibiotics	10	0	8	4.41	0.18	0.00	- 4.62
Other	11	0	8	3.89	0.53	0.00	- 4.66

G137B: *Legionella* counts reported by participants - Sample G137B

Stacked histogram with title "G137B: *Legionella* counts reported by participants - Sample G137B". Y-axis: No. of Results (0 to 40). X-axis: cfu L^{-1} (log$_{10}$).

3.74 Participant Median (log$_{10}$ cfu L^{-1})
3.61 FEPTU Median (log$_{10}$ cfu L^{-1})

Legend: GVPC (blue), BCYE with antibiotics (orange), BCYE agar without antibiotics (teal/green), Other (red)

X-axis categories: <1.75, 1.75-2.79, 2.80-2.87, 2.88-2.95, 2.96-3.03, 3.04-3.10, 3.11-3.18, 3.19-3.26, 3.27-3.33, 3.34-3.41, 3.42-3.49, 3.50-3.57, 3.58-3.64, 3.65-3.72, 3.73-3.80, 3.81-3.87, 3.88-3.95, 3.96-4.03, 4.04-4.10, 4.11-4.18, 4.19-4.26, 4.27-4.34, 4.35-4.49, 4.49-4.51, >4.51

Culture based presentation of results:

Participants are advised that if less than 10 laboratories report a result for a method no data is shown for the Median, Robust *S** and the Range Reported in the 'Culture based presentation' tables. Numbers shown in the 'Excluded Results' column are laboratories that reported a censored value.

Trend analysis

Plotting your PT results over a period of time can help to identify potential problems. If you need the latest file, please email us on foodeqa@ukhsa.gov.uk.

General comment

If you do not return a result for a distribution, you will not be able to view all the participants' results data in your individualised report. To access this missing data contact us on foodeqa@ukhsa.gov.uk.

New website

We are pleased to announce the launch of our new website: https://www.feptu.org.uk/. Please refer to this website to obtain the latest information for your proficiency testing.

Information of importance

To understand more about the proficiency testing schemes, please use the following links for information on:

1. Report format explained: Annotated report

2. Performance rating: Performance-over-time and Scheme guide (section 16.0)

3. Scoring and statistics used: Scoring information and stats

4. Homogeneity and stability: Scheme guide (section 9.0)

5. Complaints and appeal process: Scheme guide (section 20.0 and 21.0)

For further information about the operation of the service including confidentiality and terms of participation, please refer to the Scheme Guide: Scheme guide

End of report