

Summary of Results

External Quality Assessment of Water Microbiology Recreational and Surface Water Scheme

Distribution Number: S123

Sample Numbers: S123A, S123B

Distribution Date:	April 2025
Results Due:	09 May 2025
Report Date:	23 May 2025
Samples prepared and quality control tested by:	Divya George Afifa Halim Nafeesa Hussain Cansev Katar Sabine Naujokat Zak Prior Jake Videlefsky
Data analysed by:	Joanna Donn Nita Patel
Report compiled by:	Joanna Donn 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/>

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 (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 Recreational and Surface Water 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.

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

UKHSA uses methods stipulated in the Microbiology of Recreational and Environmental Waters (2000) and the DWI's series of documents: The Microbiology of Drinking Water (2002) - Methods for the Examination of Waters and Associated Materials.

The FEPTU results are used for guidance in the preliminary intended results notification, 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/>

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

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	Stephen Bullock	
Scheme Co-ordinator	Nita Patel	

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



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Sample: S123A

Swimming pool water

Contents: *Staphylococcus aureus* (22) (wild strain), *Escherichia coli* (76) (NCTC 12950) , *Enterobacter cloacae* (30) (NCTC 10005), *Enterococcus faecium* (60) (wild strain), *Pseudomonas aeruginosa* (64) (NCTC 10332), *Staphylococcus hyicus* (87) (NCTC 10350), *Kocuria kristinae* (30 per mL) (NCTC 11038)

Expected Results:

All counts are expressed as colony forming units (cfu) per 100mL except the colony count at 37°C/24h which is cfu per mL.

The fixed standard deviation value (σ_{pt} value) used for calculation of the z-scores is 0.35 for all parameters.

Parameter	Coagulase positive staphylococci	Coliform bacteria	<i>Escherichia coli</i>	Enterococci	<i>Pseudomonas aeruginosa</i>	Total staphylococci	Colony Count 37°C/24 h	Colony Count 37°C/48 h
FEPTU median	20	1.04x10 ² (2.01 log ₁₀)	76 (1.88 log ₁₀)	60	64	106	26	30
No. results returned	59	122	126	107	125	36	96	94
Assigned value (Participants median all)	22	1.31x10 ² (2.12 log ₁₀)	70 (1.85 log ₁₀)	53	70	75	25	30
Uncertainty of assigned value*	0.04	0.02	0.02	0.01	0.02	0.06	0.02	0.01
Participants mean (all results)	25	1.28x10 ² (2.11 log ₁₀)	69 (1.84 log ₁₀)	53	64	73	25	29
Expected Range	7 - 78	41 - 4.14x10 ²	22 - 2.21x10 ²	17 - 168	19 - 221	23 - 236	8 - 79	9 - 93
Standard deviation**	0.24	0.18	0.17	0.07	0.23	0.29	0.15	0.11
No of outlying counts	11	6	10	2	13	5	12	6
False positives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
False negatives	3	0	2	0	6	0	1	0
Your result								
Score for performance assessment								
Z-score								

* $U(X_{pt})$ is based on results transformed to a log₁₀ scale
** Robust S^* based on median absolute deviation about the participants' median ($MADe$)

Total sent samples	140
Not examined	9
Non returns	0
Late returns	0

Sample: S123B

Swimming pool water

Contents: *Staphylococcus aureus* (66) (wild strain), *Escherichia coli* (52) (wild strain), *Enterococcus faecalis* (33) (NCTC 5957), *Pseudomonas aeruginosa* (36) (wild strain), *Pediococcus pentosaceus* (57 per mL) (wild strain)

Expected Results:

All counts are expressed as colony forming units (cfu) per 100mL except the colony count at 37°C/24h which is cfu per mL.

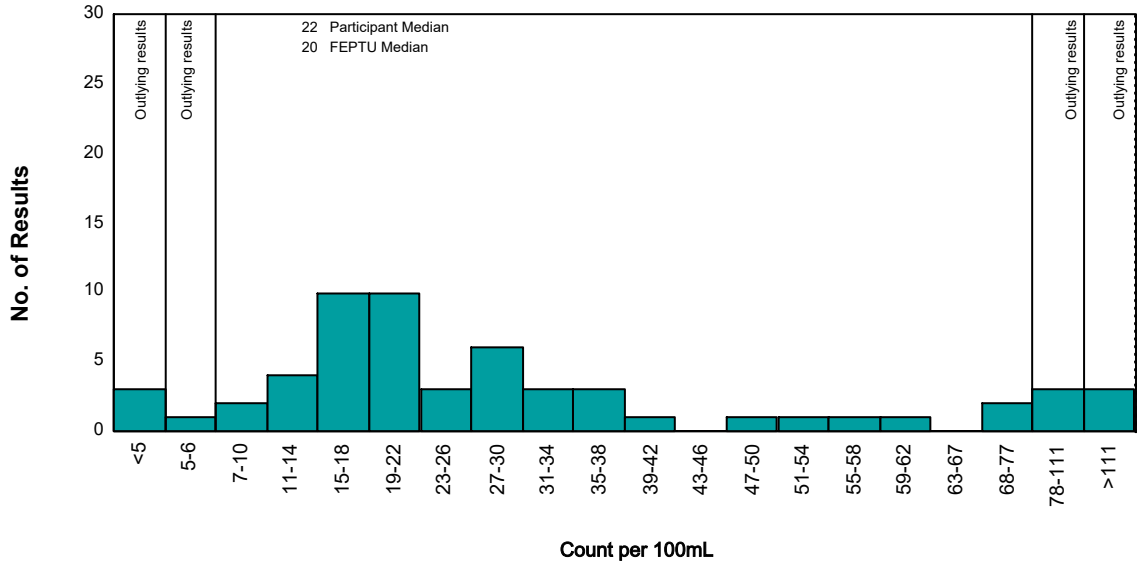
The fixed standard deviation value (*Opt* value) used for calculation of the z-scores is 0.35 for all parameters.

Parameter	Coagulase positive staphylococci	Coliform bacteria	<i>Escherichia coli</i>	Enterococci	<i>Pseudomonas aeruginosa</i>	Total staphylococci	Colony Count 37°C/24 h	Colony Count 37°C/48 h
FEPTU median	61	52	52	30	36	61	7	61
No. results returned	57	122	126	106	123	36	96	93
Assigned value (Participants median all)	63	59	59	40	33	66	3	62
Uncertainty of assigned value*	0.02	0.02	0.02	0.01	0.02	0.03	0.09	0.01
Participants mean (all results)	60	59	58	40	32	63	5	61
Expected Range	20 - 198	19 - 187	19 - 187	13 - 126	10 - 104	21 - 207	0 - 55	20 - 196
Standard deviation**	0.15	0.15	0.14	0.08	0.21	0.16	0.66	0.08
No of outlying counts	6	10	8	11	12	3	10	8
False positives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
False negatives	2	3	2	1	4	0	7	1
Your result								
Score for performance assessment								
Z-score								

* $U(X_{opt})$ is based on results transformed to a log₁₀ scale
** Robust S^* based on median absolute deviation about the participants' median (*MADe*)

Total sent samples	140
Not examined	11
Non returns	0
Late returns	0

S123A: Coagulase-positive staphylococci



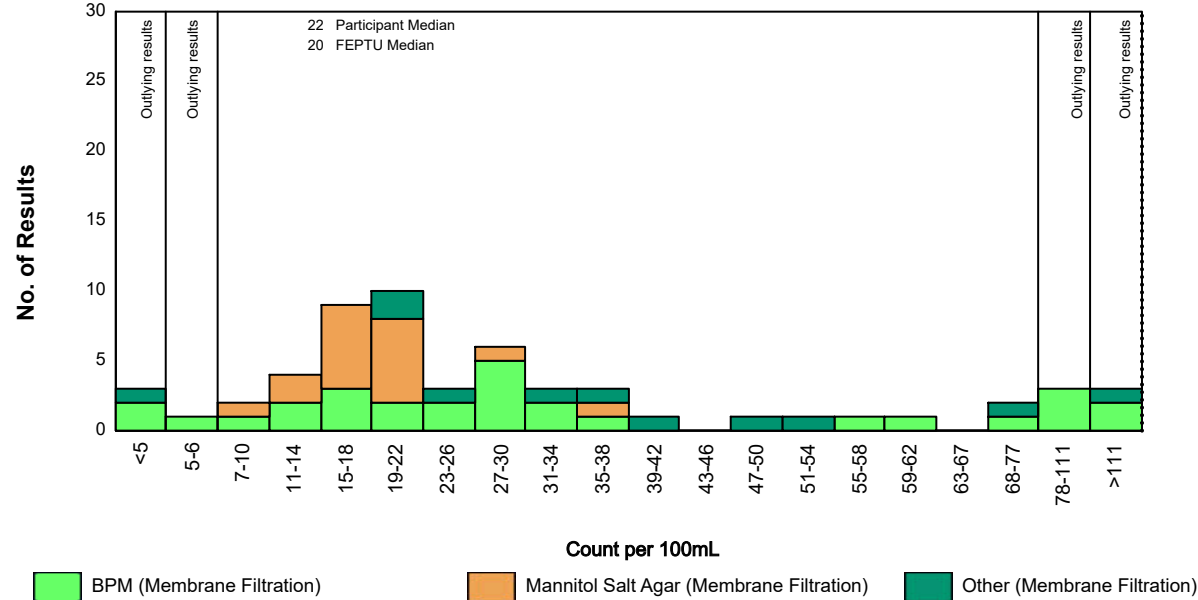
Method based presentation

S123A : Coagulase-positive staphylococci

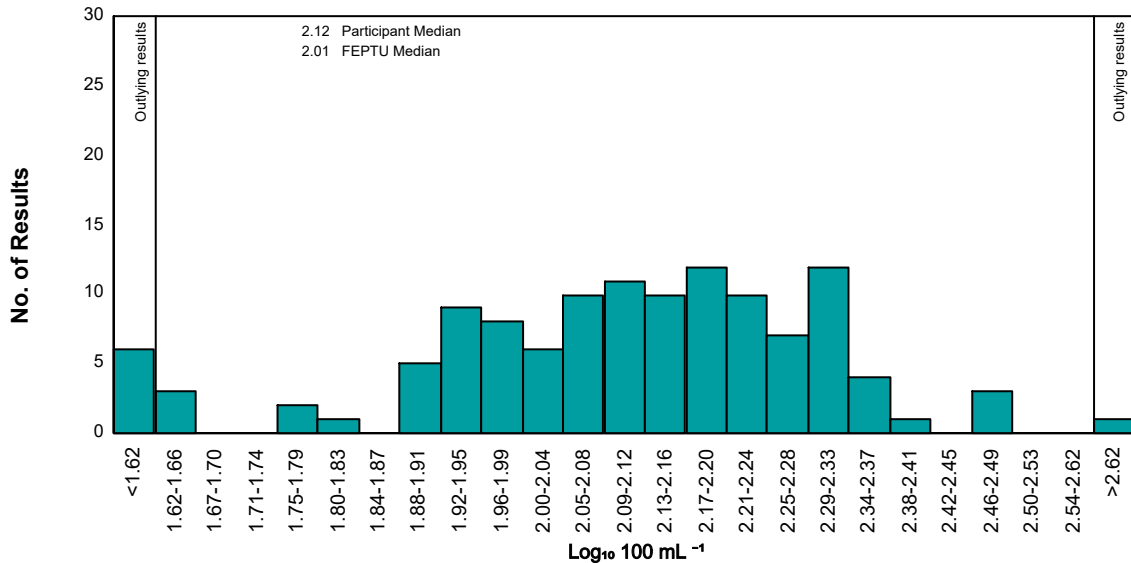
FEPTU Method: BPM

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
BPM	29	0	50	29	0.35	0 - 138
Mannitol Salt Agar	17	0	29	18	0.12	9 - 37
Other (Membrane filtration)	11	1	19	35	0.27	4 - 154

S123A: Coagulase-positive staphylococci



S123A: Coliform bacteria



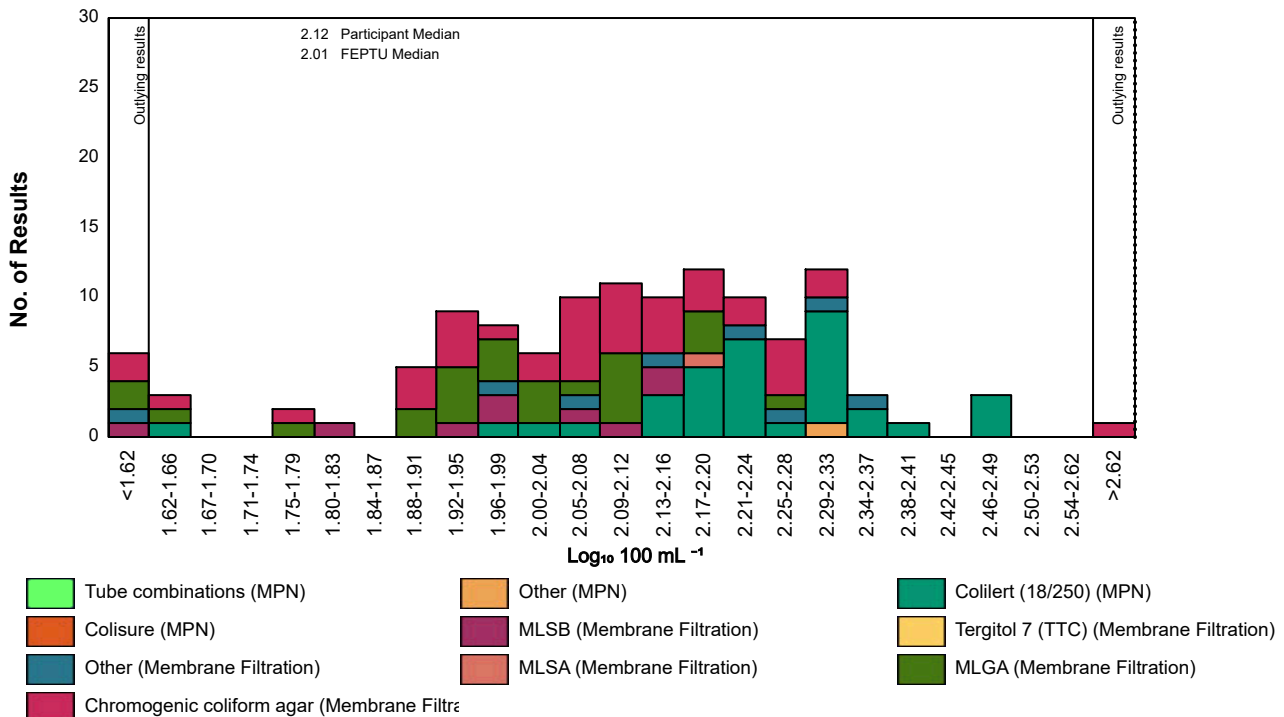
Method based presentation

S123A : Coliform bacteria

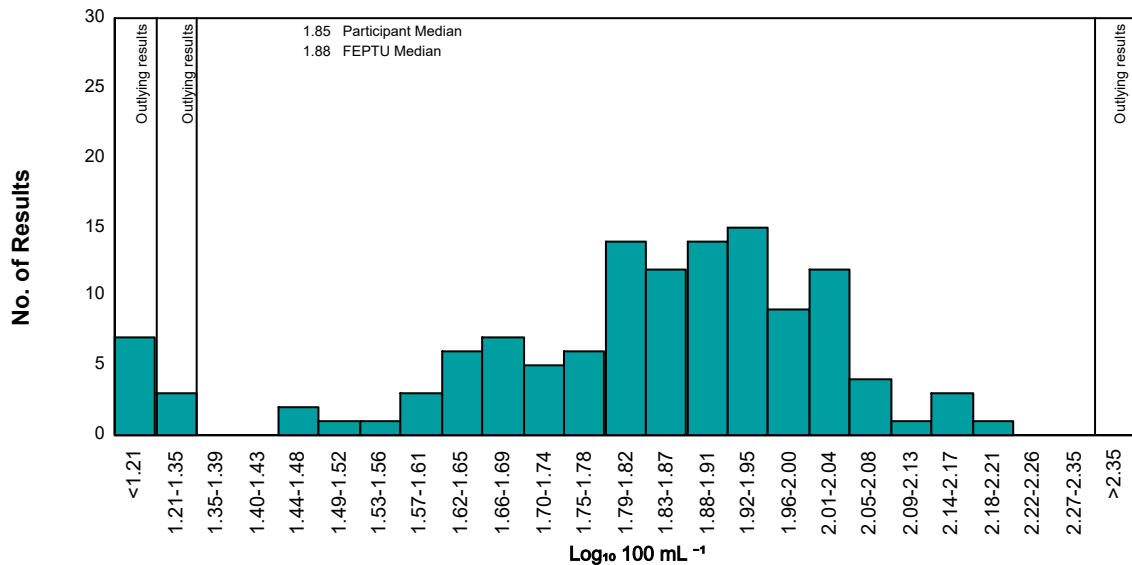
FEPTU Method: Chromogenic coliform
agar

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Tube combinations	0	0	0			-
Other (MPN)	1	0	0			-
Colilert (18/250)	34	1	28	168	0.11	45 - 310
Colisure	0	0	0			-
MLSB	9	0	7			-
Tergitol 7 (TTC)	0	0	0			-
Other (Membrane filtration)	8	0	6			-
MLSA	1	0	0			-
MLGA	26	1	21	99	0.15	17 - 192
Chromogenic coliform agar	41	0	34	120	0.17	11 - 1004

S123A: Coliform bacteria



S123A: *Escherichia coli*



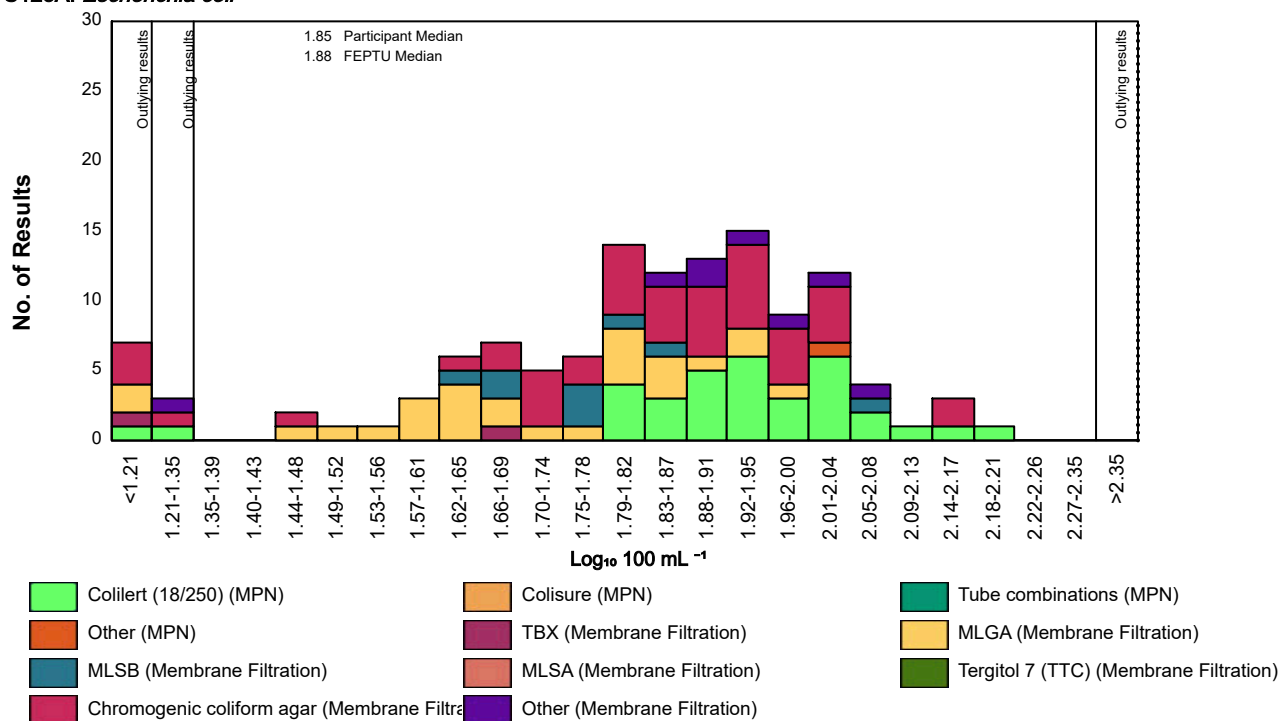
Method based presentation

S123A: *Escherichia coli*

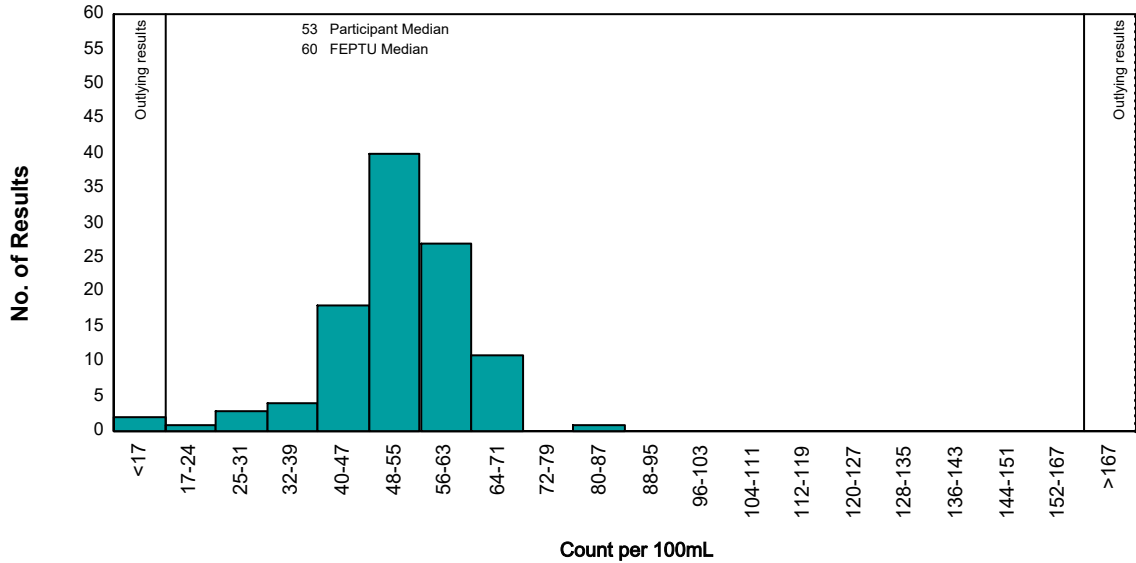
FEPTU Method: Chromogenic coliform
agar

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Colilert (18/250)	34	0	27	84	0.11	14 - 150
Colisure	0	0	0			-
Tube combinations	0	0	0			-
Other (MPN)	1	0	0			-
TBX	2	0	1			-
MLGA	27	0	21	48	0.17	0 - 92
MLSB	9	0	7			-
MLSA	0	0	0			-
Tergitol 7 (TTC)	0	0	0			-
Chromogenic coliform agar	44	0	35	71	0.15	0 - 140
Other (Membrane filtration)	8	0	6			-

S123A: *Escherichia coli*



S123A: Enterococci



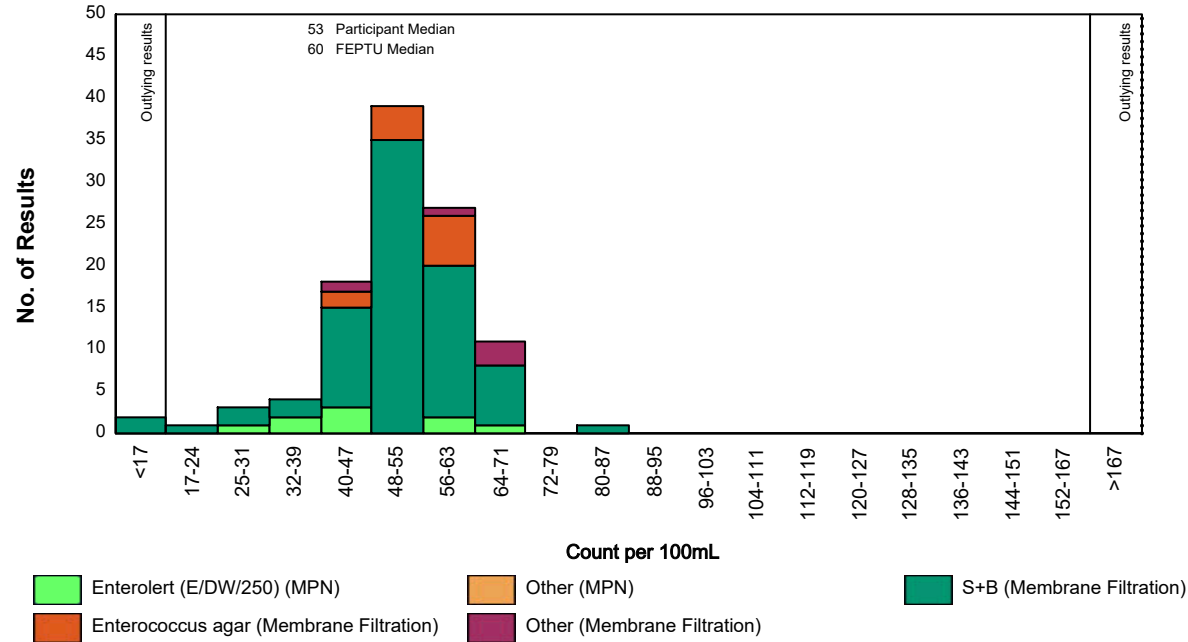
Method based presentation

S123A : Enterococci

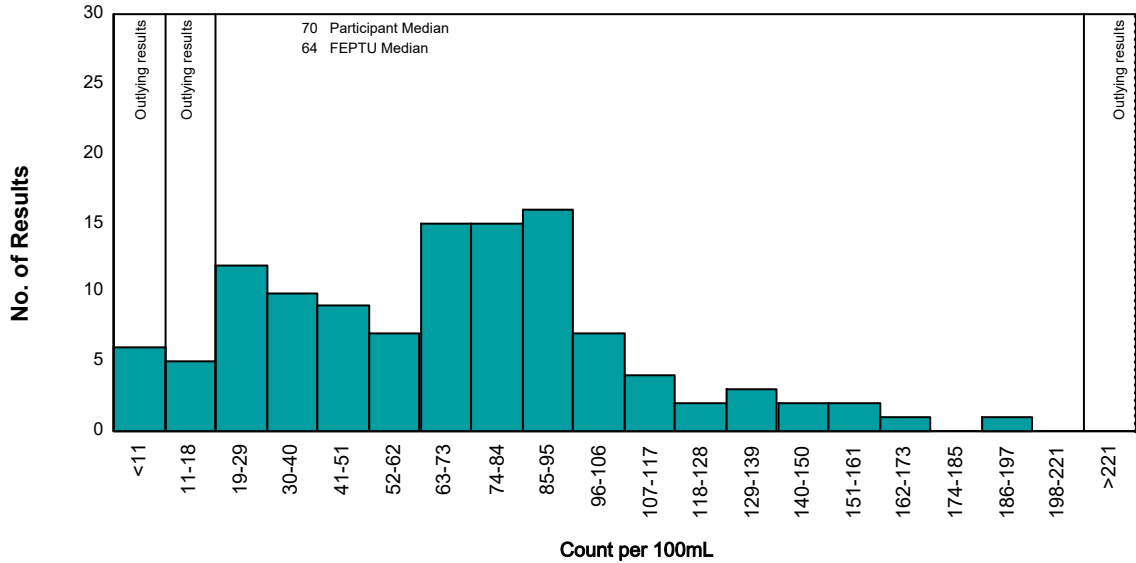
FEPTU Method: S+B

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Enterolert (E/DW/250)	9	0	8			-
Other (MPN)	0	0	0			-
S+B	80	0	75	53	0.06	15 - 86
Enterococcus agar	12	0	11	54	0.04	44 - 58
Other (Membrane filtration)	5	0	4			-

S123A: Enterococci



S123A: *Pseudomonas aeruginosa*



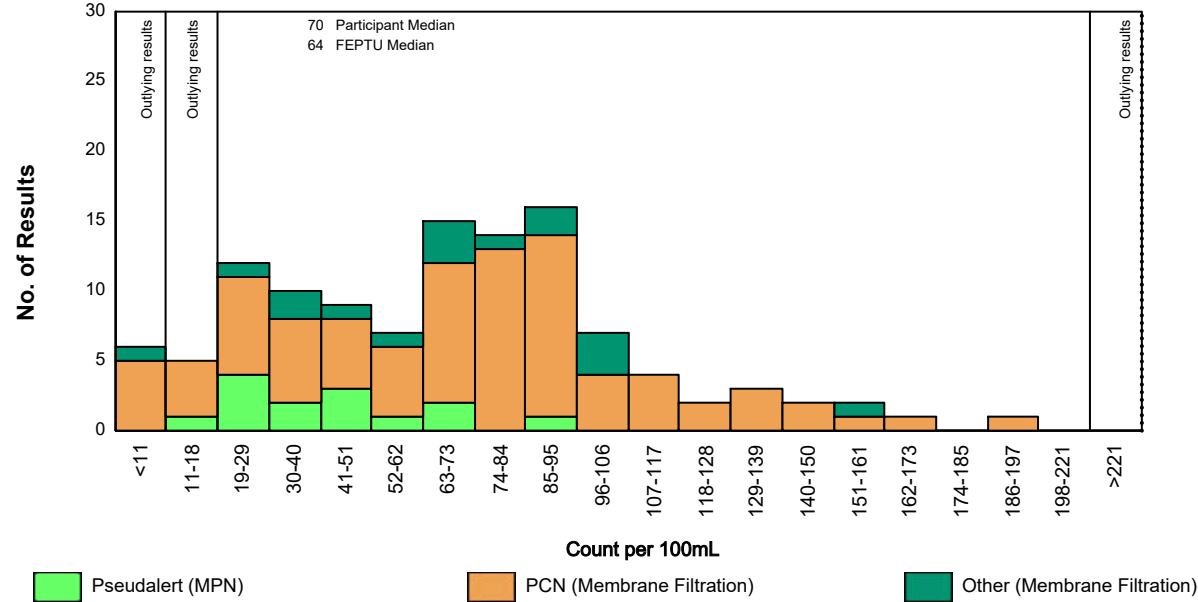
Method based presentation

S123A : *Pseudomonas aeruginosa*

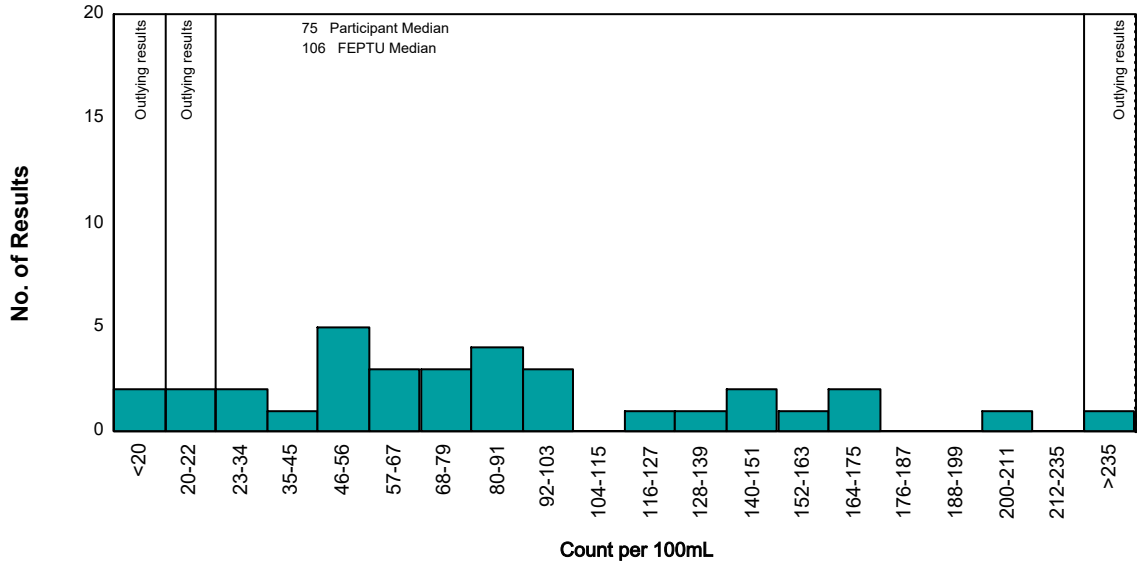
FEPTU Method: PCN

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Pseudalert	14	0	11	40	0.25	16 - 89
PCN	88	2	74	74	0.21	0 - 186
Other (Membrane filtration)	16	4	13	71	0.22	8 - 160

S123A: *Pseudomonas aeruginosa*



S123A: Total staphylococci



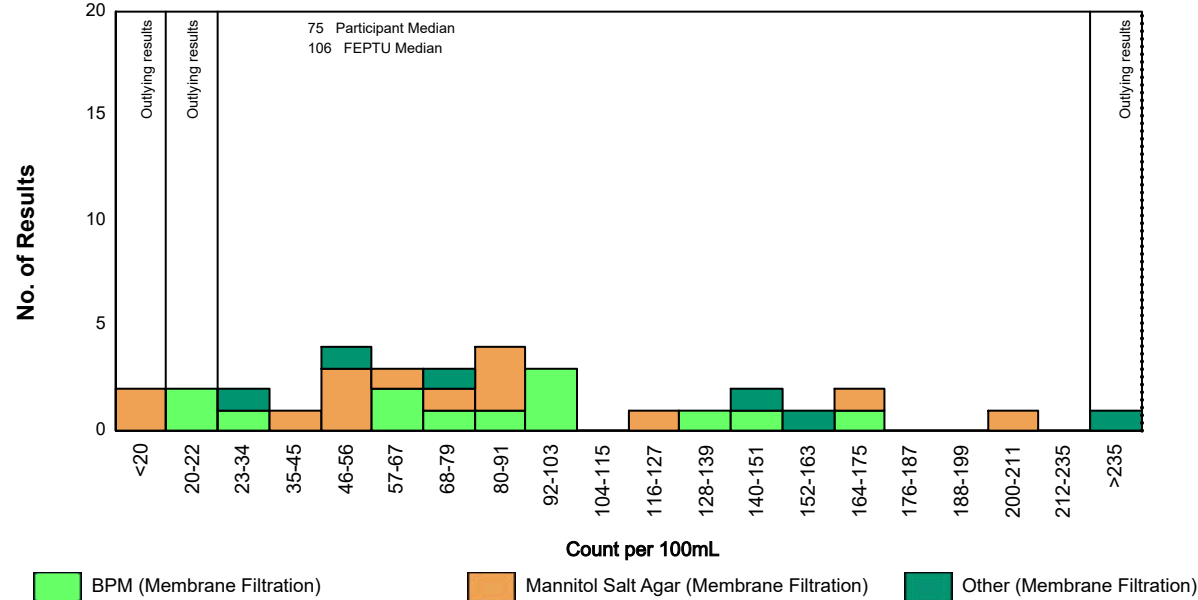
Method based presentation

S123A : Total staphylococci

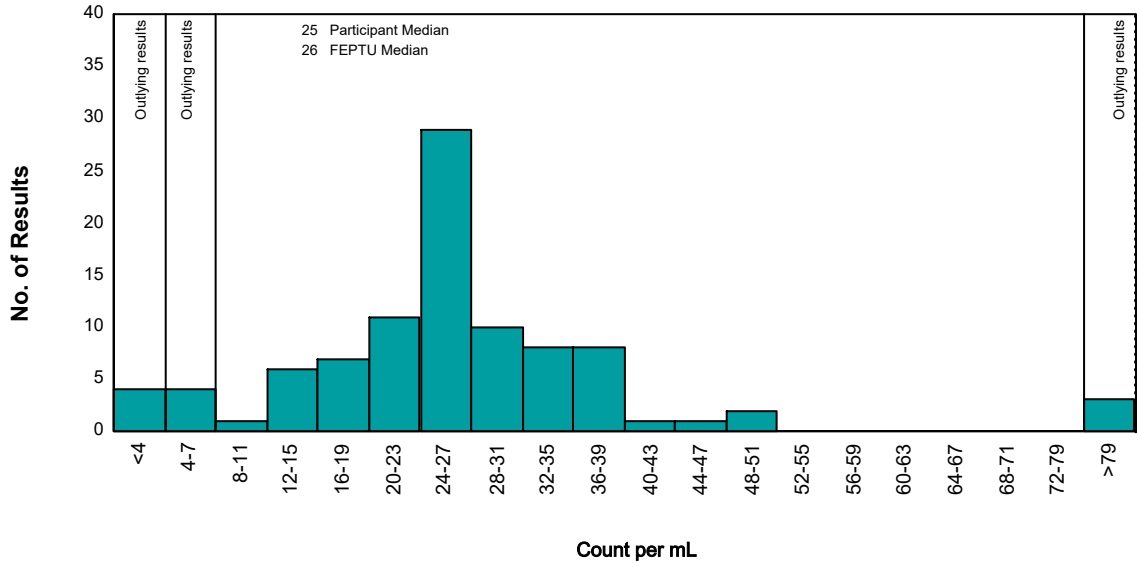
FEPTU Method: BPM

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
BPM	13	1	39	81	0.21	21 - 172
Mannitol Salt Agar	14	2	42	68	0.18	12 - 200
Other (Membrane filtration)	6	0	18			-

S123A: Total staphylococci



S123A: Colony Count 37°C/24 h



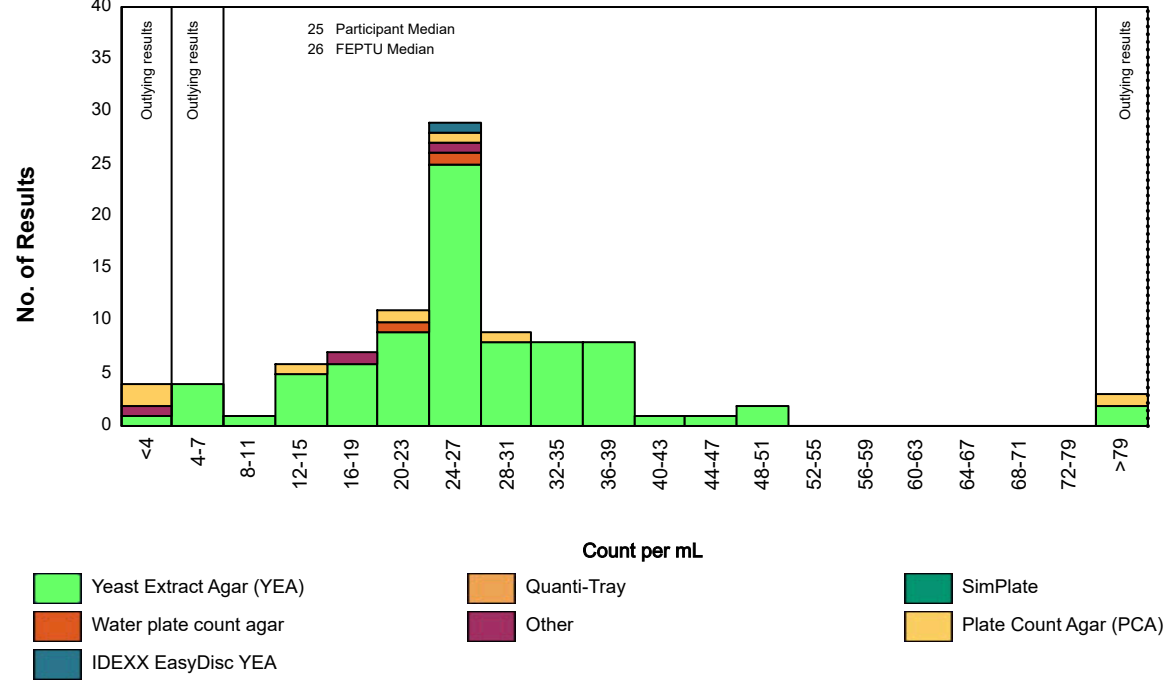
Method based presentation

S123A : Colony Count 37°C/24 h

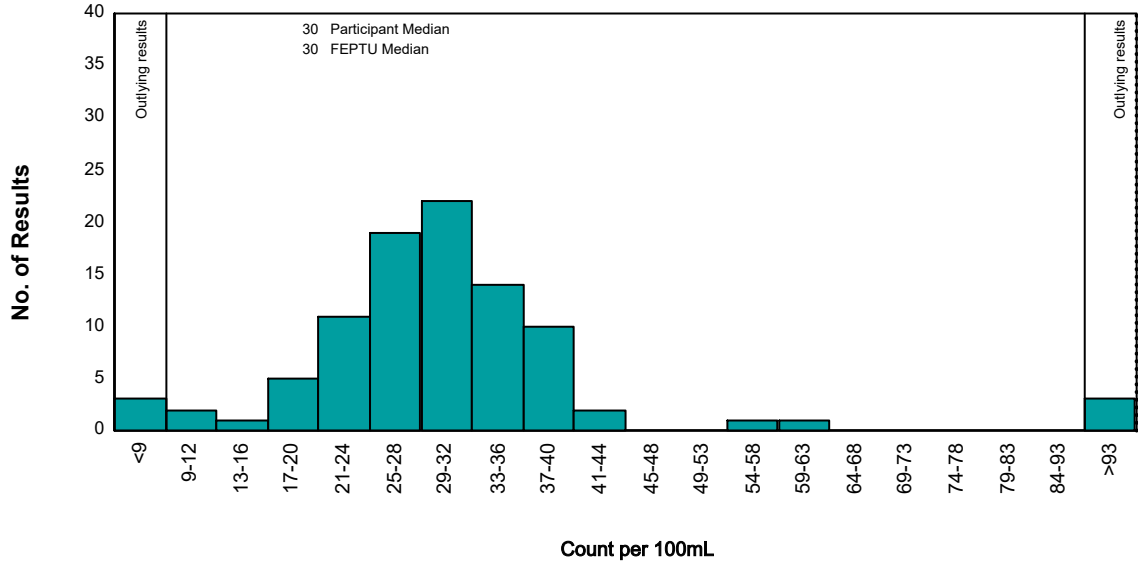
FEPTU Method: Yeast Extract Agar
(YEA)

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Yeast Extract Agar (YEA)	81	0	86	26	0.15	3 - 96
Quanti-Tray	0	0	0			-
SimPlate	0	0	0			-
Water plate count agar	2	0	2			-
Other	3	1	3			-
Plate Count Agar (PCA)	7	0	7			-
IDEXX EasyDisc YEA	1	1	1			-

S123A: Colony Count 37°C/24 h



S123A: Colony Count 37°C/48 h



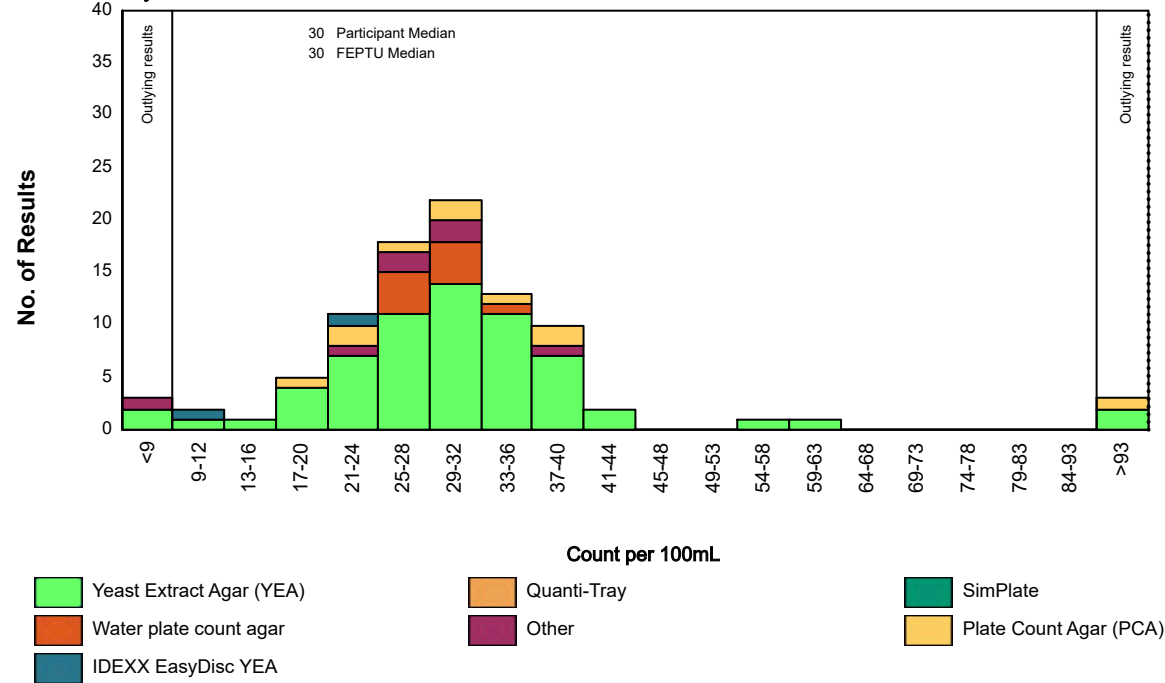
Method based presentation

S123A : Colony Count 37°C/48 h

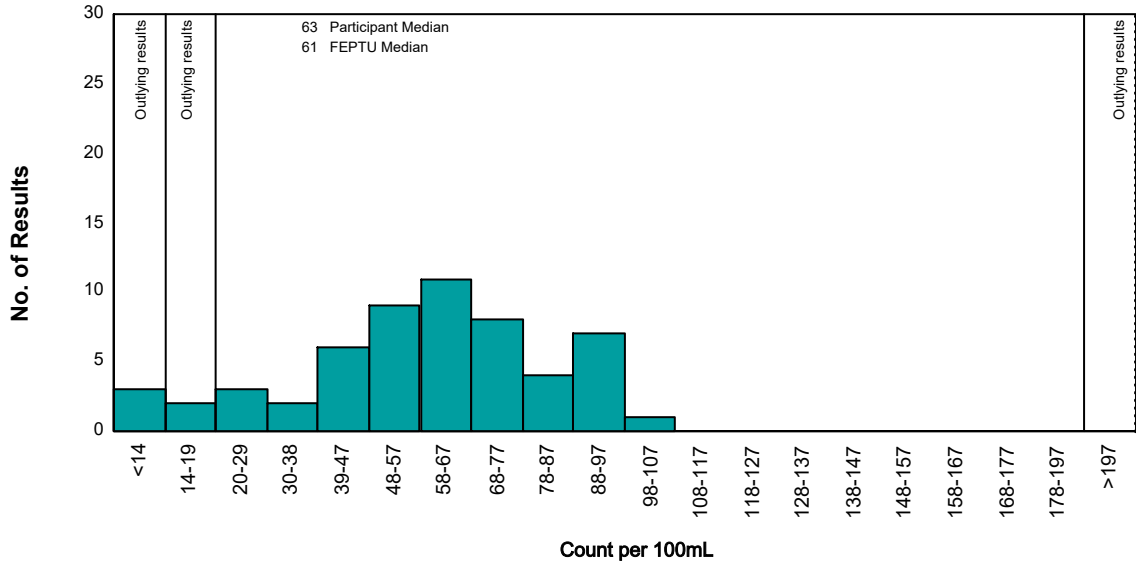
FEPTU Method: Yeast Extract Agar
(YEA)

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Yeast Extract Agar (YEA)	64	1	69	30	0.11	4 - 212
Quanti-Tray	0	0	0			-
SimPlate	0	0	0			-
Water plate count agar	9	0	9			-
Other	7	0	7			-
Plate Count Agar (PCA)	10	0	10	30	0.14	17 - 120
IDEXX EasyDisc YEA	2	0	2			-

S123A: Colony Count 37°C/48 h



S123B: Coagulase-positive staphylococci



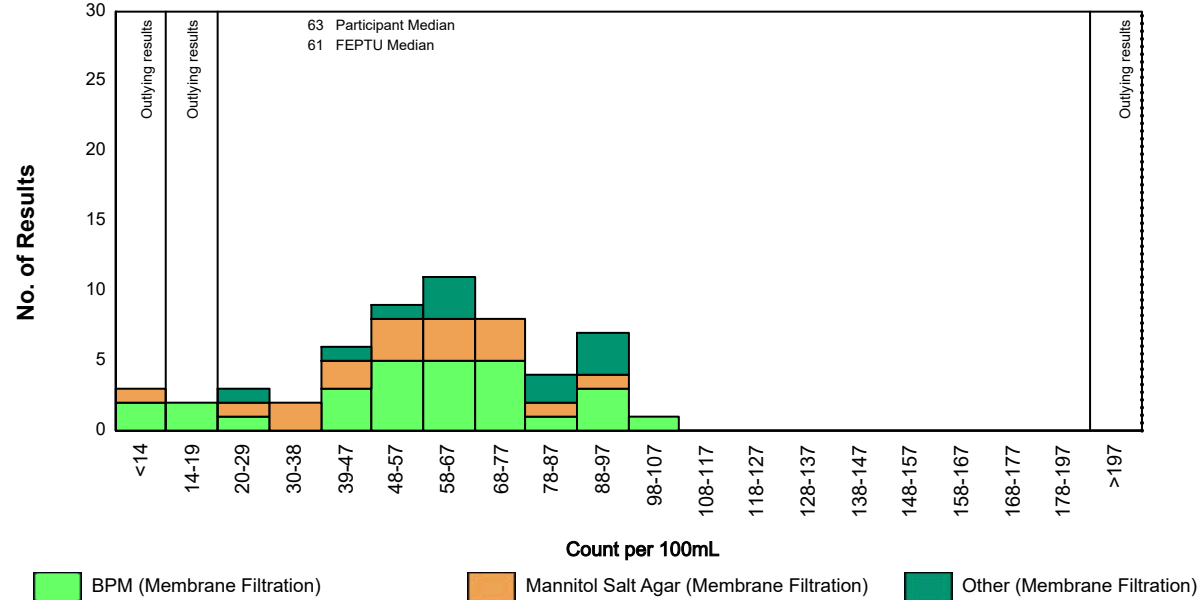
Method based presentation

S123B : Coagulase-positive staphylococci

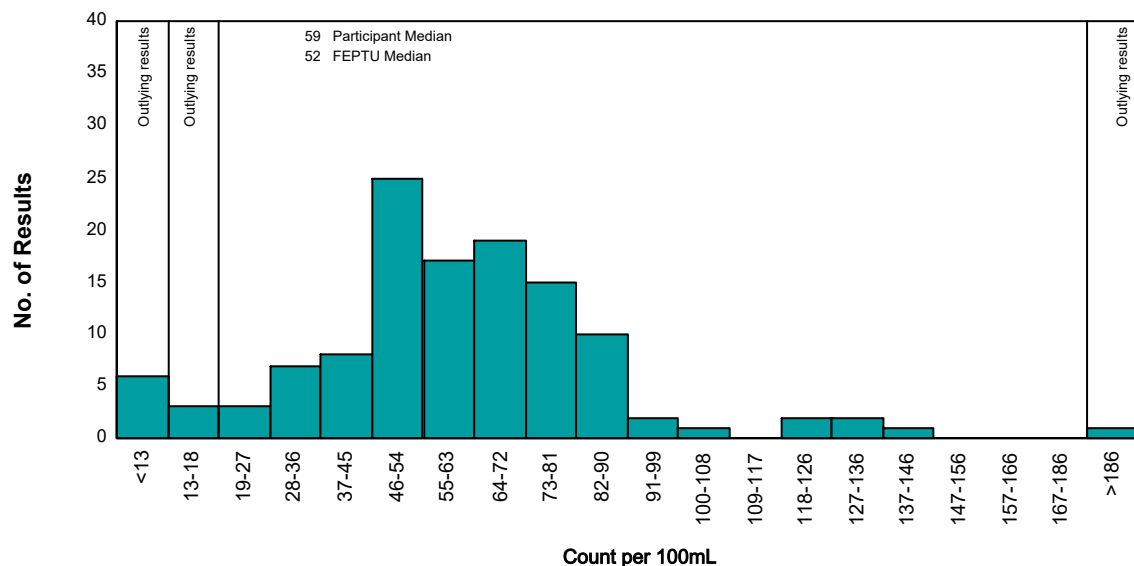
FEPTU Method: BPM

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
BPM	28	1	50	60	0.16	0 - 99
Mannitol Salt Agar	17	0	30	52	0.18	13 - 88
Other (Membrane filtration)	11	1	19	66	0.16	27 - 92

S123B: Coagulase-positive staphylococci



S123B: Coliform bacteria



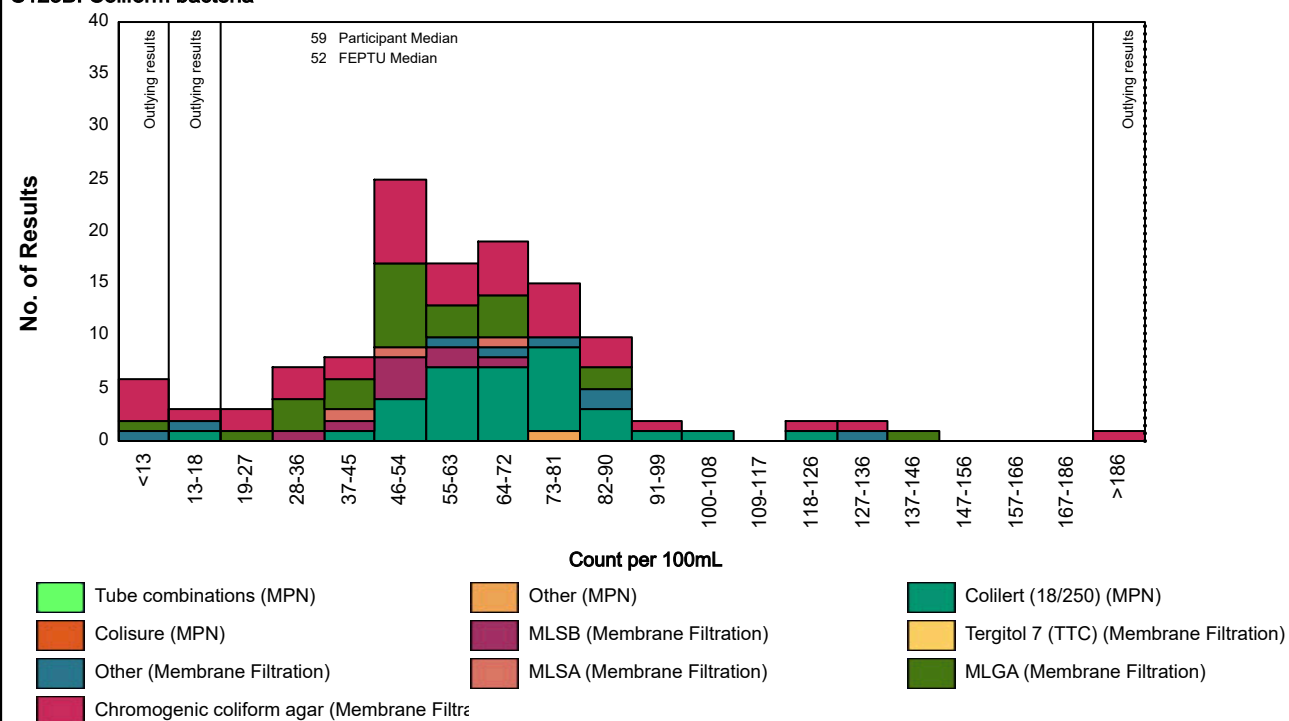
Method based presentation

S123B : Coliform bacteria

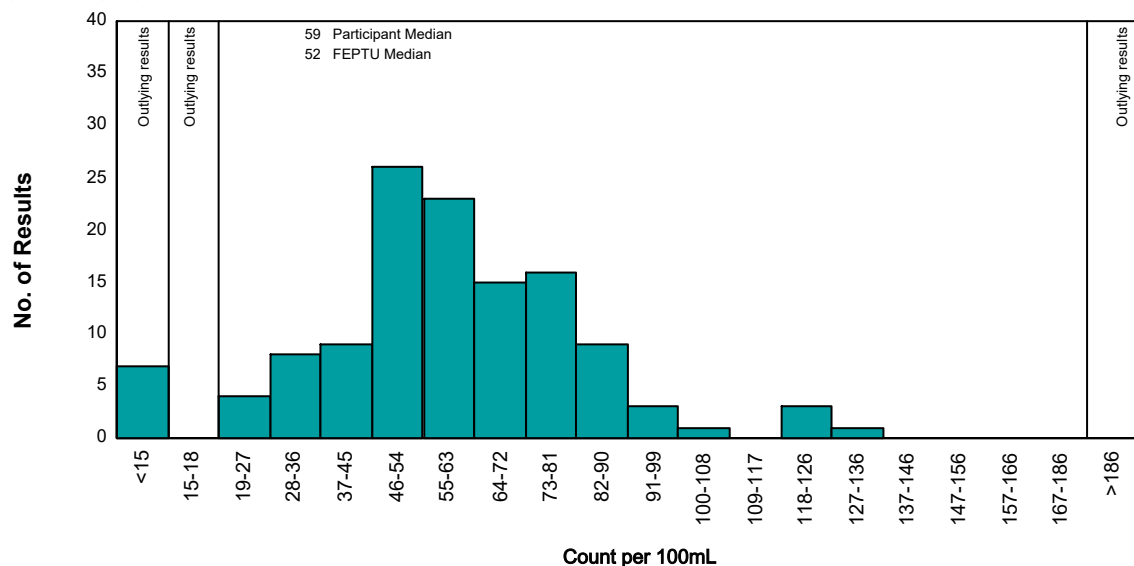
FEPTU Method: Chromogenic coliform agar

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Colilert (18/250)	34	1	27	66	0.09	14 - 118
Colisure	0	0	0			-
Tube combinations	0	0	0			-
Other (MPN)	1	0	0			-
Tergitol 7 (TTC)	0	0	0			-
Other (Membrane filtration)	8	0	6			-
MLSA	3	0	2			-
MLGA	26	0	21	52	0.16	2 - 138
Chromogenic coliform agar	41	0	33	55	0.21	0 - 1004
MLSB	9	0	7			-

S123B: Coliform bacteria



S123B: *Escherichia coli*



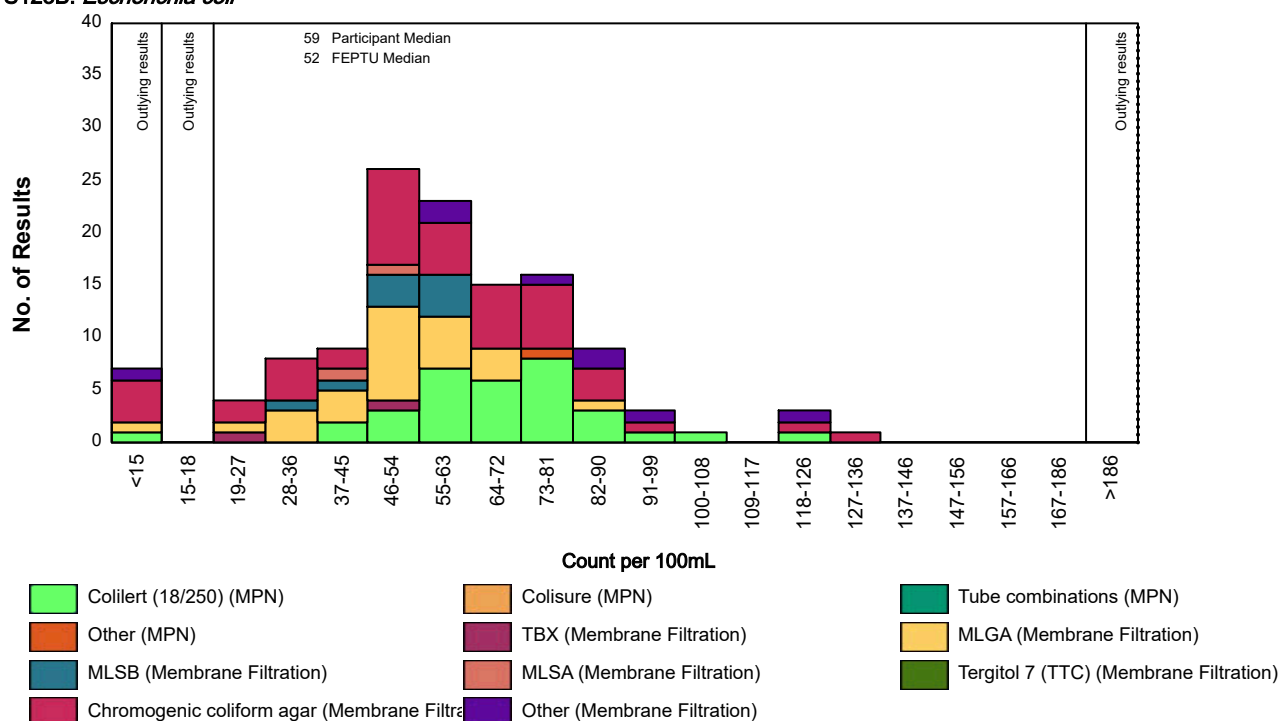
Method based presentation

S123B : *Escherichia coli*

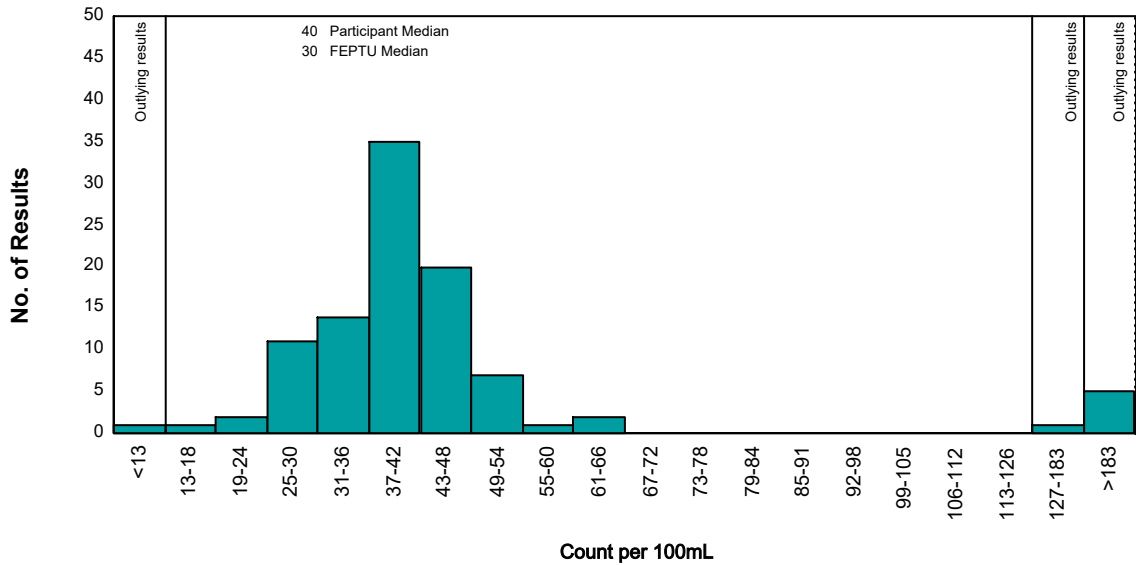
FEPTU Method: Chromogenic coliform
agar

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Colilert (18/250)	33	1	26	66	0.09	14 - 118
Colisure	0	0	0			-
Tube combinations	0	0	0			-
Other (MPN)	1	0	0			-
TBX	2	0	1			-
MLGA	26	0	20	52	0.11	2 - 89
MLSB	9	0	7			-
MLSA	2	0	1			-
Tergitol 7 (TTC)	0	0	0			-
Chromogenic coliform agar	44	0	35	56	0.18	0 - 130
Other (Membrane filtration)	8	0	6			-

S123B: *Escherichia coli*



S123B: Enterococci



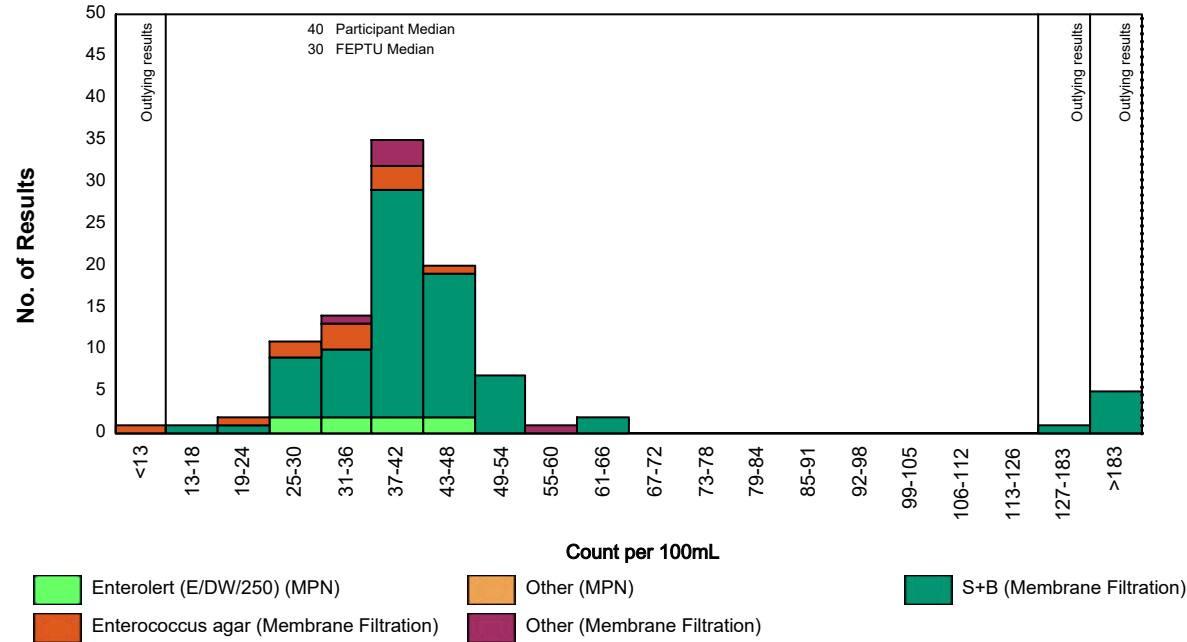
Method based presentation

S123B : Enterococci

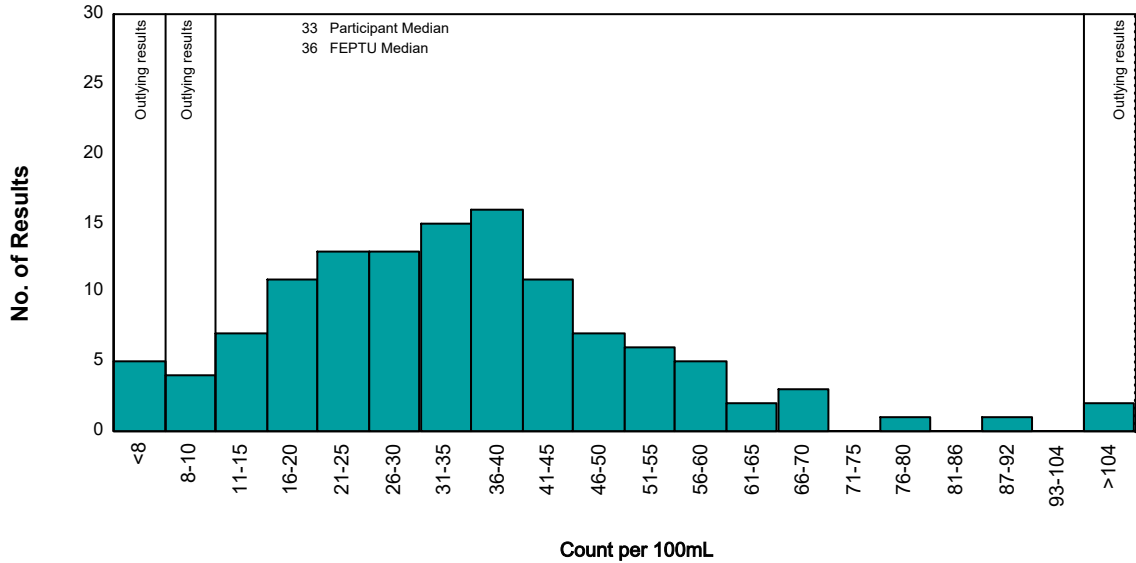
FEPTU Method: S+B

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Enterolert (E/DW/250)	8	0	8			-
Other (MPN)	0	0	0			-
S+B	76	6	76	41	0.08	13 - 4900
Enterococcus agar	11	1	11	32	0.08	0 - 44
Other (Membrane filtration)	5	0	5			-

S123B: Enterococci



S123B: *Pseudomonas aeruginosa*



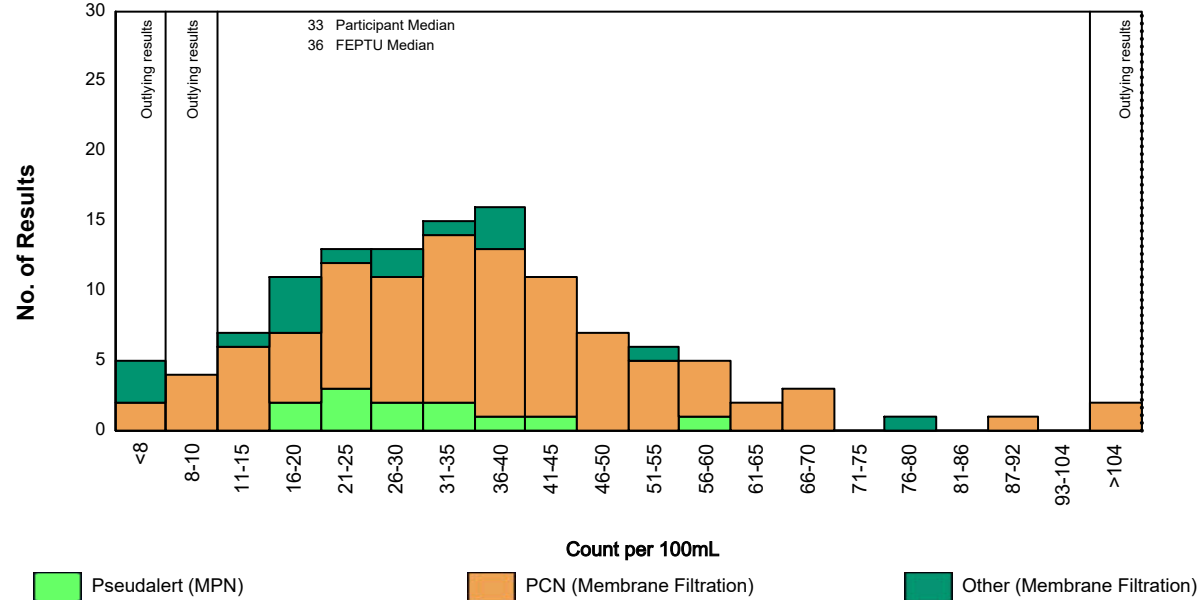
Method based presentation

S123B : *Pseudomonas aeruginosa*

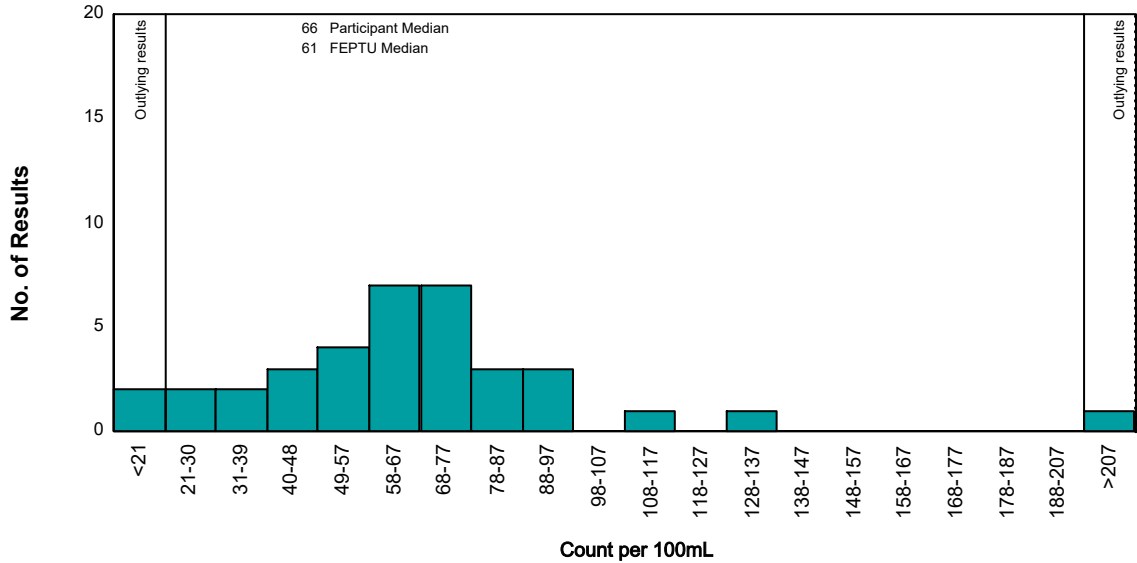
FEPTU Method: PCN

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Pseudalert	12	0	9	29	0.14	19 - 59
PCN	93	0	76	35	0.20	0 - 125
Other (Membrane filtration)	17	1	13	25	0.25	0 - 80

S123B: *Pseudomonas aeruginosa*



S123B: Total staphylococci



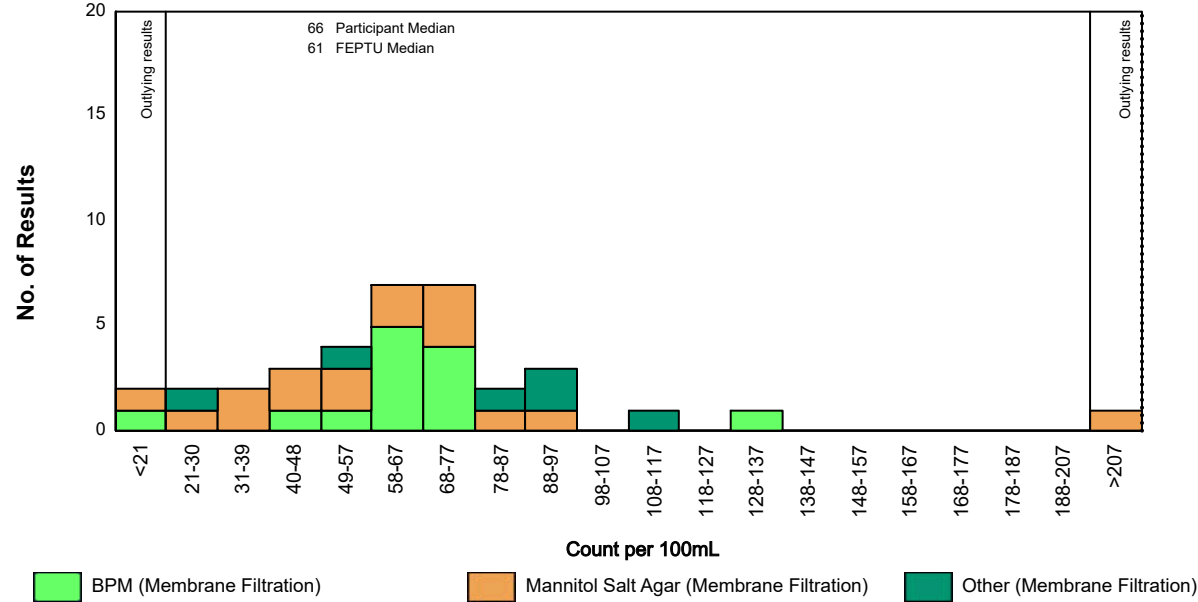
Method based presentation

S123B : Total staphylococci

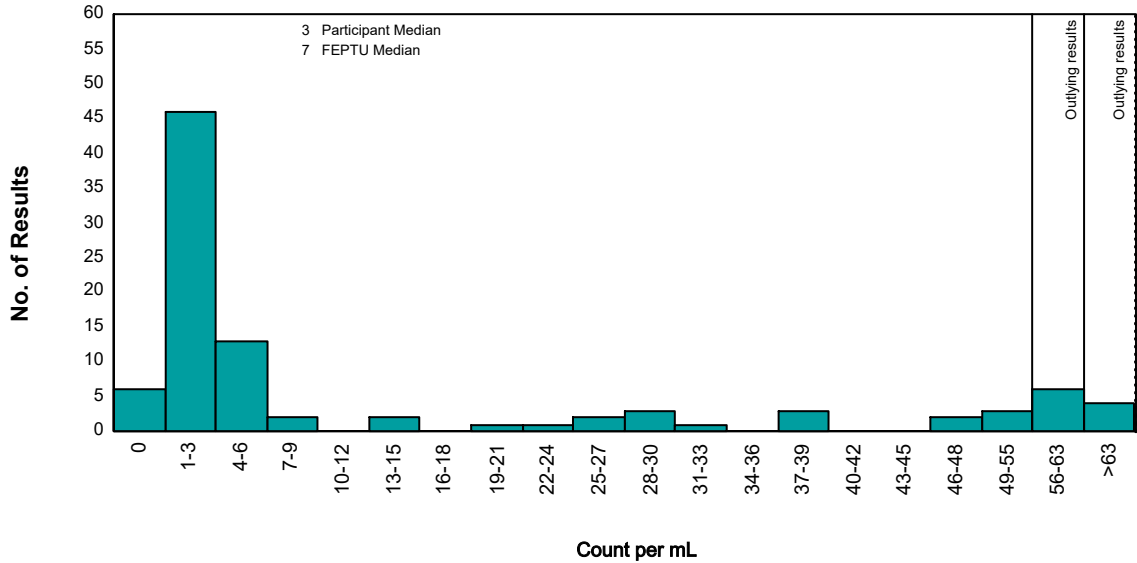
FEPTU Method: BPM

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
BPM	13	1	37	64	0.08	10 - 135
Mannitol Salt Agar	16	0	45	59	0.19	14 - 221
Other (Membrane filtration)	6	0	17			-

S123B: Total staphylococci



S123B: Colony Count 37°C/24 h



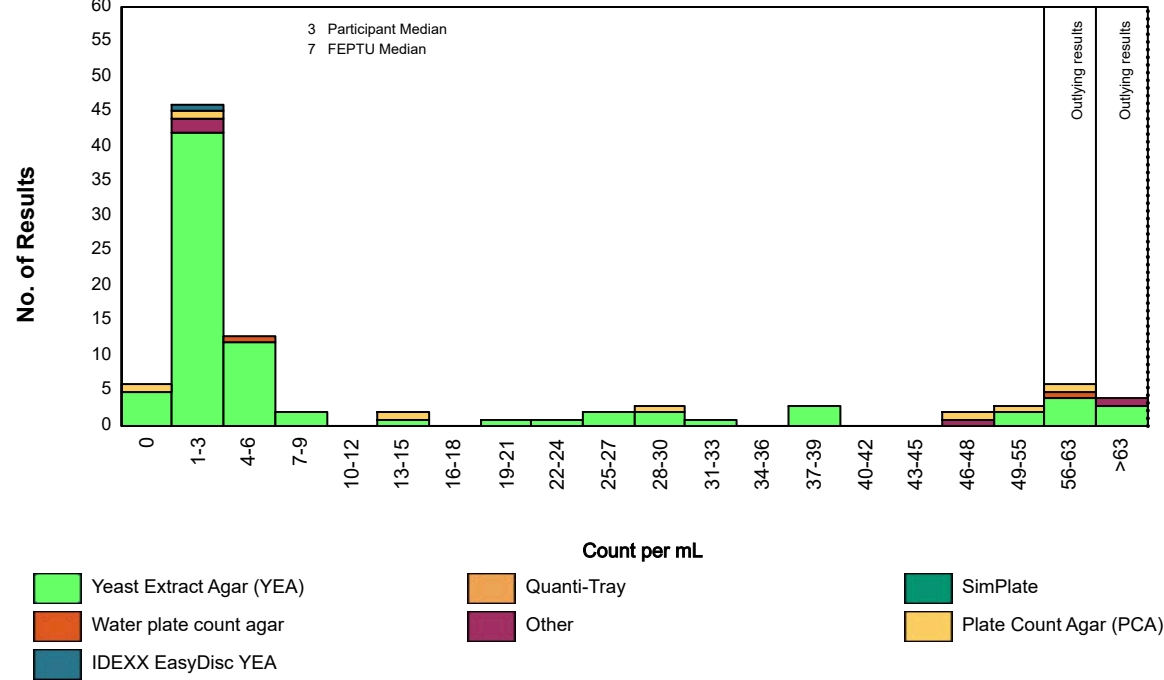
Method based presentation

S123B : Colony Count 37°C/24 h

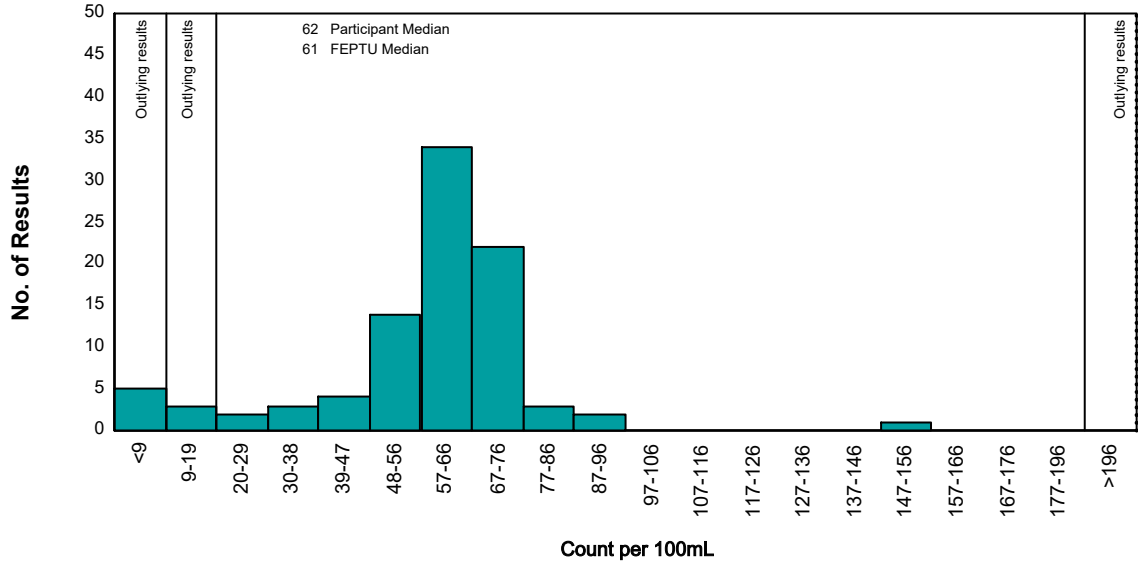
FEPTU Method: Yeast Extract Agar
(YEA)

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Yeast Extract Agar (YEA)	81	1	85	3	0.54	0 - 118
Quanti-Tray	0	0	0			-
SimPlate	0	0	0			-
Water plate count agar	2	0	2			-
Other	4	0	4			-
Plate Count Agar (PCA)	7	0	7			-
IDEXX EasyDisc YEA	1	1	1			-

S123B: Colony Count 37°C/24 h



S123B: Colony Count 37°C/48 h



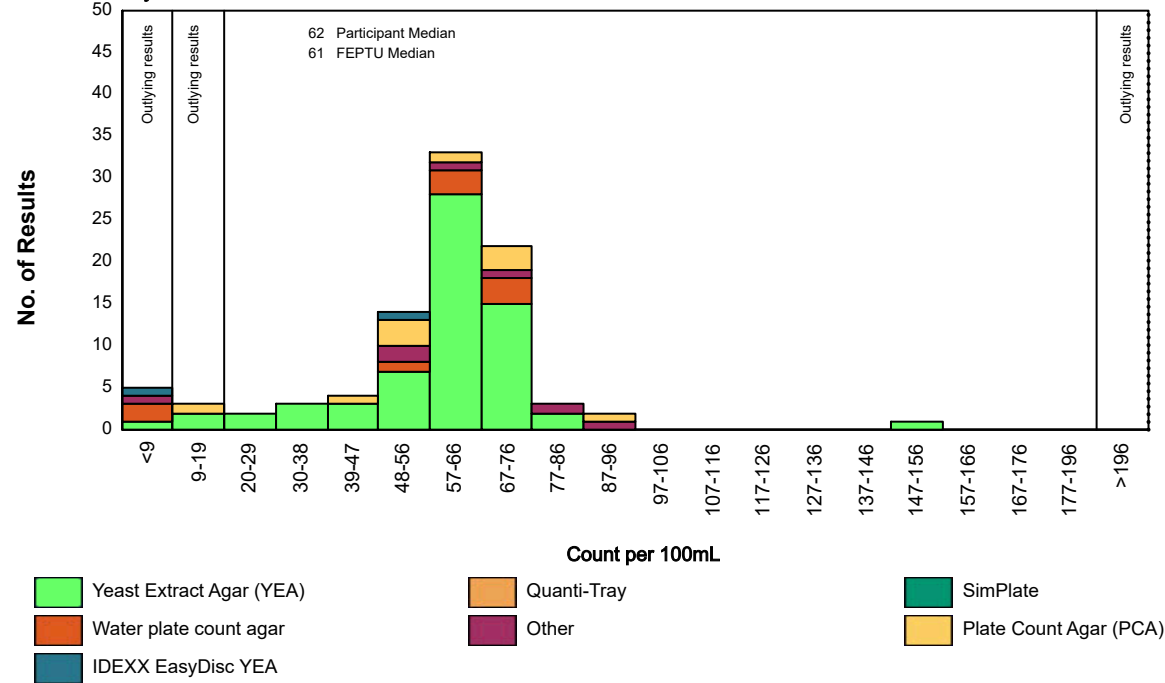
Method based presentation

S123B : Colony Count 37°C/48 h

FEPTU Method: Yeast Extract Agar
(YEA)

Method	Number of Results	Excluded Results	Percentage of the total	Median	Robust S* (Log ₁₀)	Range Reported
Yeast Extract Agar (YEA)	64	1	69	62	0.06	0 - 156
Quanti-Tray	0	0	0			-
SimPlate	0	0	0			-
Water plate count agar	9	0	9			-
Other	7	0	7			-
Plate Count Agar (PCA)	10	0	10	59	0.13	15 - 89
IDEXX EasyDisc YEA	2	0	2			-

S123B: Colony Count 37°C/48 h



Sample specific comment

S123A – *Pseudomonas aeruginosa*

A Kolmogorov–Smirnov test showed that the data for this examination was not evenly distributed. Therefore the 11 laboratories reporting a count outside the expected range have been awarded a score of 2. Participants are advised to review their z-scores with caution.

S123B – Colony count 37°C/24 h

A Kolmogorov–Smirnov test showed that the data for this examination was not evenly distributed. The standard deviation was also wide, the ten laboratories reporting a count outside the expected range have been awarded a score of 2. Participants are advised to review their z-scores with caution. This strain of *Pediococcus pentosaceus* in the sample gave variable grow pattern (as shown in the graph on page 18) when read at 24 hours.

General comments

Method based presentation of enumeration results:

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

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 contact us if you require this information 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

