FEPTU
Food & Environmental Proficiency Testing Unit
Operated by UK Health Security Agency

Summary of Results

External Quality Assessment of Food/Environmental Microbiology

Environmental Swab Scheme

Distribution Number: ES36 **Sample Numbers: ES0071, ES0072**

Distribution Date:	**March 2025**
Results Due:	**04 April 2025**
Report Date:	**28 April 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**
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For general information about the scheme please refer to:

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

For more specific information about results assessments, scoring systems, statistics, and guidance on analysing your results for the proficiency testing samples please refer to:

Guide to Scoring and Statistics: 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 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 Environmental Swab Scheme is 0.35. 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 are investigated to establish the possible cause. As a general rule, UKHSA recommends that all questionable and unsatisfactory results are investigated.

FEPTU Quality Control: To demonstrate homogeneity of the sample, a minimum of 10 LENTICULE® discs, selected randomly from a batch, are tested in duplicate for parameters requiring enumeration and 10 LENTICULE discs are examined for pathogen detection.

To demonstrate stability of the sample, a minimum of six LENTICULE discs, selected randomly from a batch, are examined throughout the distribution period, either for enumeration or pathogen detection.

FEPTU results are determined using UK Health Security Agency method: detection and enumeration of bacteria in swabs and other environmental samples (FNES4).

The intended results letters provide guidance for participants regarding the assigned values.

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

Refer to section 19.0 of the Scheme Guide if you have experienced difficulties with any of the 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	FEPTU's website
Scheme consultants	Nicola Elviss	
Scheme co-ordinator	Nita Patel	

Accreditation: UKHSA Food EQA Scheme for Environmental Swab is accredited by the United Kingdom Accreditation Service (UKAS) to ISO/IEC 17043:2010.

UKAS PROFICIENCY TESTING
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Swab Sample: ES0071

Sample type: Template area swab (10cm x 10cm)

Request: Examine sample following your routine protocol for hygiene indicator organisms.

Contents:

Enterobacter aerogenes (60) (wild strain), *Escherichia coli* (8.5x10²) (wild strain), *Listeria seeligeri* (4.0x10²) (wild strain), *Enterococcus durans* (6.6x10²) (wild strain) - all levels per cm²

Expected Results:

Examination	Expected Result	Your Result	Score for performance assessment	Z-score
Aerobic Colony Count (30ºC)	7.1x10² - 8.8x10³ cfu per cm²			
Enterobacteriaceae	2.3x10² - 2.9x10³ cfu per cm²			
Escherichia coli	1.7x10² - 1.7x10³ cfu per cm²			
Listeria spp.				

Comments on Performance:

Aerobic Colony Count (30ºC)	
Total participants reporting for Aerobic Colony Count (30ºC)	29
Participants reporting a high censored value	1
Assigned value (participants' median)	2.5x10³ cfu per cm² (3.4 $\log_{10}$)
Uncertainty of assigned value ($U(Xpt)$ = $\log_{10}$ cfu per cm²)	0.06
No. of outlying counts	6 (2 low / 4 high)
Participants' mean	2.4x10³ cfu per cm² (3.37 $\log_{10}$)
*Standard deviation of participants' results	0.27 $\log_{10}$ cfu per cm²
FEPTU QC median	2.0x10³ cfu per cm² (3.29 $\log_{10}$)

Enterobacteriaceae	
Total participants reporting for *Enterobacteriaceae*	27
Participants reporting a high censored value	1
Assigned value (participants' median)	8.1x10² cfu per cm² (2.91 $\log_{10}$)
Uncertainty of assigned value ($U(Xpt)$ = $\log_{10}$ cfu per cm²)	0.06
No. of outlying counts	6 (2 low / 4 high)
Participants' mean	7.6x10² cfu per cm² (2.88 $\log_{10}$)
*Standard deviation of participants' results	0.27 $\log_{10}$ cfu per cm²
FEPTU QC median	8.1x10² cfu per cm² (2.91 $\log_{10}$)

Escherichia coli	
Total participants reporting for *Escherichia coli*	24
Assigned value (participants' median)	5.5x10² cfu per cm² (2.74 $\log_{10}$)
Uncertainty of assigned value ($U(Xpt)$ = $\log_{10}$ cfu per cm²)	0.05
No. of outlying counts	6 (3 low / 3 high)
Participants' mean	5.5x10² cfu per cm² (2.74 $\log_{10}$)
*Standard deviation of participants' results	0.2 $\log_{10}$ cfu per cm²
FEPTU QC median	3.4x10² cfu per cm² (2.53 $\log_{10}$)

***Listeria* spp.**	
Total participants reporting for *Listeria* spp.	15
Participants reporting a low censored value	3
Participants reporting a high censored value	1

Total sent samples	39
Non-returns	3
Not examined	6

The fixed standard deviation value (σpt value) used for calculation of the z-scores is **0.35** for all parameters.

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

Swab Sample: ES0072

Sample type: Random area swab

Request: Examine sample following your routine protocol for hygiene indicator organisms.

Contents:

Escherichia coli ($6.8x10^4$) (wild strain), *Bacillus cereus* ($5.9x10^3$) (wild strain), *Candida tropicalis* ($9.0x10^4$) (wild strain), *Lactobacillus plantarum* ($1.0x10^5$) (wild strain) - all levels per swab

Expected Results:

Examination	Expected Result	Your Result	Score for performance assessment	Z-score
B.cereus	$2.5x10^3$ - $2.5x10^4$ cfu per swab			
Aerobic Colony Count (30ºC)	$4.6x10^4$ - $4.6x10^5$ cfu per swab			
Enterobacteriaceae	$1.7x10^4$ - $3.0x10^5$ cfu per swab			
Escherichia coli	$2.4x10^4$ - $2.4x10^5$ cfu per swab			

Comments on Performance:

B.cereus	
Total participants reporting for *B.cereus*	14
Assigned value (participants' median)	$7.9x10^3$ cfu per swab (3.9 $\log_{10}$)
Uncertainty of assigned value ($U(Xpt)$ = $\log_{10}$ cfu per swab)	0.03
No. of outlying counts	4 (4 low / 0 high)
Participants' mean	$7.4x10^3$ cfu per swab (3.87 $\log_{10}$)
*Standard deviation of participants' results	0.09 $\log_{10}$ cfu per swab
FEPTU QC median	$6.1x10^3$ cfu per swab (3.78 $\log_{10}$)

Aerobic Colony Count (30ºC)	
Total participants reporting for Aerobic Colony Count (30ºC)	28
Participants reporting a high censored value	1
Assigned value (participants' median)	$1.5x10^5$ cfu per swab (5.16 $\log_{10}$)
Uncertainty of assigned value ($U(Xpt)$ = $\log_{10}$ cfu per swab)	0.05
No. of outlying counts	7 (6 low / 1 high)
Participants' mean	$1.3x10^5$ cfu per swab (5.12 $\log_{10}$)
*Standard deviation of participants' results	0.22 $\log_{10}$ cfu per swab
FEPTU QC median	$1.4x10^5$ cfu per swab (5.16 $\log_{10}$)

Enterobacteriaceae	
Total participants reporting for *Enterobacteriaceae*	27
Participants reporting a high censored value	1
Assigned value (participants' median)	$7.0x10^4$ cfu per swab (4.85 $\log_{10}$)
Uncertainty of assigned value ($U(Xpt)$ = $\log_{10}$ cfu per swab)	0.07
No. of outlying counts	7 (6 low / 1 high)
Participants' mean	$6.1x10^4$ cfu per swab (4.78 $\log_{10}$)
*Standard deviation of participants' results	0.31 $\log_{10}$ cfu per swab
FEPTU QC median	$6.9x10^4$ cfu per swab (4.84 $\log_{10}$)

Escherichia coli	
Total participants reporting for *Escherichia coli*	25
Assigned value (participants' median)	$7.5x10^4$ cfu per swab (4.87 $\log_{10}$)
Uncertainty of assigned value ($U(Xpt)$ = $\log_{10}$ cfu per swab)	0.06
No. of outlying counts	7 (6 low / 1 high)
Participants' mean	$6.4x10^4$ cfu per swab (4.8 $\log_{10}$)
*Standard deviation of participants' results	0.24 $\log_{10}$ cfu per swab
FEPTU QC median	$6.7x10^4$ cfu per swab (4.83 $\log_{10}$)

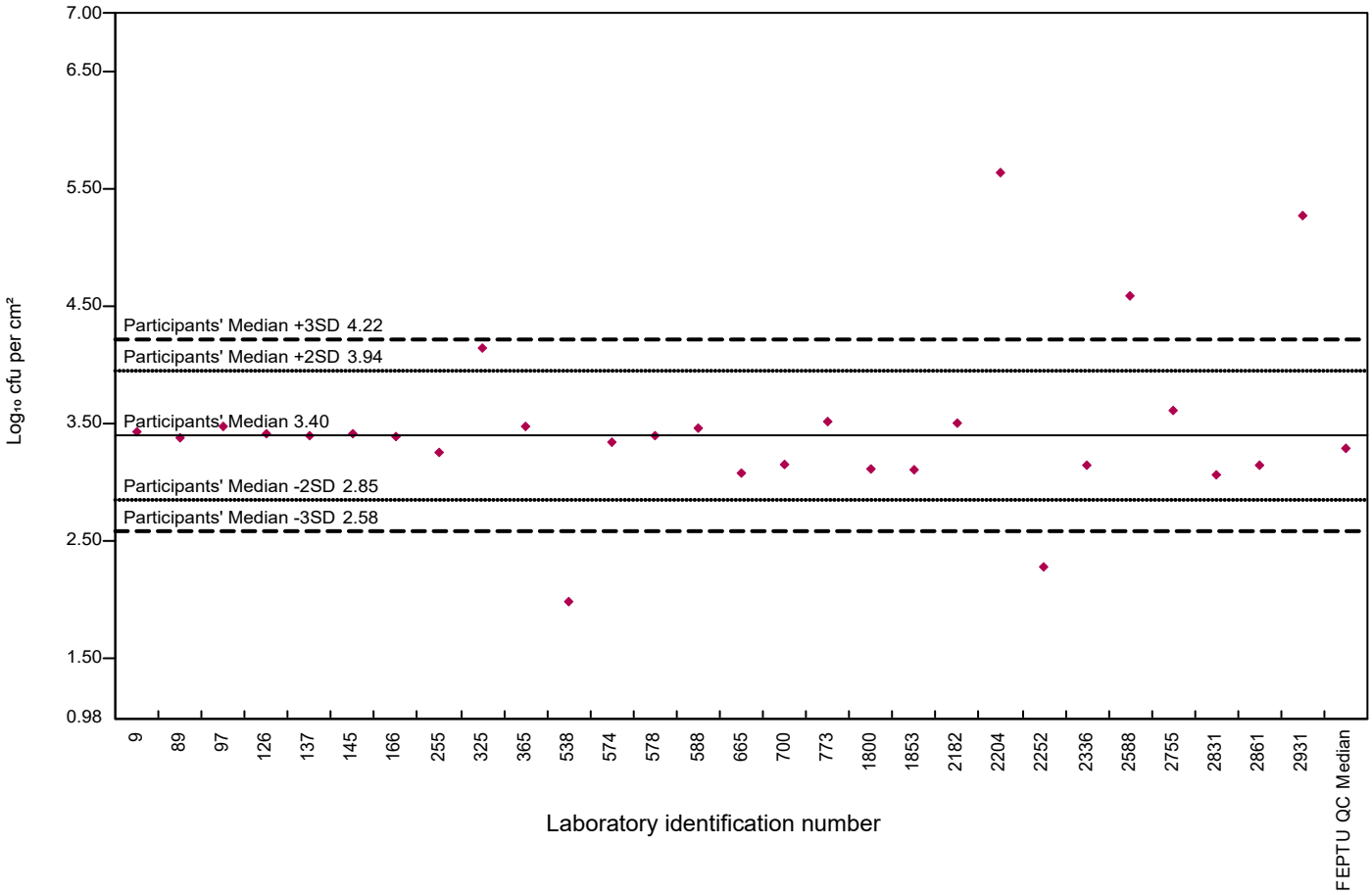
Total sent samples	39
Non-returns	3
Not examined	7

The fixed standard deviation value (σpt value) used for calculation of the z-scores is **0.35** for all parameters.

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

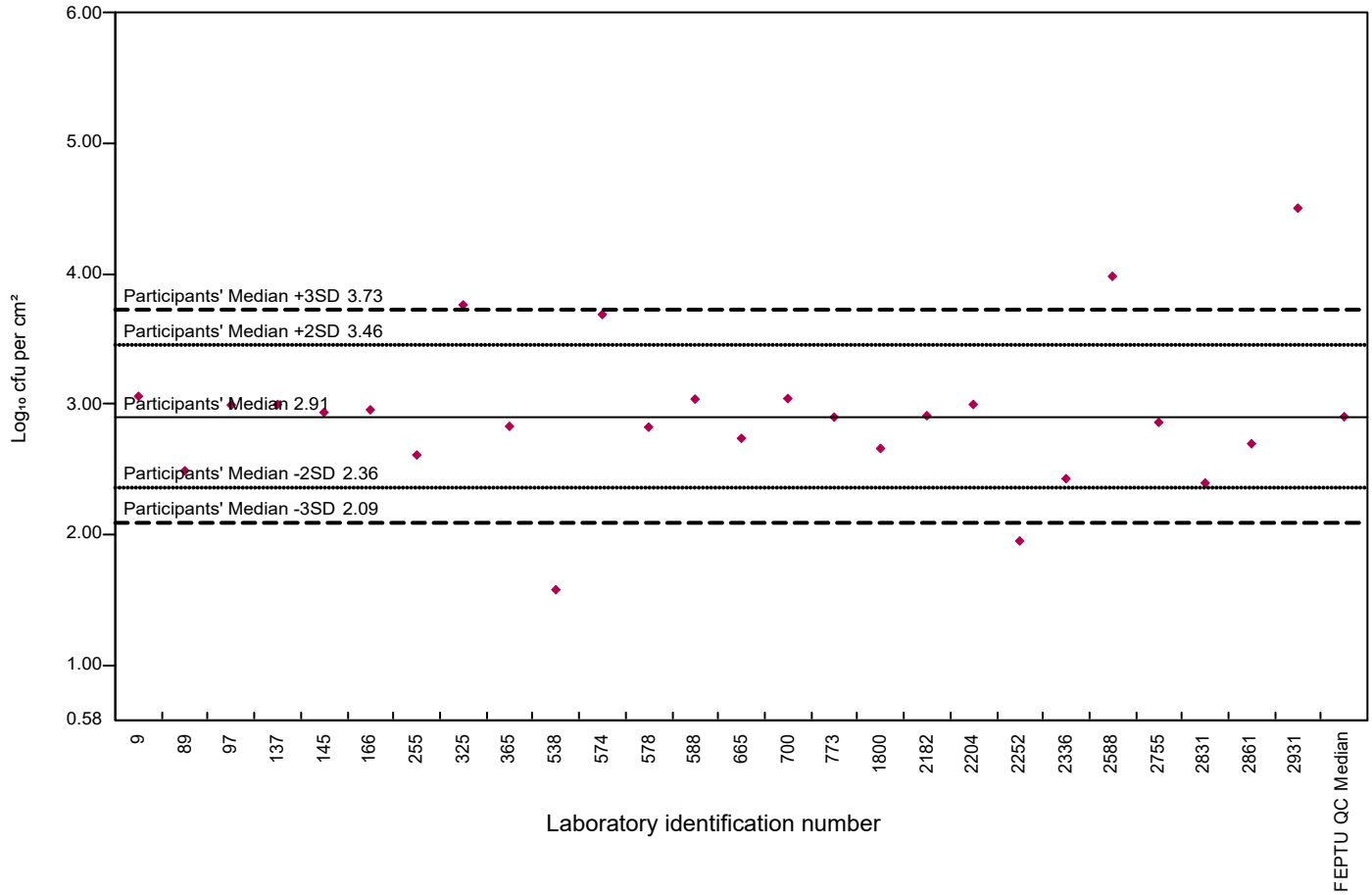
ES0071 - Aerobic Colony Count (30ºC)

Key: ◆ Reported result



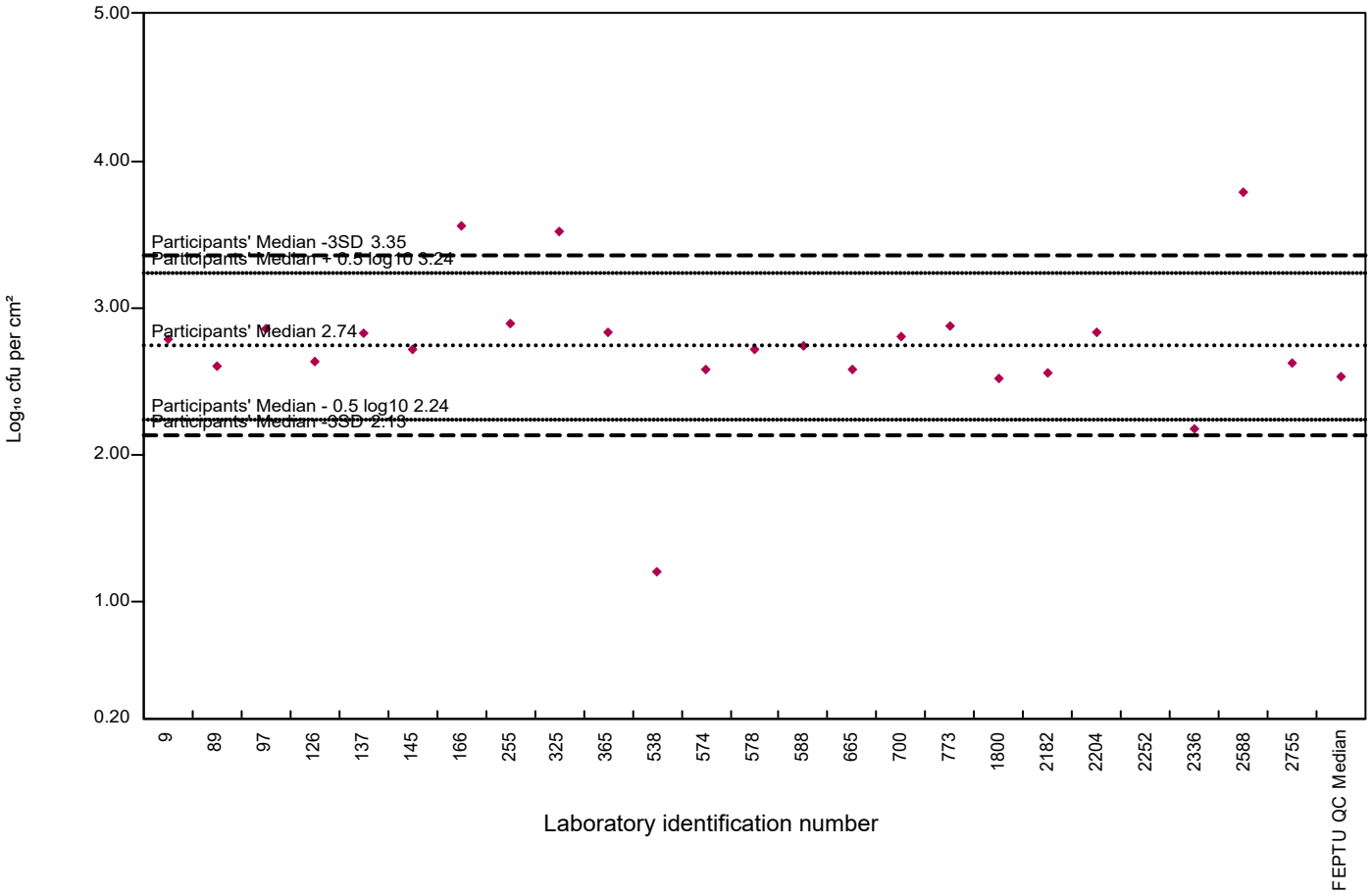
ES0071 - *Enterobacteriaceae*

Key: ◆ Reported result



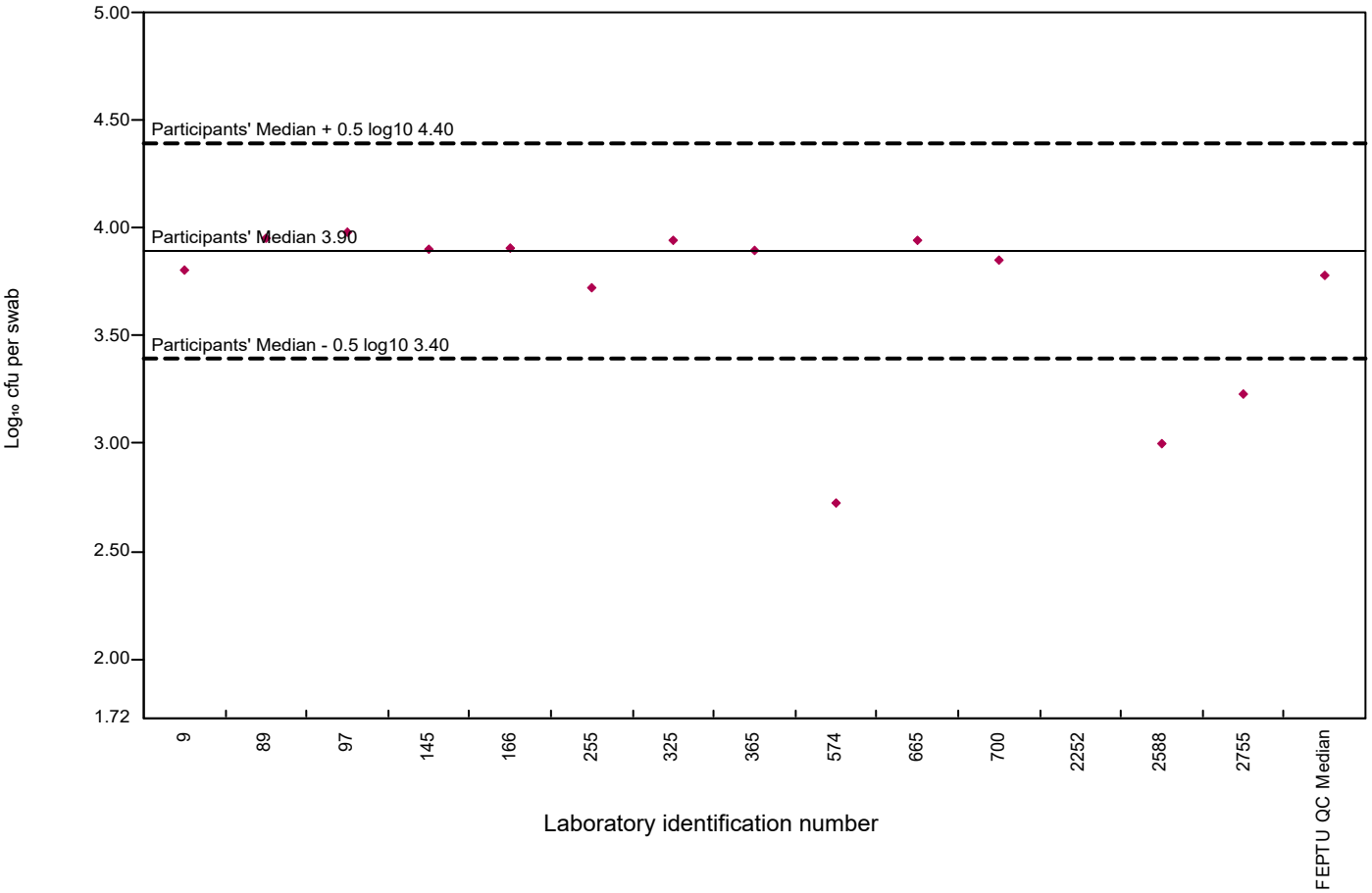
ES0071 - *Escherichia coli*

Key: ◆ Reported result



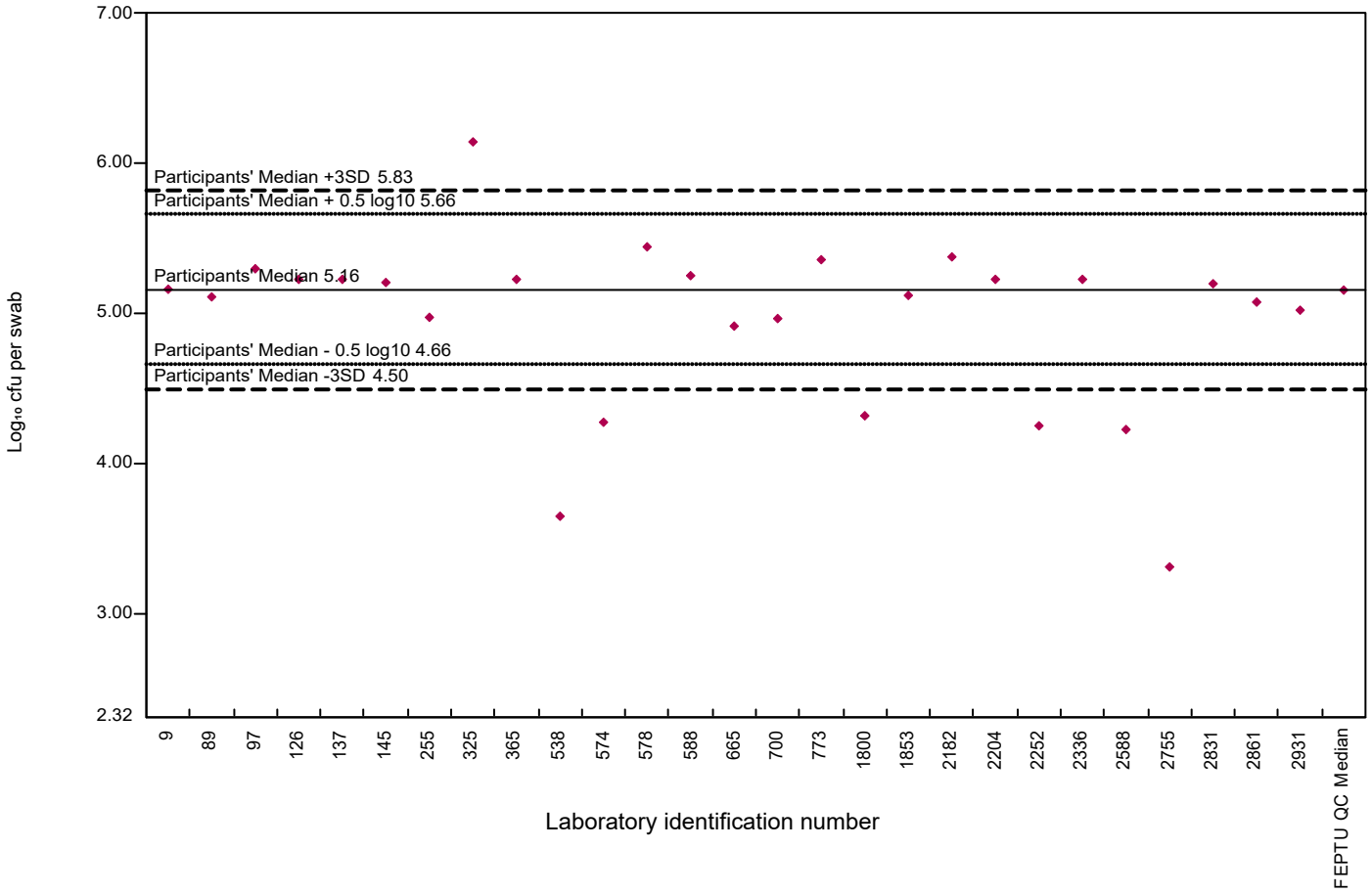
ES0072 - *B.cereus*

Key: ◆ Reported result



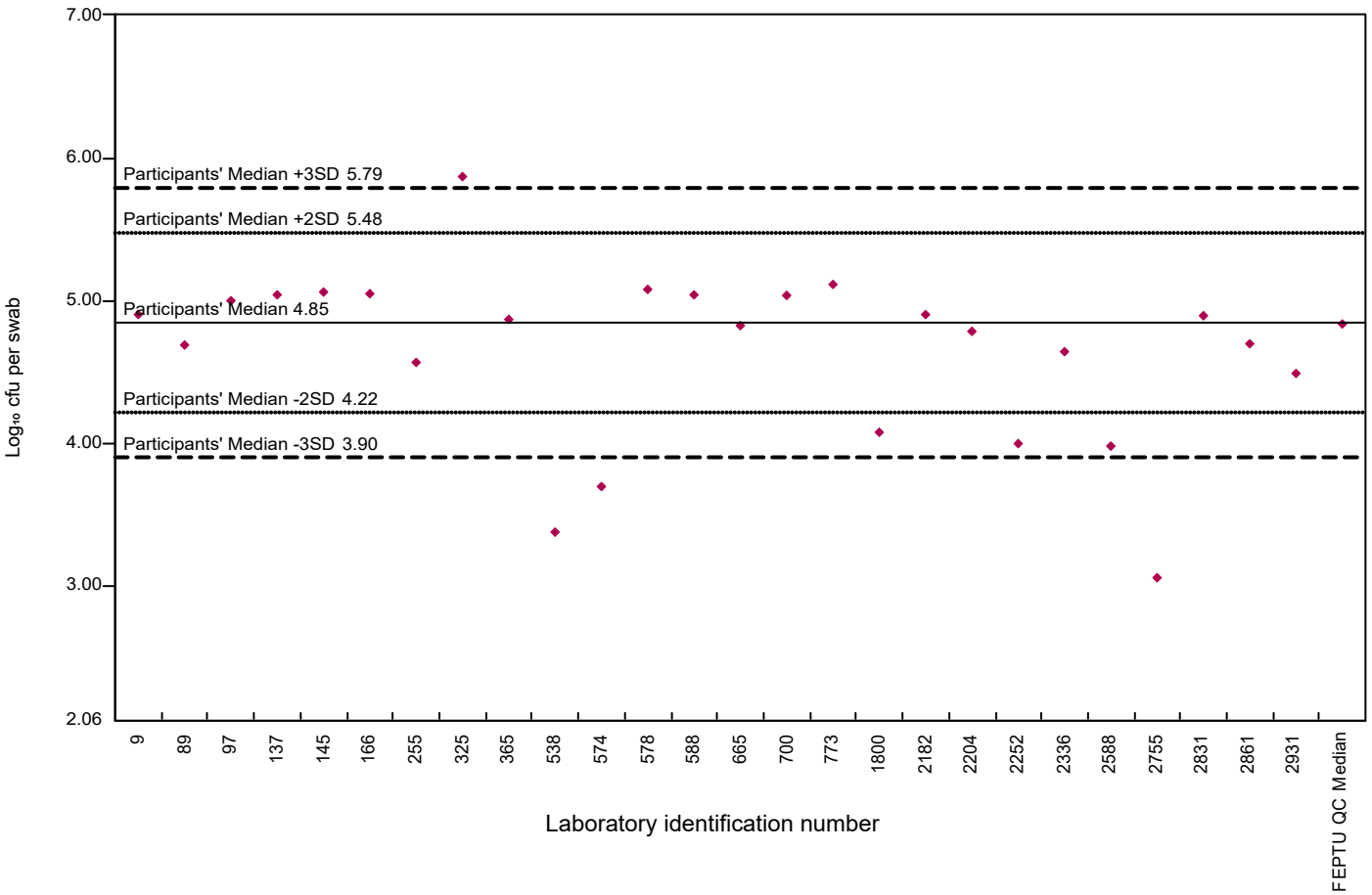
ES0072 - Aerobic Colony Count (30ºC)

Key: ◆ Reported result



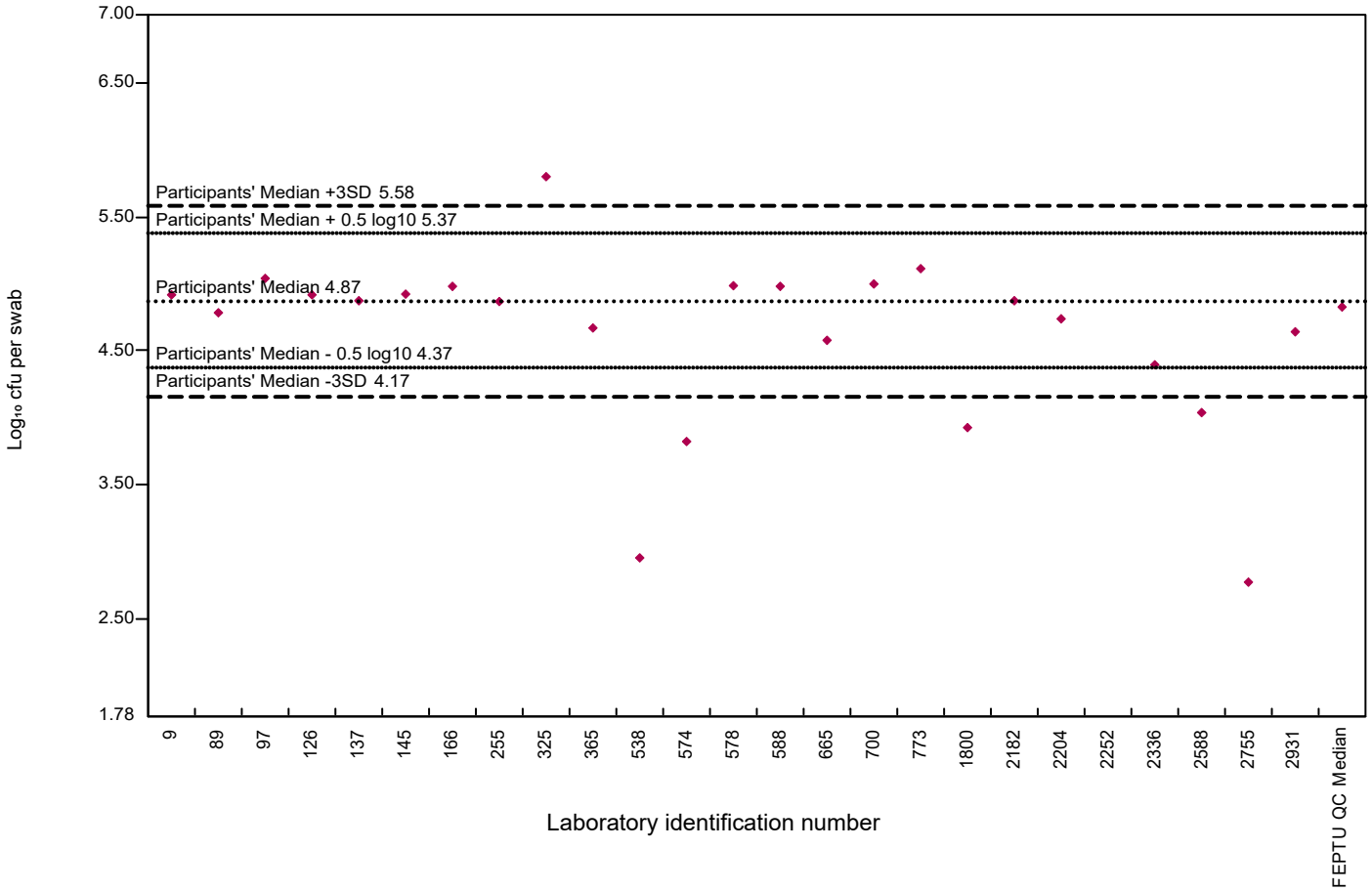
ES0072 - *Enterobacteriaceae*

Key: ◆ Reported result



ES0072 - *Escherichia coli*

Key: ◆ Reported result



Sample specific comment

For both these samples ES0071 and ES0072 the number of results reported as outliers was higher than expected.

ES0071 was a template area (10cm x10cm) swab sample and results needed to be reported as per cm^2 and for ES0072 the sample was a random area swab and results reported as per swab.

It is unclear with some participants what results were actually reported, however further analysis of the laboratories (anonymised) reporting on outlying result is shown in the table below:

Laboratory	ES0071		ES0072	
	Number of results reported lower than expected	Number of results reported higher than expected	Number of results reported lower than expected	Number of results reported higher than expected
A		3/3		3/4
B	3/3		3/3	
C		1/3	4/4	
D	3/3		3/4	
E		3/3	4/4	
F		2/2		
G			3/3	
H			4/4	

A Kolmogorov-Smirnov test carried out on all the examinations for both samples concluded that the data was evenly distributed. The number of data sets analysed is low, therefore impacting the overall performance for each examination. This is lower than expected due to the number of laboratories reporting an incorrect count. Laboratories reporting an incorrect count should review how their results were calculated as part of their investigation.

ES0071 – *Listeria* sp.

This sample contained a *Listeria seeligeri* at levels of about $4.0x10^2$ per cm^2. However the results obtained by laboratories were variable (even within the FEPTU laboratory), suggesting issues with this strain phenotypic characteristics, therefore this examination has not been scored.

Statistical evaluation

Participants are advised that for a robust statistical evaluation at least 20 reported results are required for a parameter. When statistical calculation is based on 10 – 19 results, they should be interpreted with caution as they may be overly influenced by outlying results.

Comments for distribution ES36

Sample ES0071

The table below shows the additional examinations carried out by the laboratories and the reported results. Those highlighted in red are considered incorrect results based on the contents of the sample.

Additional examinations	Number of laboratories examining	Reported results
B. cereus	2	0 (1) <10 (1)
Coliform	1	570 (1)
Pseudomonas spp.	1	<25
Staphylococcus aureus	3	<1 (1) <20 (1) 11600 (1)

Sample ES0072

The table below shows the additional examinations carried out by the laboratories and the reported results. Those highlighted in red are considered incorrect results based on the contents of the sample.

Additional examinations	Number of laboratories examining	Reported results
Coliform	1	97000 (1)
Pseudomonas spp.	1	<25
Staphylococcus aureus	1	<1 (1) <10 (1) <100 (1)

General comments

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. Please email us to access the missing data.

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