



Summary of Results

External Quality Assessment of Water Microbiology

Legionella Isolation from Water Samples

Distribution Number: G129

Sample Numbers: G129A, G129B

Distribution Date:	January 2023
Results Due:	17 February 2023
Report Date:	22 February 2023
Samples prepared and quality control tested by:	Divya George Nafeesa Hussain Cansev Katar Margaret Njenga Zak Prior Jake Videlefsky
Data analysed by:	Joanna Donn Nita Patel
Report compiled by:	Joanna Donn Nita Patel
Authorised by:	Nita Patel

This report must not be reproduced without permission of the organisers.

UK Health Security Agency
Food and Environmental Proficiency Testing Unit (FEPTU)

61 Colindale Avenue
London
NW9 5EQ

Tel: +44 (0)20 8327 7119
Fax:

For further information on the scheme please refer to:

Scheme Guide: <https://www.gov.uk/government/publications/food-and-water-proficiency-testing-schemes-scheme-guide>

Scoring Guide: <https://www.gov.uk/government/publications/food-and-water-proficiency-testing-schemes-scoring-systems-and-statistics>

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 log₁₀ value)
 X_{pt} = assigned value (participants' consensus median (expressed as a log₁₀ 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 17.0 of the Scheme Guide if you have experienced difficulties with any of the examinations.

<https://www.gov.uk/government/publications/food-and-water-proficiency-testing-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 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* 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	



Accreditation: UKHSA Water EQA Scheme for *Legionella* Isolation is accredited by the United Kingdom Accreditation Service (UKAS) to ISO/IEC 17043:2010.

0006

Sample: G129A

Contents:

- *Legionella pneumophila* serogroup 3 (1.5x10³) (wild strain)
- *Enterococcus faecalis* (2.0x10²) (wild strain)
- *Pseudomonas fluorescens* (1.1x10³) (NCTC 3756)

Expected Results:

	Expected Result	Your Result	Score	Z-Score	Comments
Isolation of legionellae	Detected				
Identification	<i>L.pneumophila</i>				
Serogroup	2 - 15				
Enumeration	3.20x10 ² - 1.01x10 ⁴ cfu L ⁻¹				
Results Returned					
Total score out of N/A					

Background Flora:

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

Comments on Performance:

Total participants reporting results	130
Participants reporting detected	127 (98%)

Participants reporting <i>L.pneumophila</i>	114 (90%)
Participants reporting not examined	6 (5%)
Participants reporting <i>Legionella</i> spp.	1 (1%)
Participants reporting <i>Legionella</i> spp. not <i>L.pneumophila</i>	1 (1%)
Participants reporting <i>L.rubrilucens</i>	1 (1%)

Serogroups for <i>L.pneumophila</i>	
Participants reporting serogroups 2 - 15	114 (90%)
Participants reporting serogroup not examined	6 (5%)
Participants reporting no serogroup result	4 (3%)
Participants reporting serogroup not applicable	2 (2%)
Participants reporting serogroup 1	1 (1%)

Sample: G129A (cont)

Total participants enumerating legionellae	129
Participants reporting a low censored value	1
Participants reporting a high censored value	1

Assigned value (participants' median)	1.80x10 ³ cfu L ⁻¹
Uncertainty of assigned value ($U(\chi_{pt})=\log_{10}$ cfu L ⁻¹)	0.04
No. of outlying counts	6 (2 low / 4 high)
Participants' mean	1.82x10 ³ cfu L ⁻¹
Standard deviation of participants' results *	0.36 log ₁₀ unit per cfu L ⁻¹

FEPTU median	1.49x10 ³ cfu L ⁻¹
--------------	--

Total sent sample	136
Non-returns	3
Not examined	3

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: G129B

Contents:

- *Legionella pneumophila* serogroup 1 (2.8×10^3) (wild strain)
- *Brevundimonas vesicularis* (2.7×10^3) (wild strain)
- *Citrobacter braakii* (1.2×10^3) (wild strain)

Expected Results:

	Expected Result	Your Result	Score	Z-Score	Comments
Isolation of legionellae	Detected				
Identification	<i>L.pneumophila</i>				
Serogroup	1				
Enumeration	$5.33 \times 10^2 - 1.69 \times 10^4$ cfu L ⁻¹				
Results Returned					
Total score out of N/A					

Background Flora:

Brevundimonas vesicularis did form colonies on GVPC after processing and *Citrobacter braakii* did not

Comments on Performance:

Total participants reporting results	130
Participants reporting detected	126 (97%)

Participants reporting <i>L.pneumophila</i>	117 (93%)
Participants reporting not examined	5 (4%)

Serogroups for <i>L.pneumophila</i>	
Participants reporting serogroup 1	116 (92%)
Participants reporting serogroup not examined	5 (4%)
Participants reporting no serogroup result	4 (3%)
Participants reporting serogroups 2 - 15	1 (1%)

Sample: G129B (cont)

Total participants enumerating legionellae	129
Participants reporting a low censored value	2
Participants reporting a high censored value	1

Assigned value (participants' median)	3.00×10^3 cfu L ⁻¹
Uncertainty of assigned value ($U(x_{pt}) = \log_{10}$ cfu L ⁻¹)	0.04
No. of outlying counts	7 (6 low / 1 high)
Participants' mean	2.78×10^3 cfu L ⁻¹
Standard deviation of participants' results *	0.36 log ₁₀ unit per cfu L ⁻¹

FEPTU median	2.76×10^3 cfu L ⁻¹
--------------	--

Total sent sample	136
Non-returns	3
Not examined	3

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*).

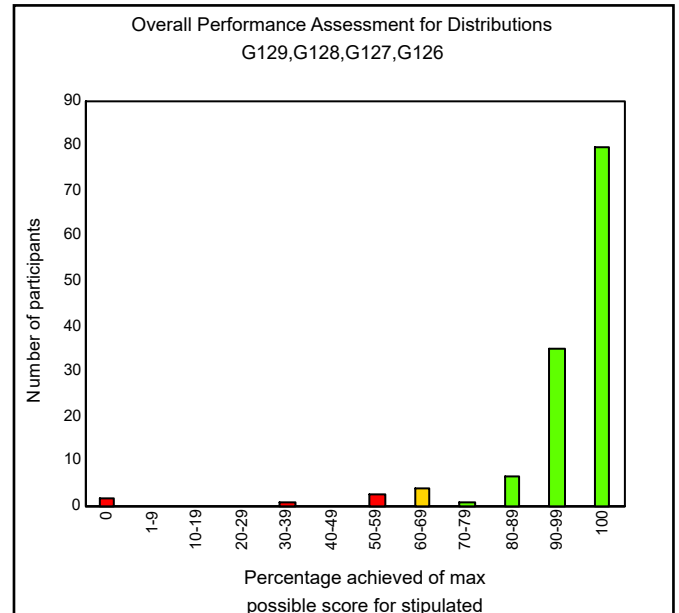
Performance Assessment Sheet

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' cumulative scores for each of the examination types are compared with the maximum possible

Distribution	Sample	Your score	Your %
G129	G129B		
	G129A		
G128	G128A		
	G128B		
G127	G127A		
	G127B		
G126	G126A		
	G126B		



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

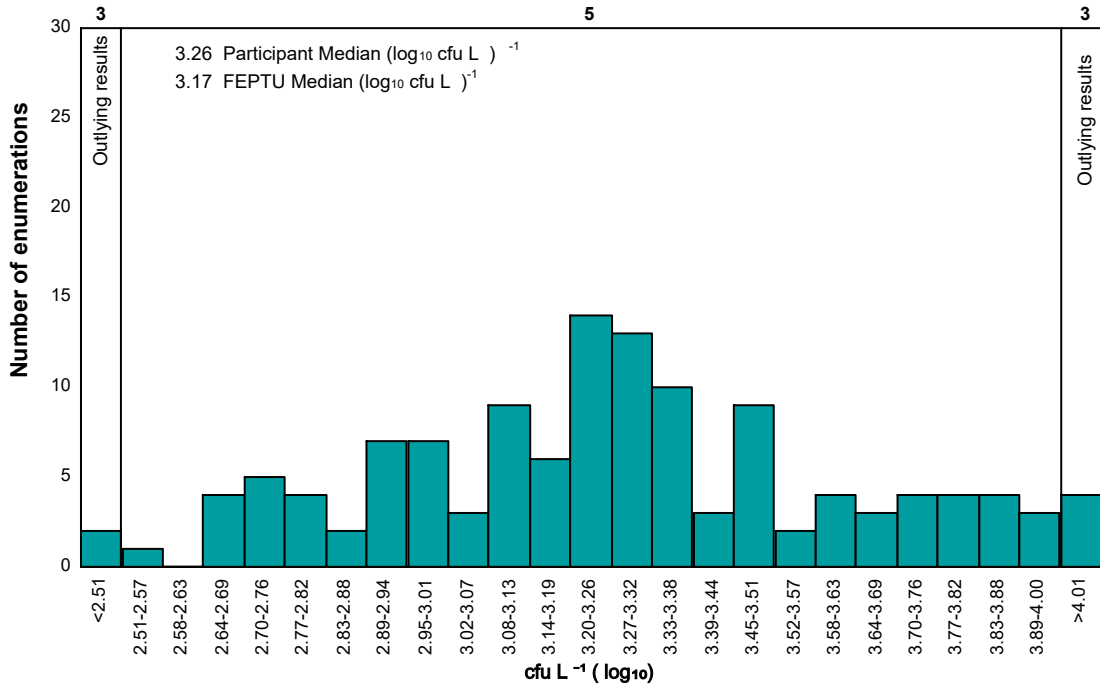
a) refer to the relevant sample reports for specific comments

b) refer to the website guidance documents:

<https://www.gov.uk/government/collections/external-quality-assessment-eqa-and-proficiency-testing-pt-for-food-water-and-environmental-microbiology>

c) contact the organisers for advice.

Legionella counts reported by participants - Sample G129A



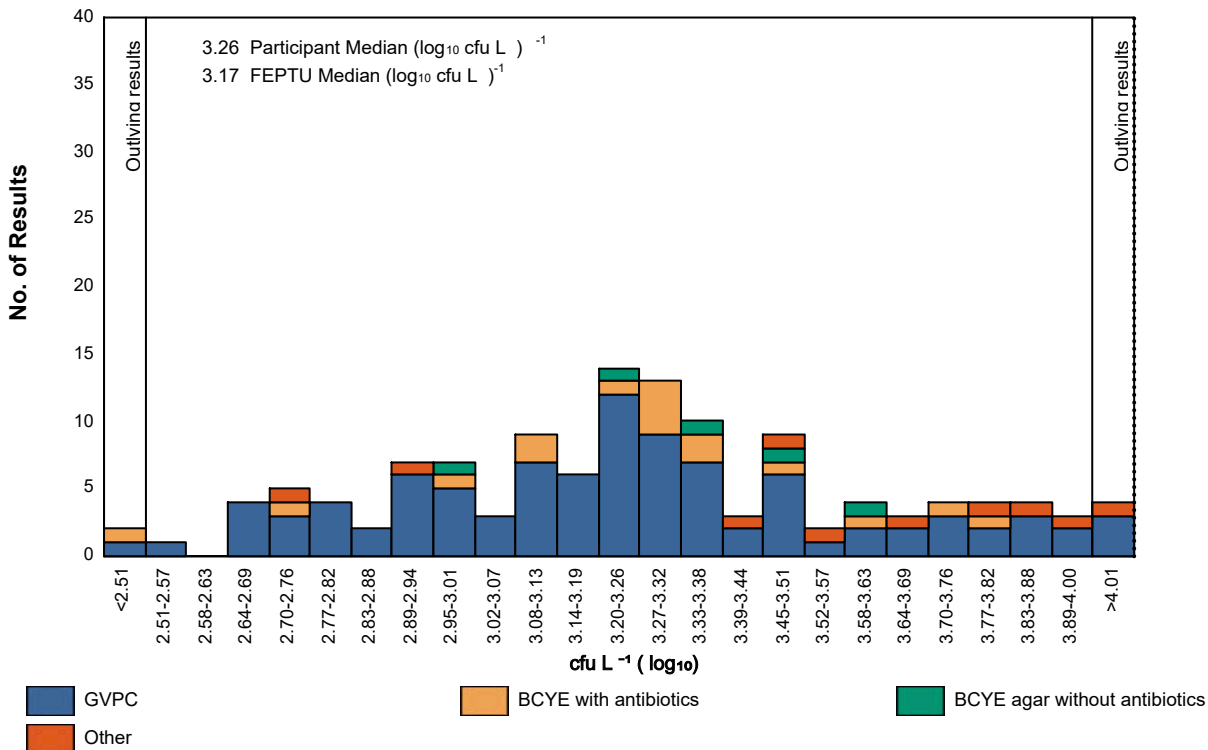
Culture based presentation

G129A

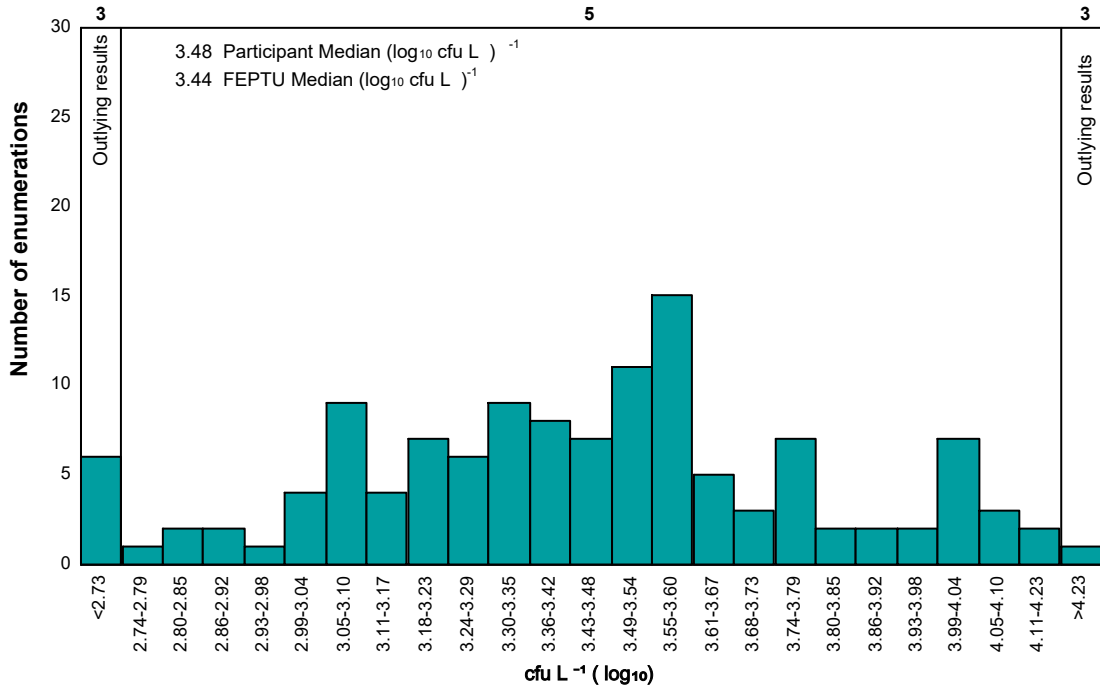
FEPTU Culture: GVPC

Culture	Number of Results	Excluded Results	Percentage of the total	Median	Robust S*	Range Reported
				Log 10		
GVPC	96	0	75	3.23	0.35	2.30 - 5.54
BCYE with antibiotics	16	1	12	3.29	0.28	2.48 - 3.78
BCYE agar without antibiotics	5	1	3			-
Other	10	0	7	3.61	0.35	2.70 - 4.30

G129A: Legionella counts reported by participants - Sample G129A



Legionella counts reported by participants - Sample G129B



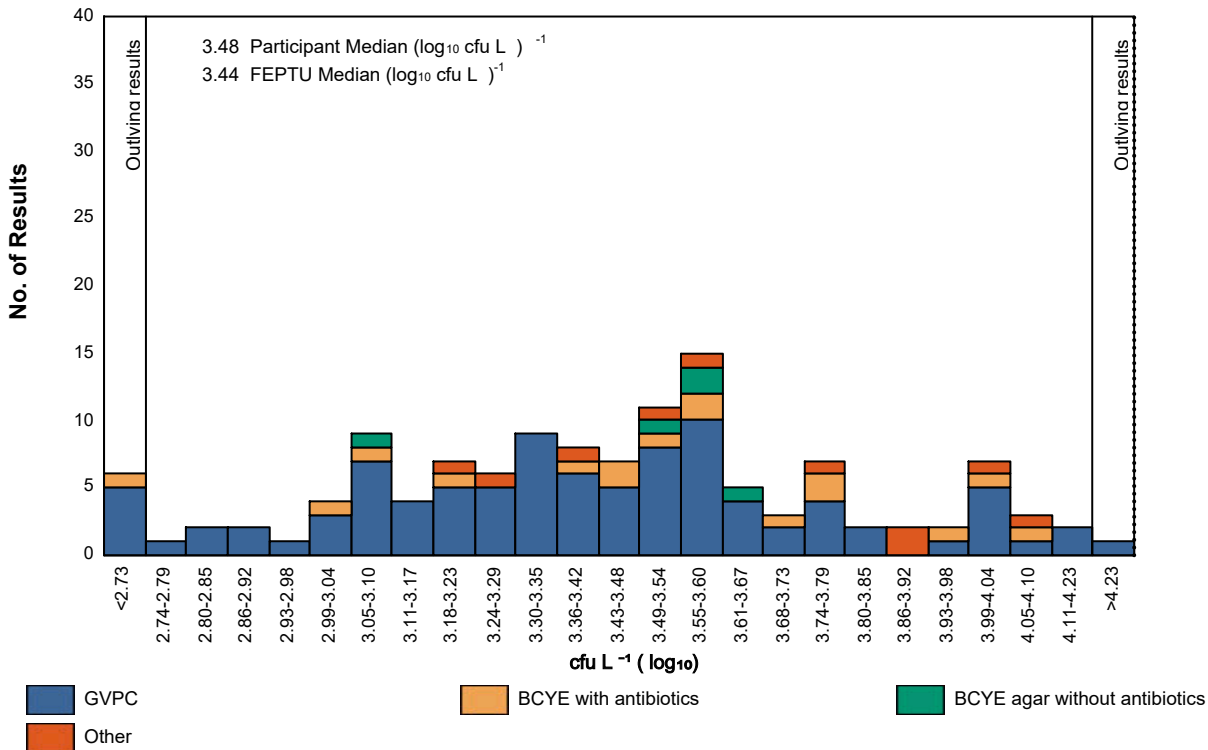
Culture based presentation

G129B

FEPTU Culture: GVPC

Culture	Number of Results	Excluded Results	Percentage of the total	Median	Robust S*	Range Reported
				Log 10		
GVPC	95	1	75	3.37	0.35	2.00 - 4.30
BCYE with antibiotics	16	1	12	3.53	0.38	2.30 - 4.08
BCYE agar without antibiotics	5	1	3			-
Other	10	0	7	3.69	0.36	3.18 - 4.04

G129B: Legionella counts reported by participants - Sample G129B



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.

End of report

