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Measurement Uncertainty

EURL-*Campylobacter* workshop 2025

Gunnar Andersson, EURL-*Campylobacter*, 30 September

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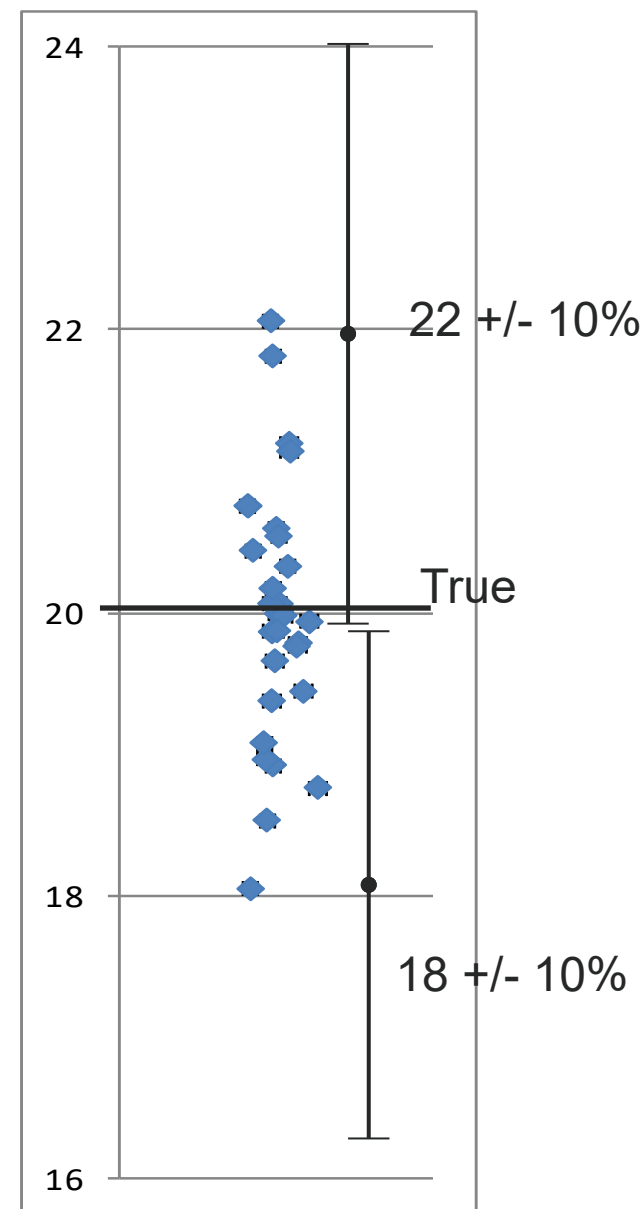
Aim

- Evaluate if measurement uncertainty is within acceptable limits

- Identify difficulties in the estimation and reporting of measurement uncertaiinty in the proficience tests

- Propose possible improvements of instructions and protocol

- Update on measurement uncertainty database

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Guidance values of acceptable MU for enumeration

Table 1: Enumeration with colony-count technique (in $\log_{10}$ cfu/g).
*Source: AFSSA opinion, 2008[5]

|	Homogeneous matrix		Heterogeneous matrix	
Total number of colonies	Method without confirmation	Method with confirmation	Method without confirmation	Method with confirmation
≤5	0,7	0,7	0,7	0,8
6-10	0,5	0,6	0,6	0,7
11-15	0,4	0,5	0,5	0,6
16-150 or 16-300, depending on the method	0,3	0,5	0,5	0,6

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What protocol was used for Technical U?

- EN ISO 19036:2019 (18)

- ISO/TS 19036:2006/Amd 1:2009 (3 lab)

- NMKL No 8 (2008) (1 lab)

- ISO 16140-3:2021 and EN ISO 19036:2019 (1 lab)

- Did you encounter problems?

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What was reported

- Technical uncertainty

- 23/ 30 reports

- Total uncertainty

- 17/30 reports

Technical uncertainty
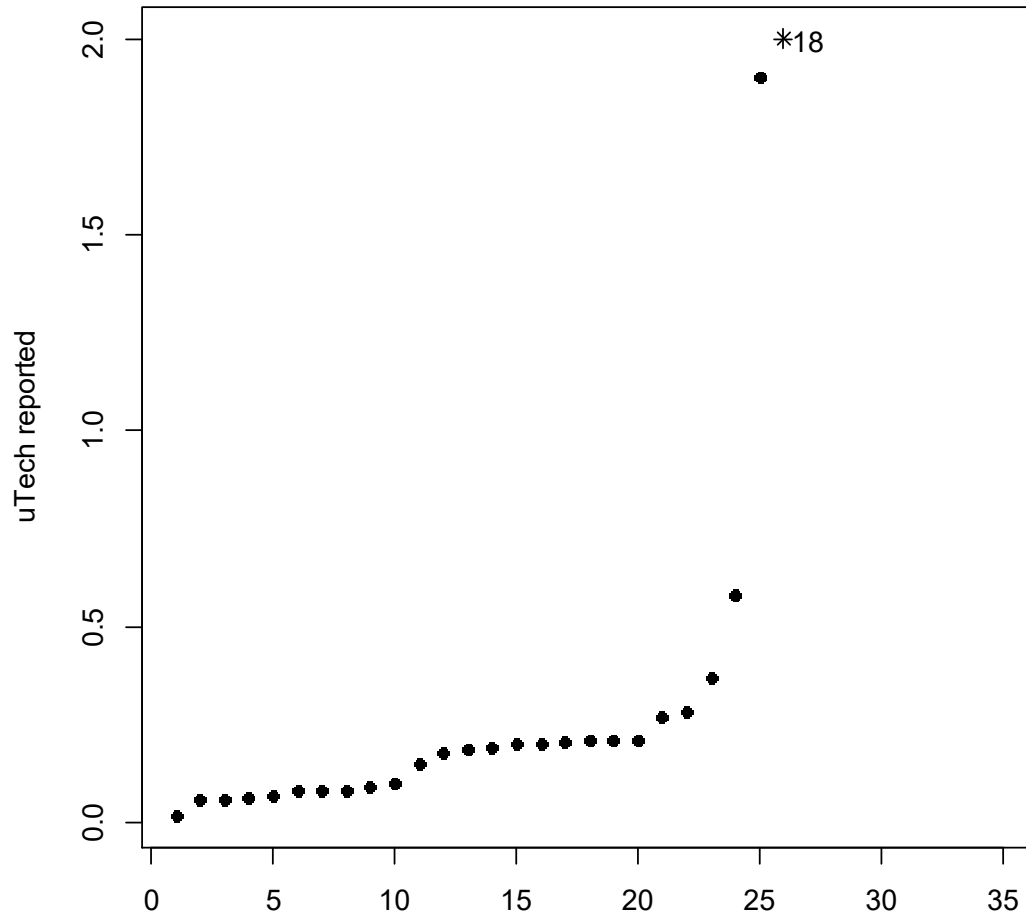
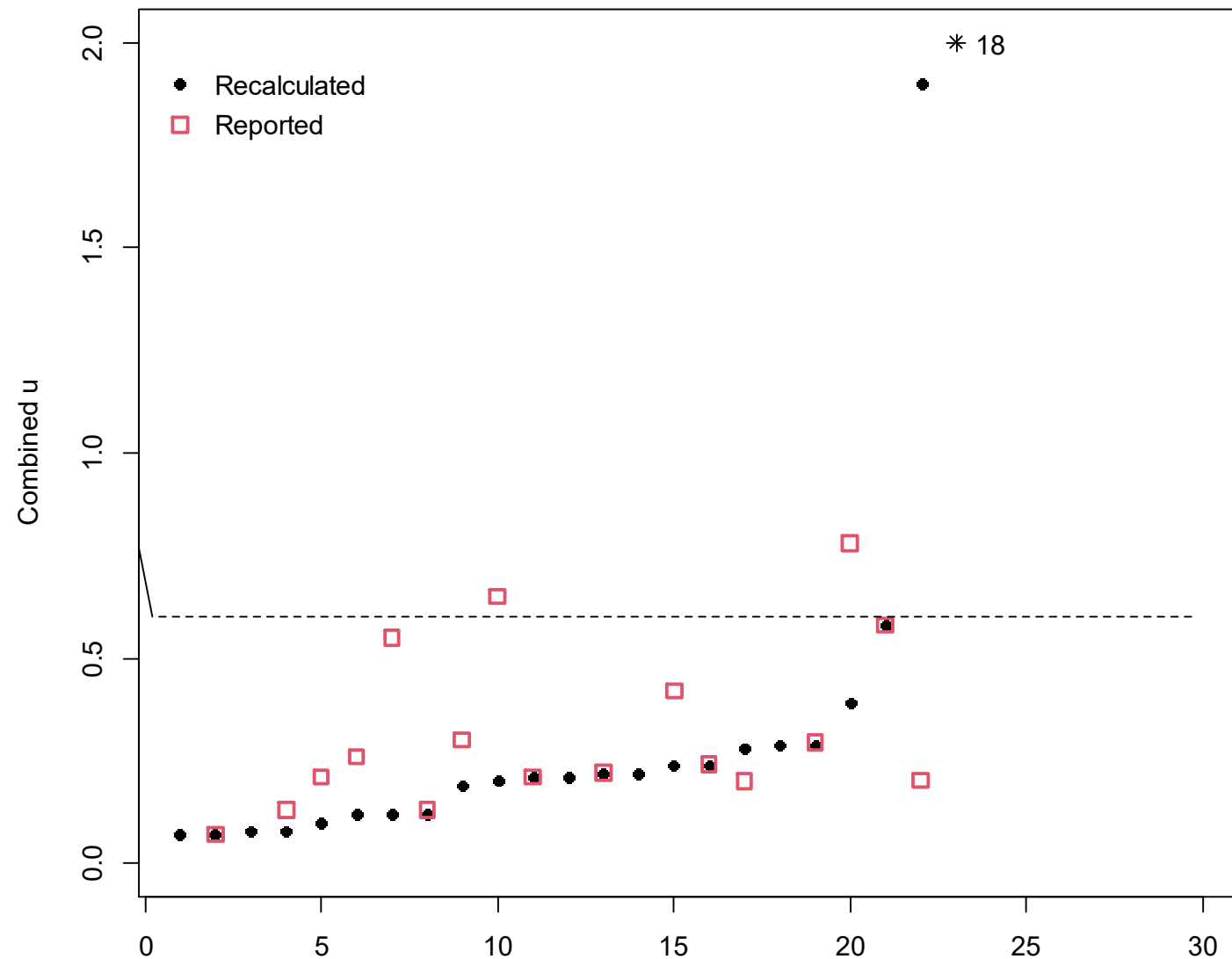## Deviating responses

- 18!   (data format error?)

- 0.21 log cfu

- 0,28 log10

- ± 0,06

- SR = 0.10 (log10) cfu/g

- Not estimated for ISO 10272-2. For corresponding NMKL 119 method, the technical uncertainty was estimated to 0.27 log cfu/g.

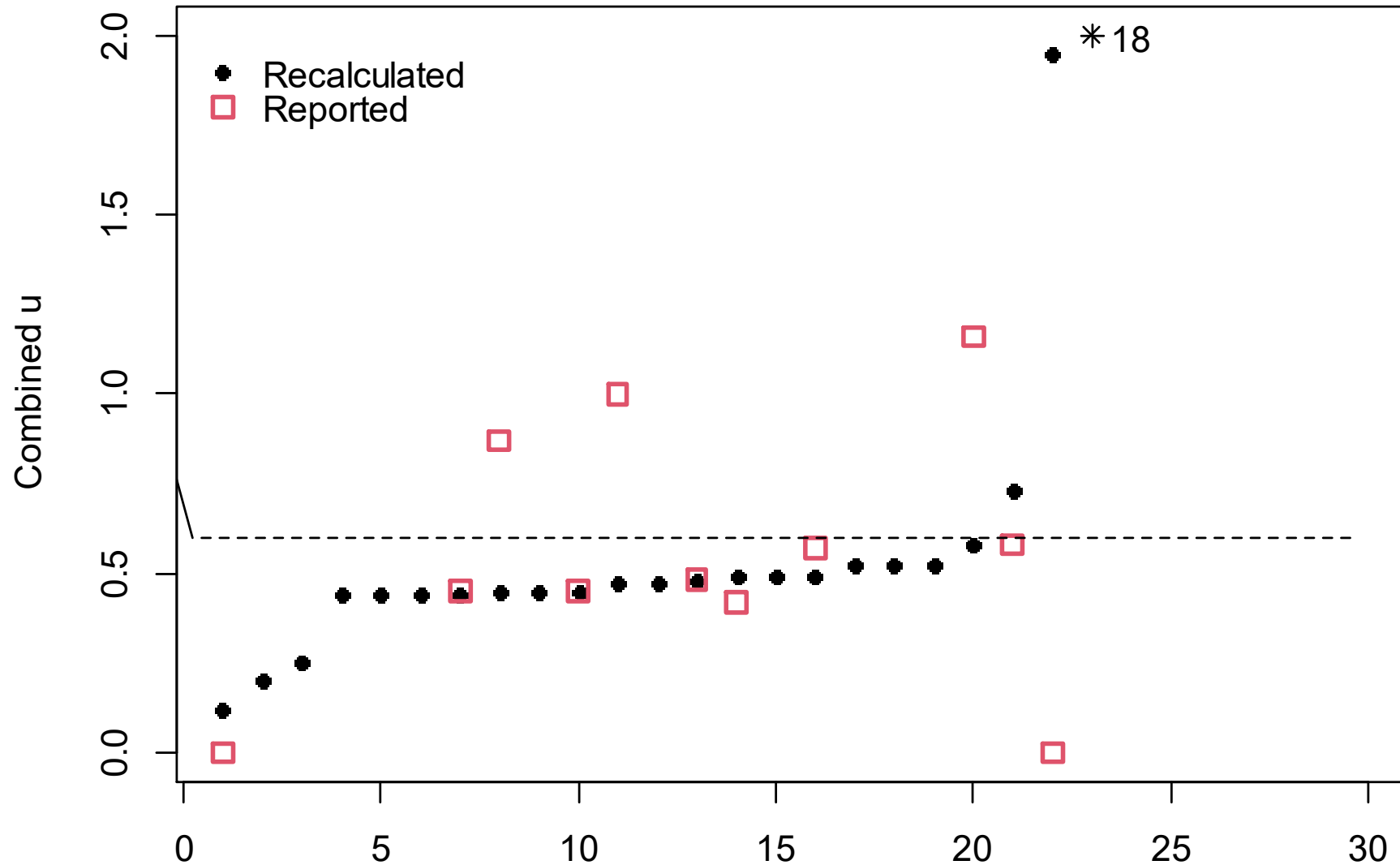- Are the instructions still ambigous regarding format of response?

Combined Uncertainty

Combined uncertainty sample 1

Combined uncertainty cont.

Combined uncertainty sample 3

Low count, not detected
by all labs

Some labs do not estimate
d_{dist} for negative samples

Combined u, reported vs recalculated

- u with same value   (3 labs)

- u with almost same value (rounding?)   (1 lab)

- Same value except when negative counts   (1 lab)

- Matrix u not provided   (1 lab)

- U (2*u) instead of u   (3 labs)

- u_{tech} reported as u   (1 lab)

- +/- u_{tech} (2 labs)

- +/- 2*u_{tech} (2 labs)

- Did not report combined uncertainty   (6 labs)

- Odd value (add sd instead of var?)   (2 labs)

- Odd value, no hypothesis   (2 labs)

Conclusions

- The measurement uncertainty is generally acceptable

- Ambiguity in the reported uncertainty (u or U or u_{tech})

- Calculations may be a challenge for some labs

- The questions on MU needs to be further clarified to obtain unambigeous responses

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A new matrix uncertainty database

- At present, values of MaU can be obtained from the EURL database

- A French database, from 2020, hosts values of MaU from 78 experiments

- A project group of the, ISO/TC 34/SC 9/WG 2 "statistics" will merge the databases into one, hosted by the SC 9 website

- The projectgroup will present a proposal at the ISO/TC 34/SC 9/WG 2 on the 29th of November

- Pilot version sumbitted to SC9

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User interface

- Excel file for download

- Tables created by R-script
  - Update by R-script

- Interface using text match and filter
  - Catergory-type search
  - Free text search

Search by type and category

ISO/TC 34/SC 9/WG 2 database of matrix uncertainty (MaU, according to ISO 19036, clause 6.4)

Select a category, type and matrix (defined in ISO 16140-2, Annex A) from drop-down lists (green cells, line 4, columns A, C, E).
Or use free-text search below (green cells A11 & E11).

Select a category		Select a type		Select a matrix (item)		MaU
Raw milk and dairy products	▼	Raw milk-based products with high fat content and/or high background flora		Raw milk based soft cheese		0,14

Description of category		Descripton of type		Info on selected matrix (item)		Info on experiment(s)
Insert description of Category: Raw milk and dairy products		Insert description of Type: Raw milk-based products with high fat content and/or high background flora		General comments: Camembert de Normandië, lot 157211, tht 27-07-2021		Value from 1 experiments: Lm NL matrix 1 Conducted in The Netherlands following protocol(s) 1 sample X 11 test portions

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Free-text search

Search text	Hits	Select from hits	MaU
shrimp	COOKED AND CHILLED WHOLE SHRIMP	mixed salad (pasta, mozzarella, raw vegetables, Speck ham)	0,1

Hits (cont.)	Category of selected matrix (item)
Raw Frozen Shrimp	Multi-component foods or meal components
Raw shrimp	
Unpeeled cooked shrimps	
North sea shrimp (Crangon crangon)	

Type of selected matrix (item)

Mayonnaise-based deli salads (acid) with processed ingredients

Hint: for more information, select a type and a category from the drop-down menus

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Thank you!

Questions?

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