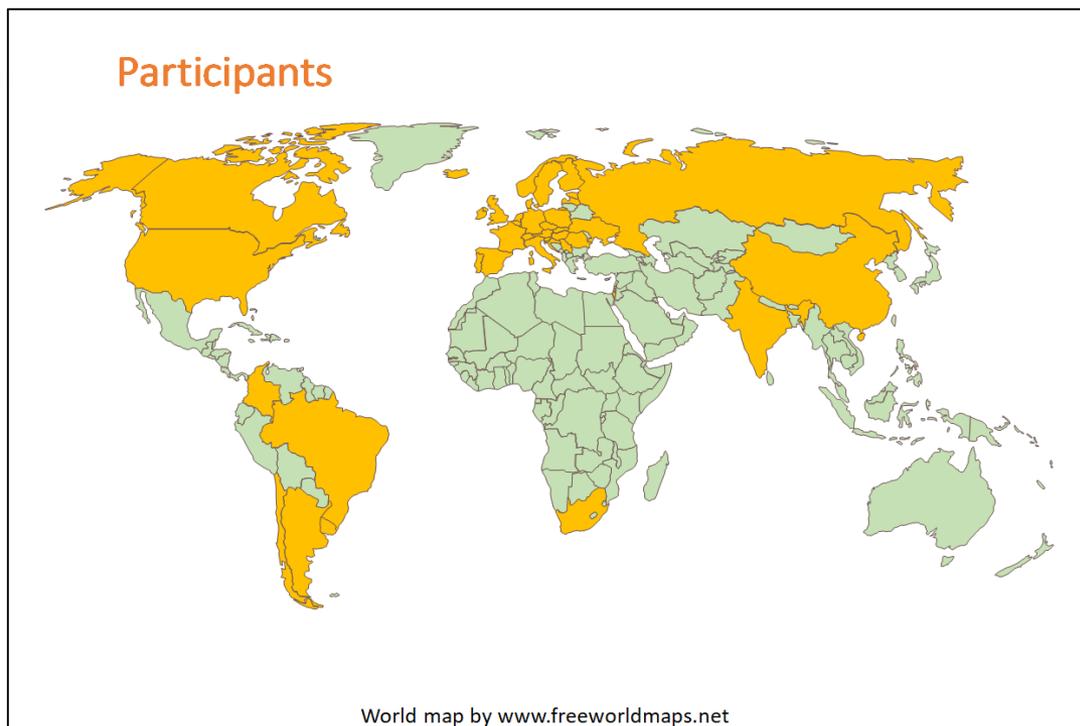


Global 24-Hour Calculation Trends in Automatic Milking Systems

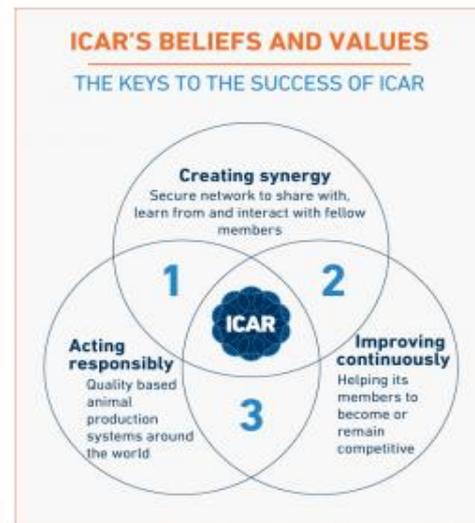


Pavel Bucek, Xavier Bourrigan, Friedrich Reinhardt, Kai Kuwan, Juho Kyntäjä, Danuta Radzio, Yaniv Lavon, Bruce Dokkebakken, Carlos Trejo, Kevin Haase, Franz Josef Auer, Filippo Miglior, Antonio Martins, Julio Carvalheira, Richard Cantin, Tone Roalkvam, Guðmundur Jóhannesson, Nils-Erik Larsson, Dianová Marta, Filippo Rapaioli, Fernando Sotelo, Jere High, David Hambrook, Armand Braun, Eric Barras, Uffe Lauritsen, Veronique Frappreau, Sofia Alday, Claudio Napolis Costa, José Augusto Horst, Galina Fedorova, Olga Kachanova, René van der Linde, Brian Coughlan, Gillon Alain, Mauro Fioretti, R L Bhagat, A B Pande, Mario Séguin, Marija Klopcic, Erna Galvanovska, Daina Lodina, Angie Coburn, ACHA, Árpád Kenéz, María Jesús, Bularca Ioan Raul, Janette Mathie, Zdenko Ivkic, Jianbin Li50, Aire Pentjärv, Biljana Perisic, Nilesh Nayee, R O Gupta, Steven Sievert, Seamus Gilheany, An Pengpeng, Sun Xianzhi, Japie van der Westhuizen, Volodymyr Tytenko, Augier Gabriel, Lecomte Christophe, Carlos Lizana, Pavla Rosincinova, Robert Fourdraine, László Dégen, Samuel Pinto, Glorieux Gery, Rotar Mircea Catalin, Dena Snidall

Materials and Methods

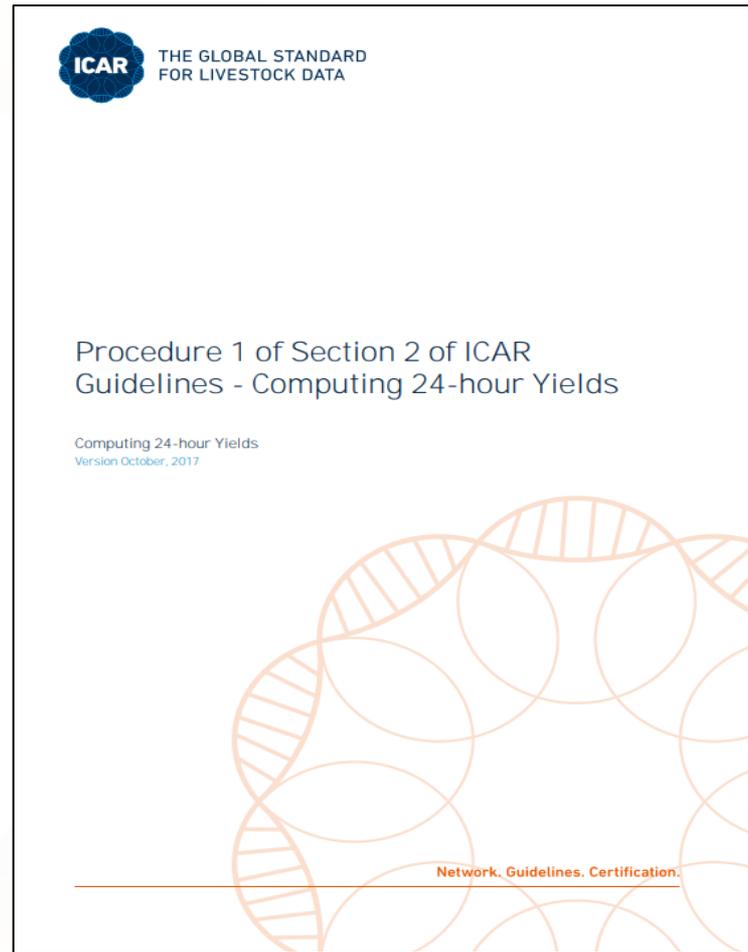


THE GLOBAL STANDARD
FOR LIVESTOCK DATA

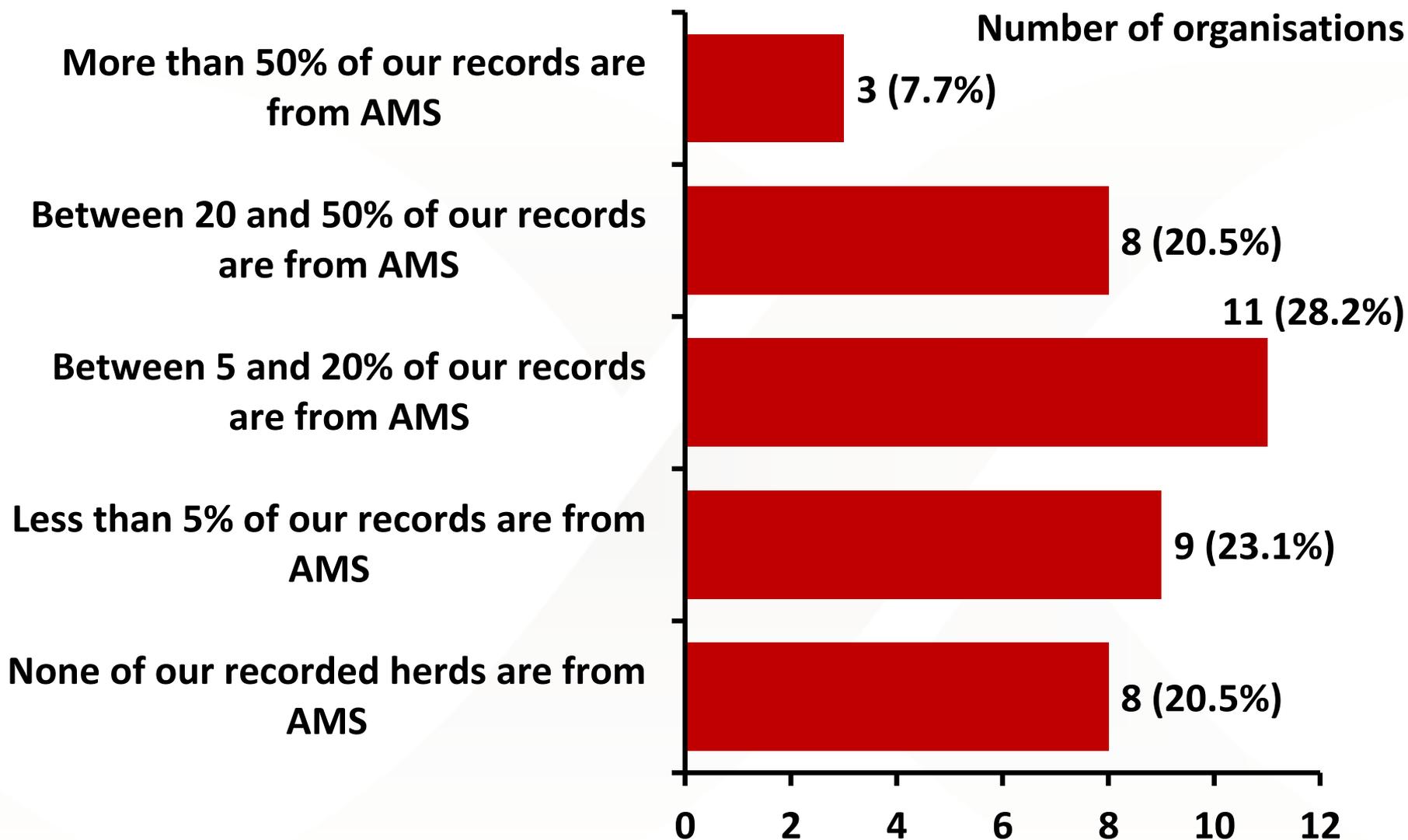


- Data were obtained from 52 organisations from around the world
- Consisting of 90 questions, the survey provides an analysis of all data, which were submitted between December 2018 and March 2019

Results – General aspects of 24-hour AMS calculations



What is the importance of AMS within your organisation?



What recording methods do you use for AMS?

Answer options	Number of organisations
We use milking data from a multiple number of days, including the sample day	22
We use milking data from a multiple number of days, excluding the sample day	3
We use milking data from one day	7
We use an automatically calculated milk total based on robot software	4

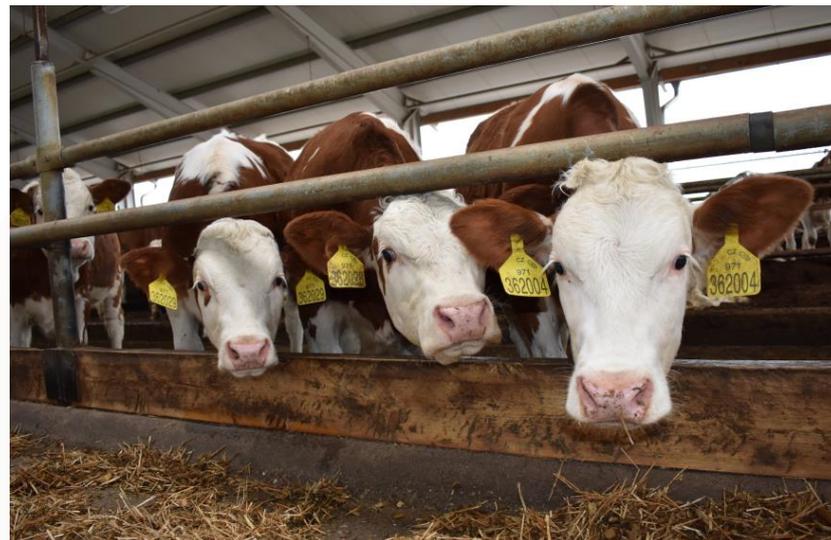
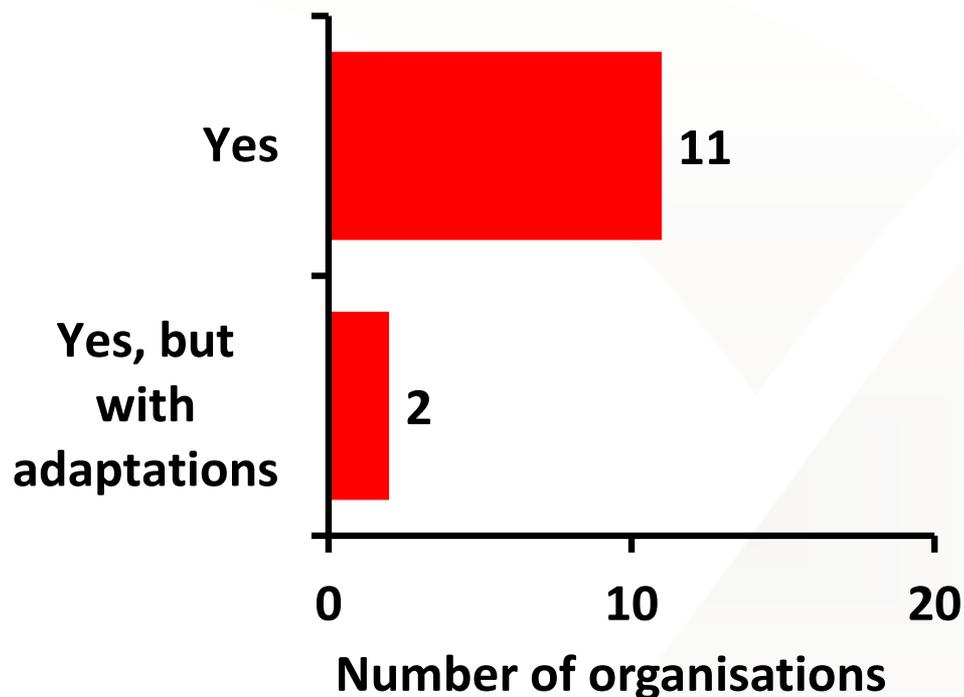
- The majority of MROs take milking data from a multiple number of days, mostly including the sample day, with only some MROs excluding the sample day

Most MROs record between 4 and 7 days

- 2 days: 13.0% of organisations
- 3 days: 4.3% of organisations
- **4 days: 30.4% of organisations**
- 5 days: 4.3% of organisations
- 6 days: 4.3% of organisations
- **7 days: 39.1% of organisations**



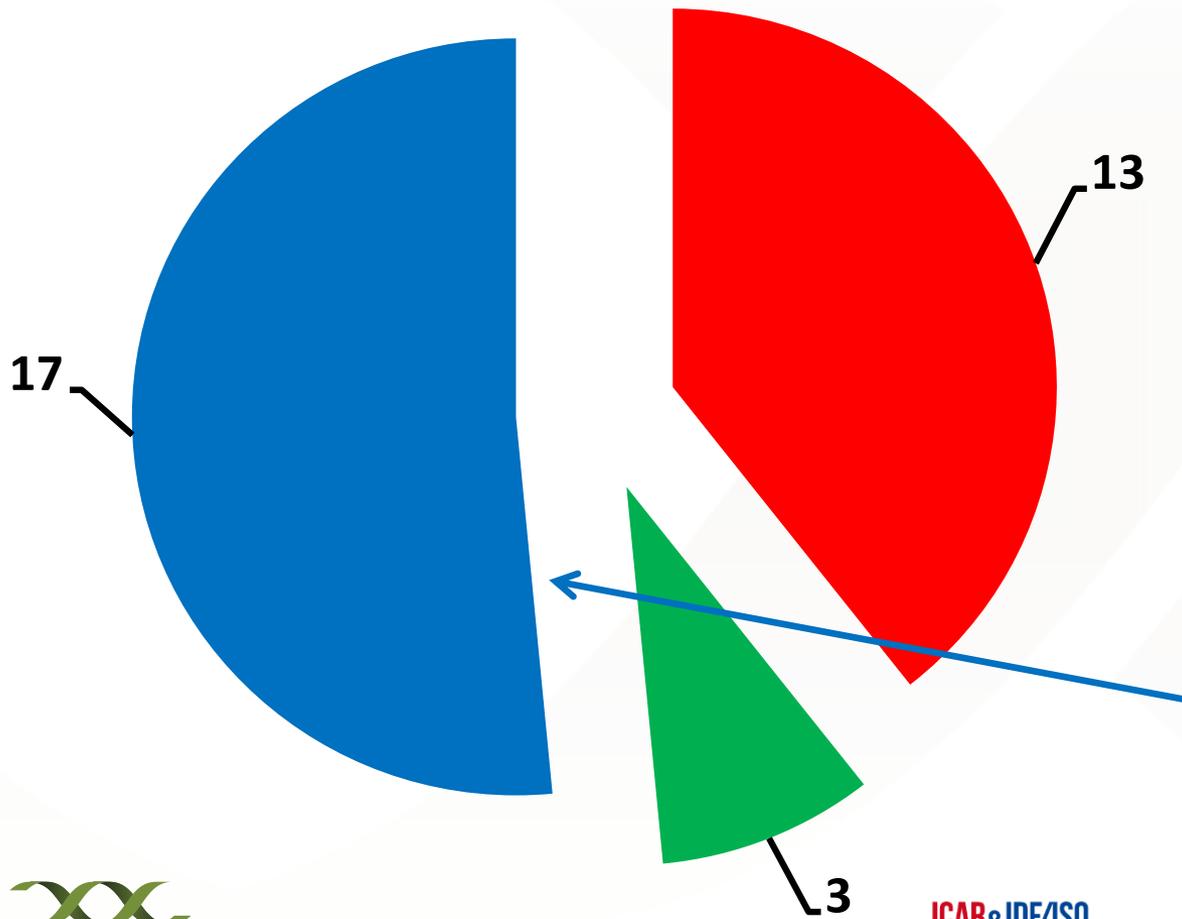
Do you use the LAZENBY (2002) METHOD described in the Guidelines



- This AMS method factors in different intervals to provide a more complex overall average, an important factor in AMS calculations

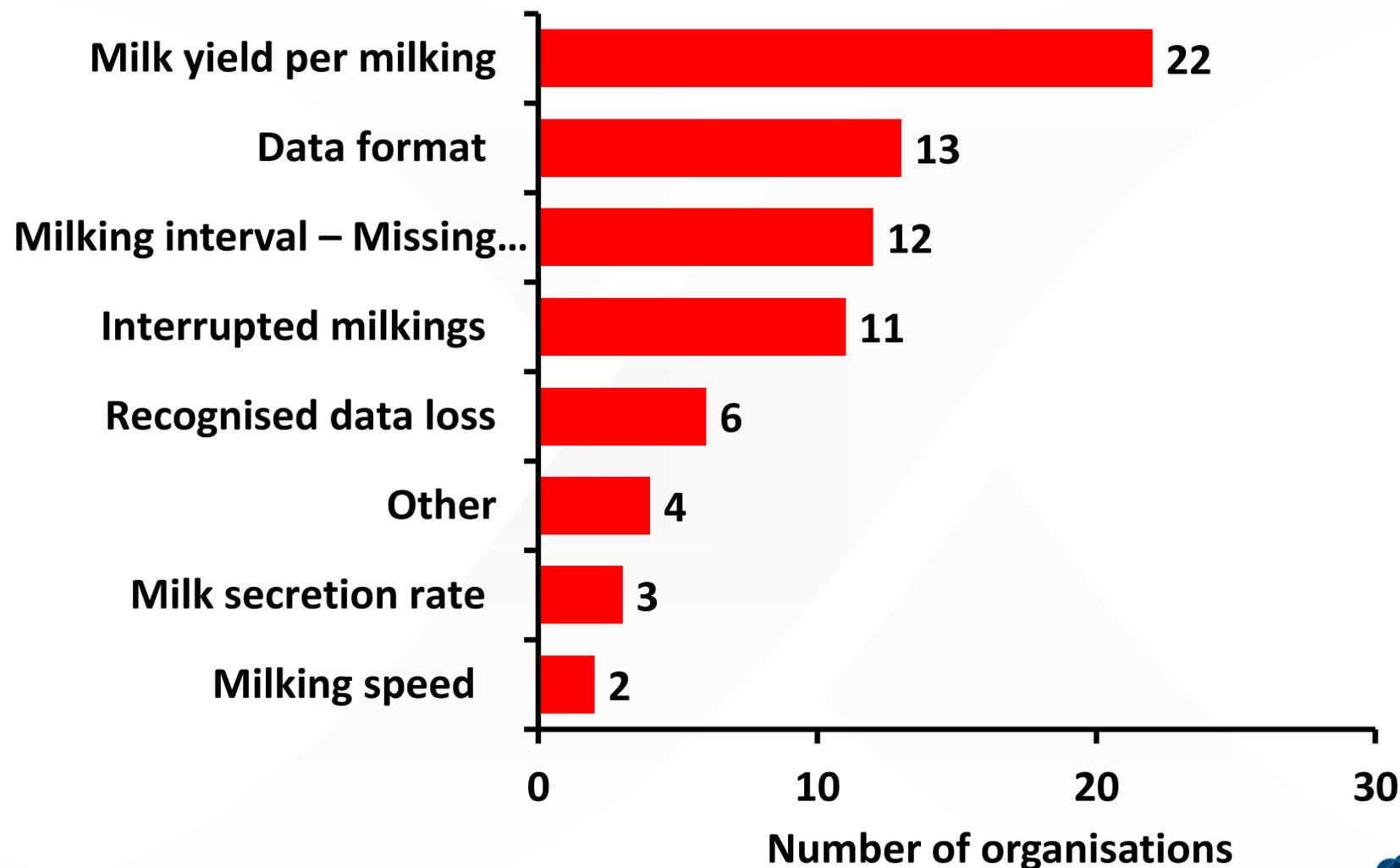
How do you calculate fat and protein yields using AMS?

Number of organisations



- We use milk yield from several days, including the sampling day, to calculate the fat and protein yields
- We use milk yield from several days, excluding the sampling day, to calculate the fat and protein yields
- We only use milk yield from the sampling day to calculate the fat and protein yields

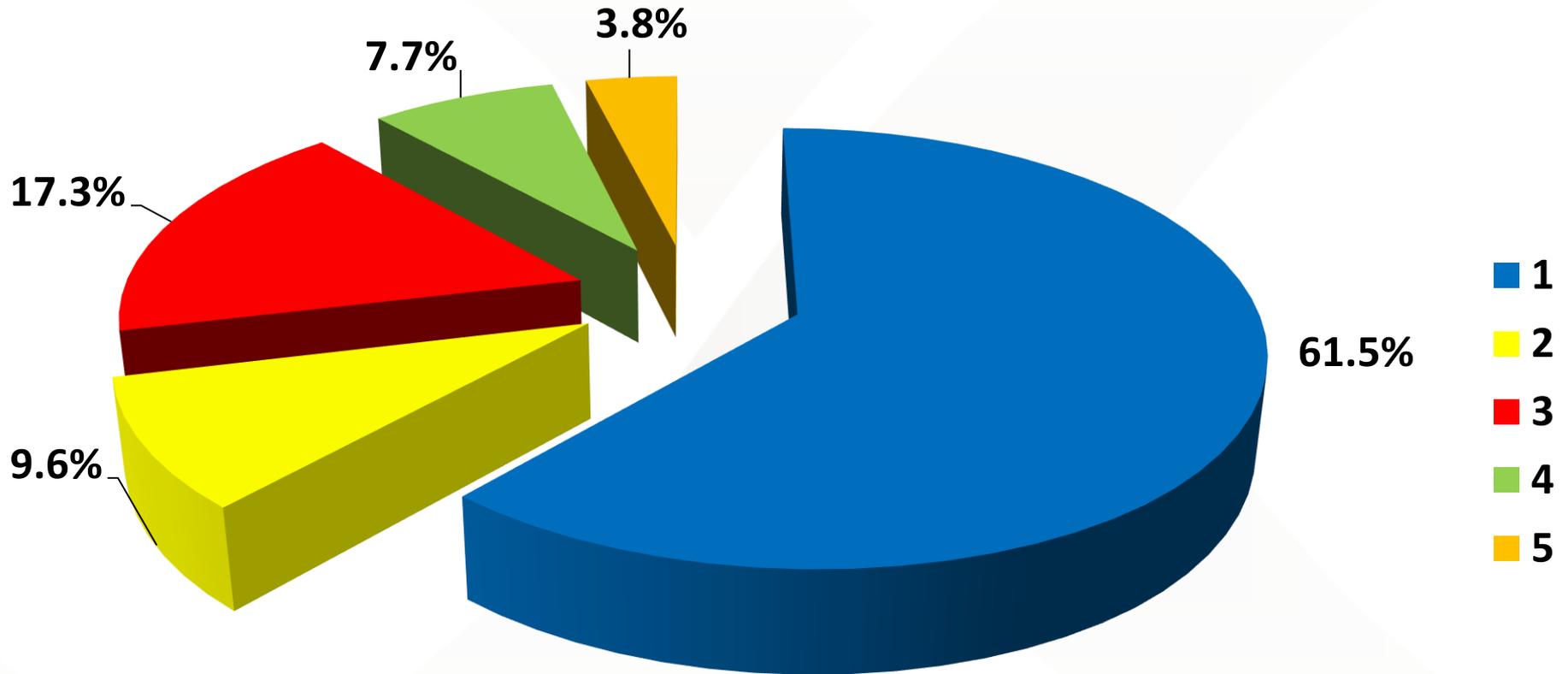
What data quality indicators do you monitor when extracting data from the robot software?



What data quality indicators do you monitor when extracting data from the robot software?

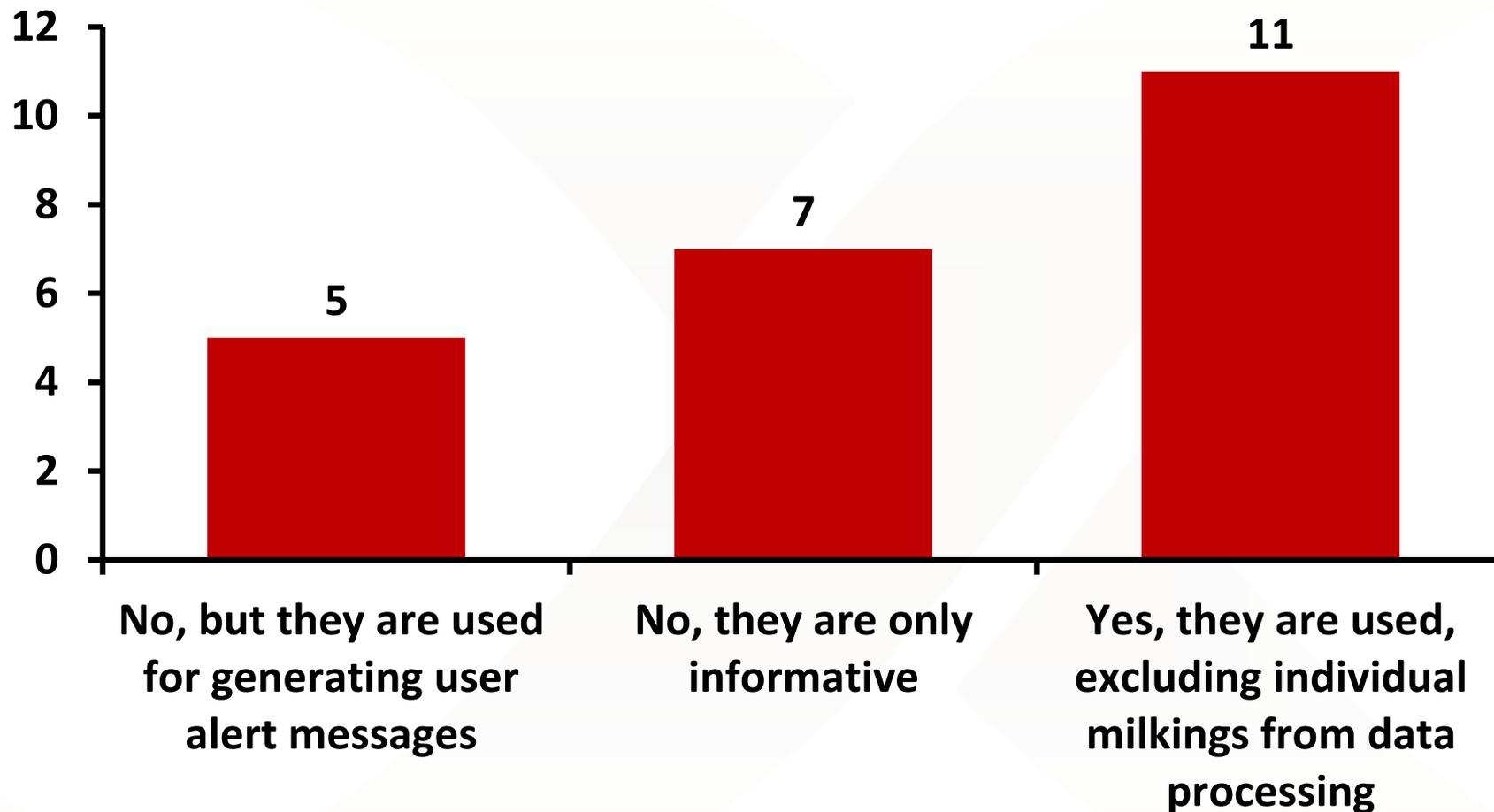
Number of combined indicators used by MROs

% of organisations that use combined indicators



Do these indicators affect calculations?

Number of organisations



Do you use the BOULOC ET AL. (2002) method described in the guidelines

- This method is designed for calculating milk yield production over one day
- Implementation is low with only 5 MROs stating they use the method
- Most MROs calculate over a multiple number of days, with one MRO using an adaptation of the method



What sampling schemes do you use for AMS?

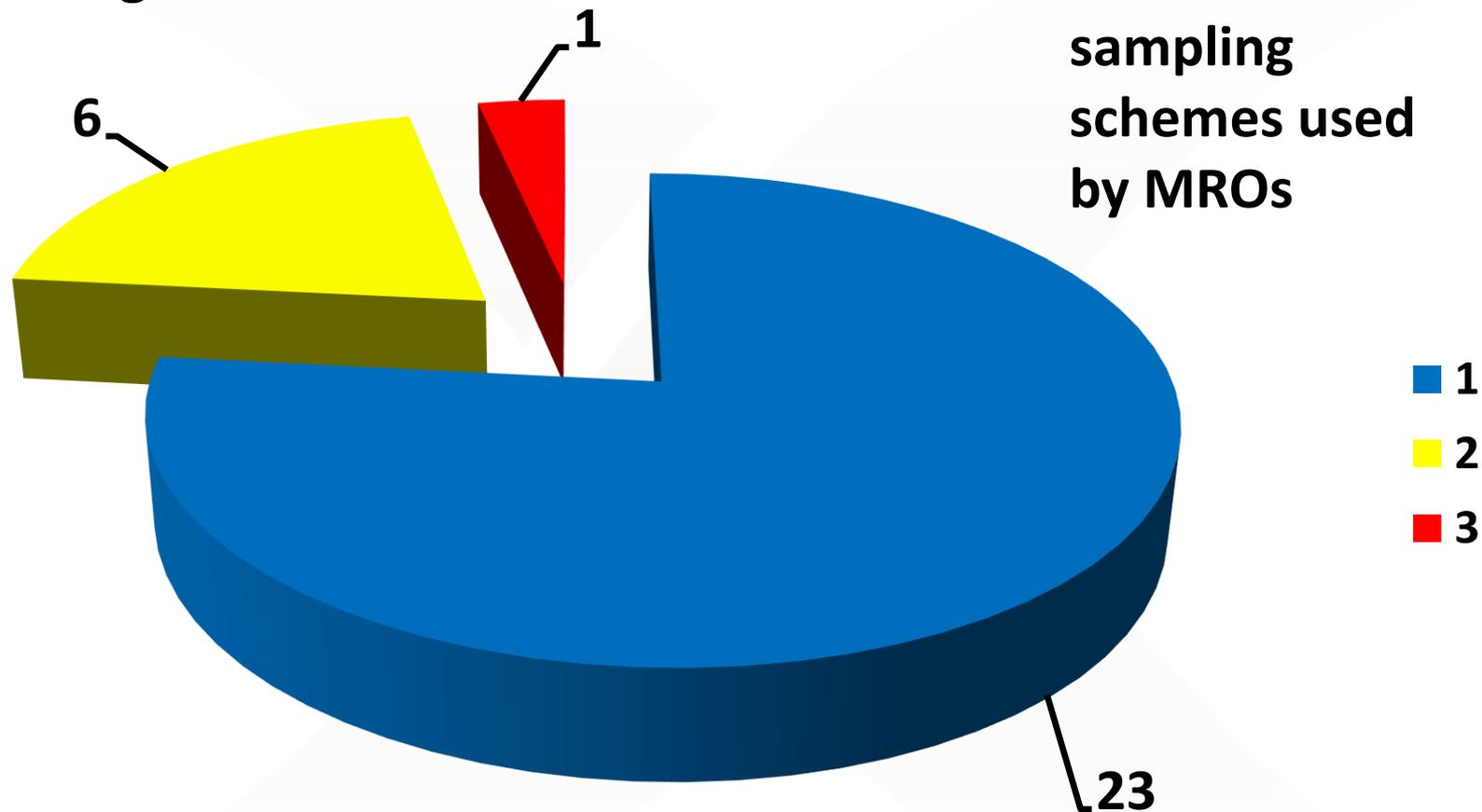
Answer options	Number of organisations
Scheme Z – sampling from one milking per cow and recording	27
Scheme M – separate samples from several milkings, all analysed separately	6
Scheme E – samples from several milkings joined in equal amounts for analysis	3
Scheme P – samples from several milkings joined proportionally for analysis	2

- The most common practice is to use scheme Z only (27 MROs), which involves sampling and recording from one milking per cow
- Prevalence of one-milking sampling has increased with an eye on reducing costs, an important area for future discussion

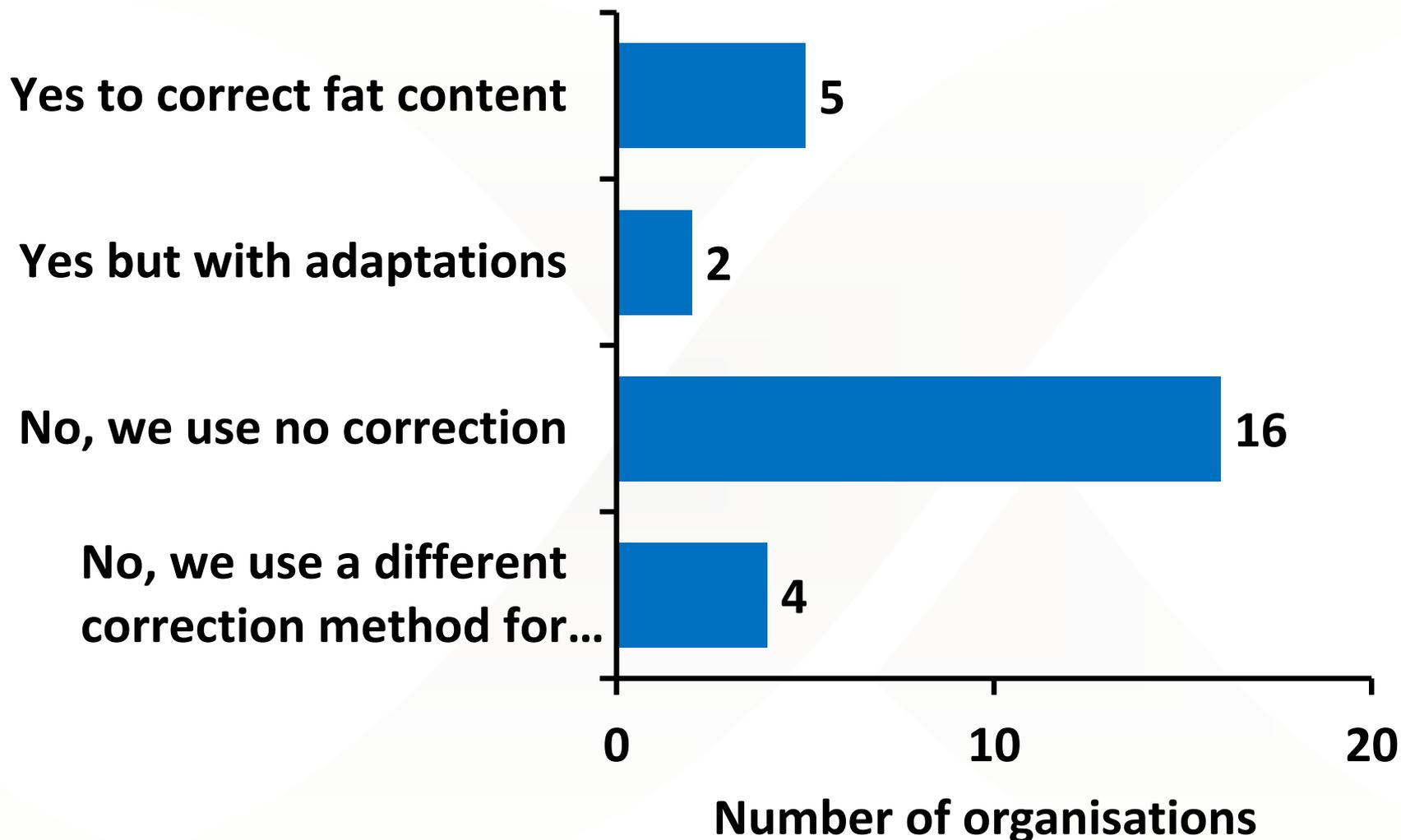
Number of sampling schemes used by MROs

Number of organisations

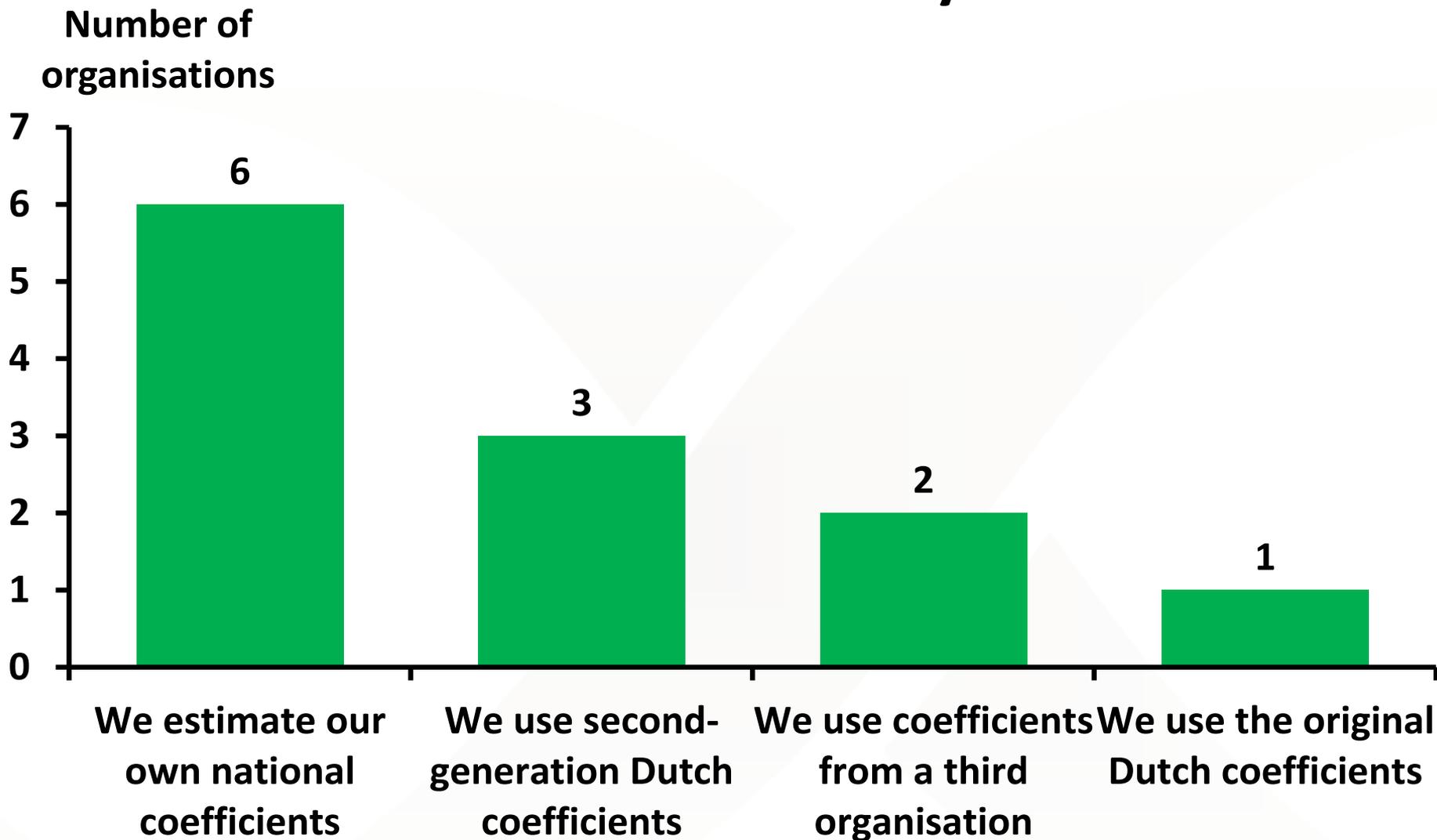
Number of sampling schemes used by MROs



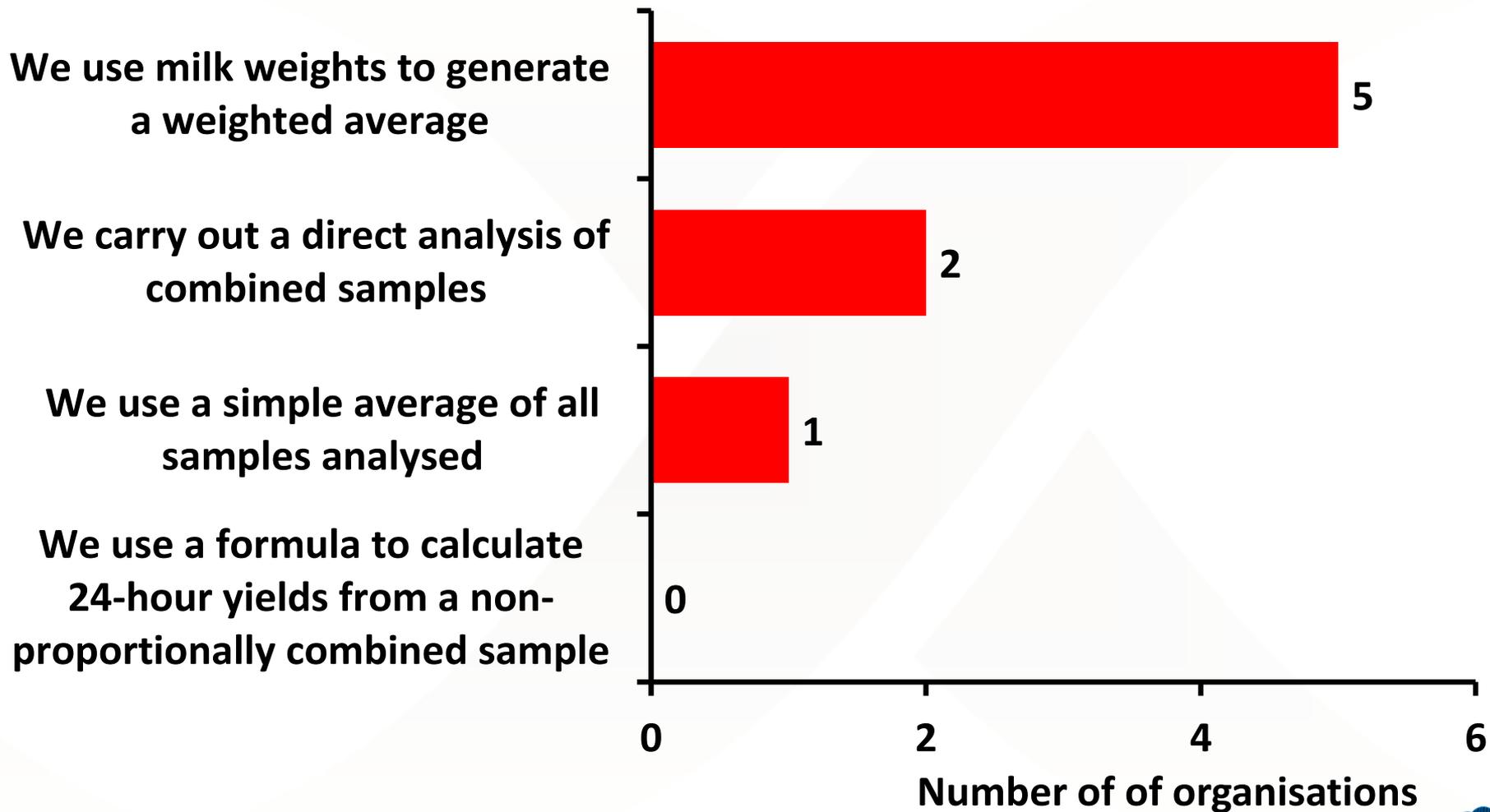
Do you use the GALESLOOT & PEETERS (2000) method described in the guidelines



What coefficients do you use?



When analysing several samples or combining them in a non-proportional way, how do you calculate daily fat and protein yields?



How long does the sampling period last when using schemes M and E (hours)

Answer options

Number of organisations

12

3

14

1

24

3



Results – estimating independent factors and coefficients for AMS



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Survey summarises how many records were used for estimations or recalculations of factors and coefficients.

The following numbers were provided:

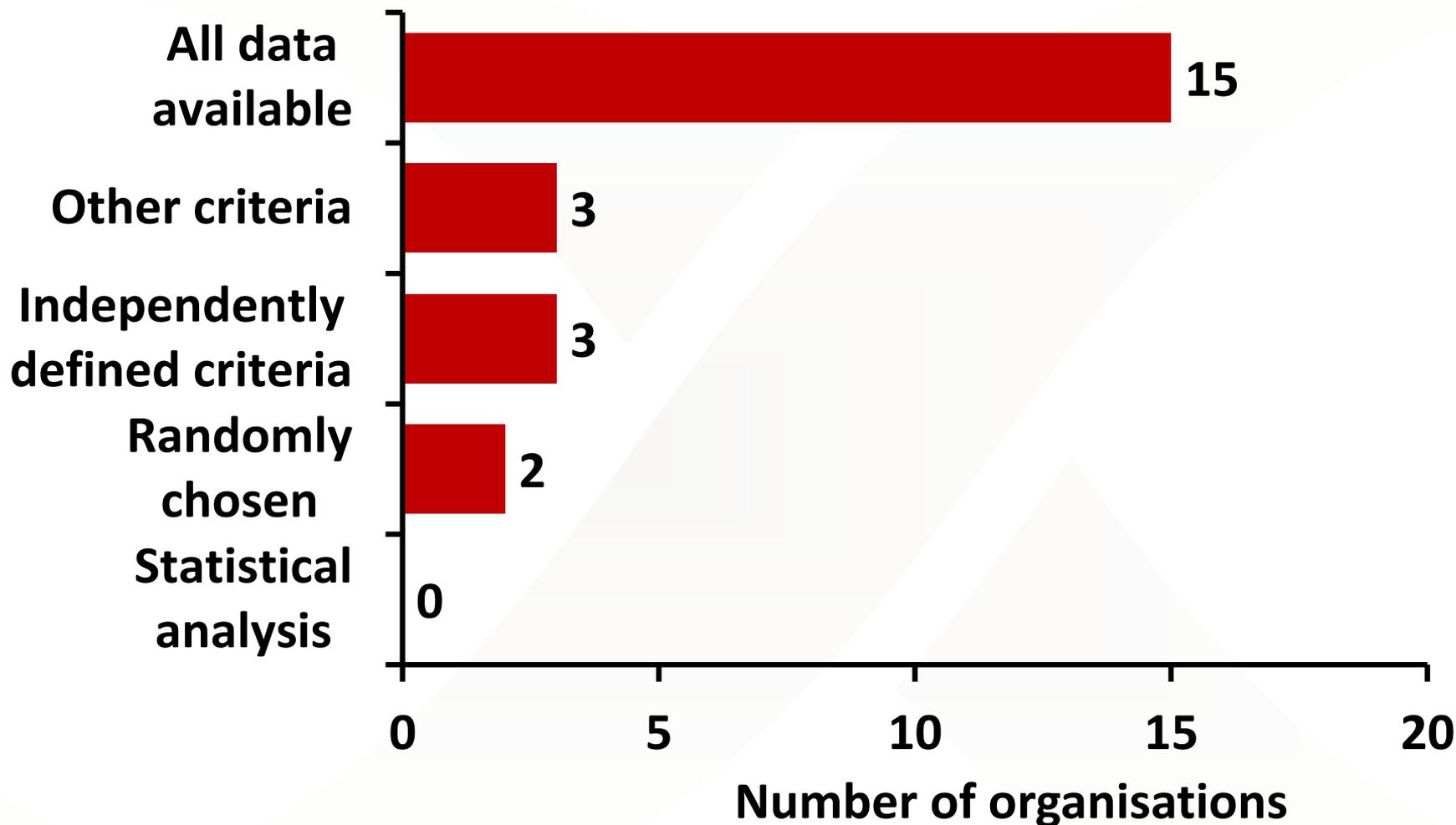
- **Number of herds from 3 to 13,300**
- **Number of cows from 360 to 400,000**
- **Number of milkings 14 to 1,779,324**
- **Number of lactations 5,000 to 1,200,000**
- **Recommendation in this field could be valuable**



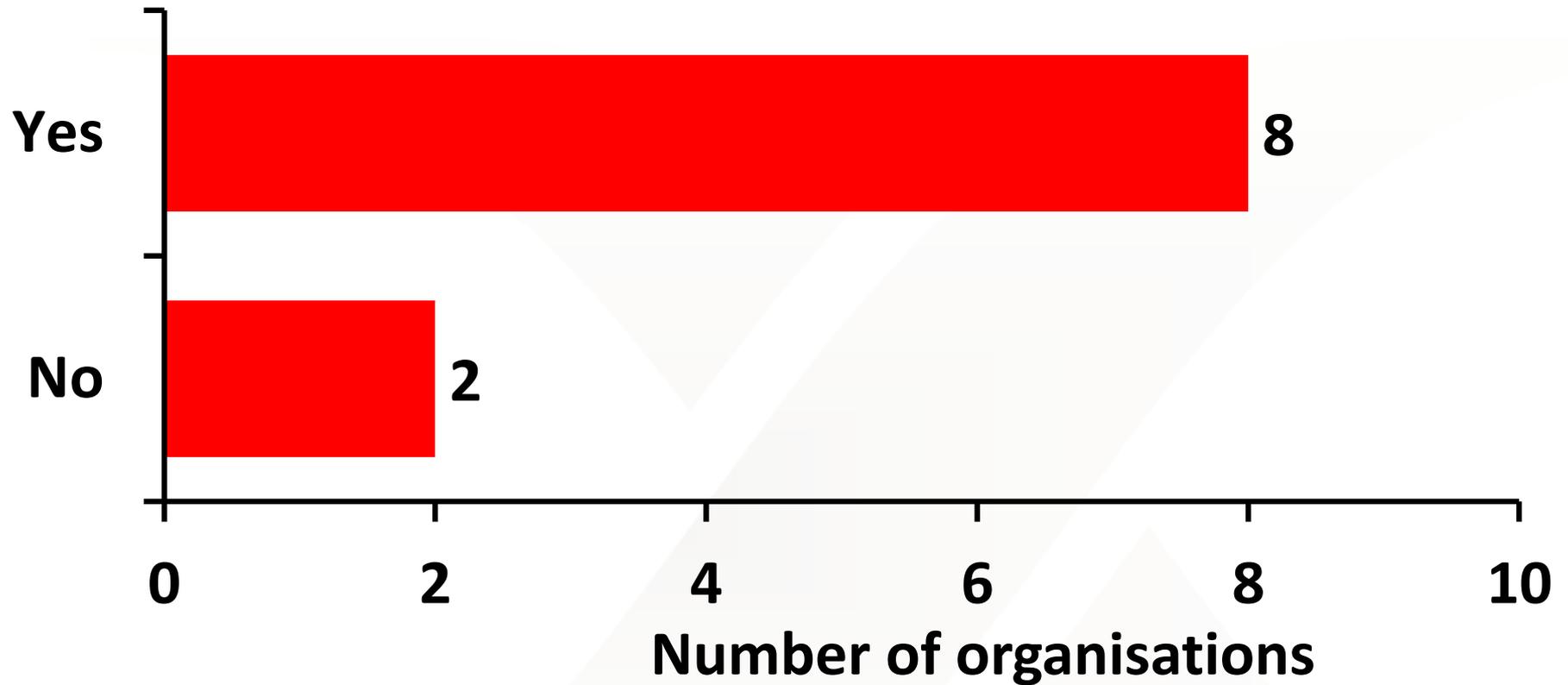
Over what period do you collect data for estimations or recalculations?



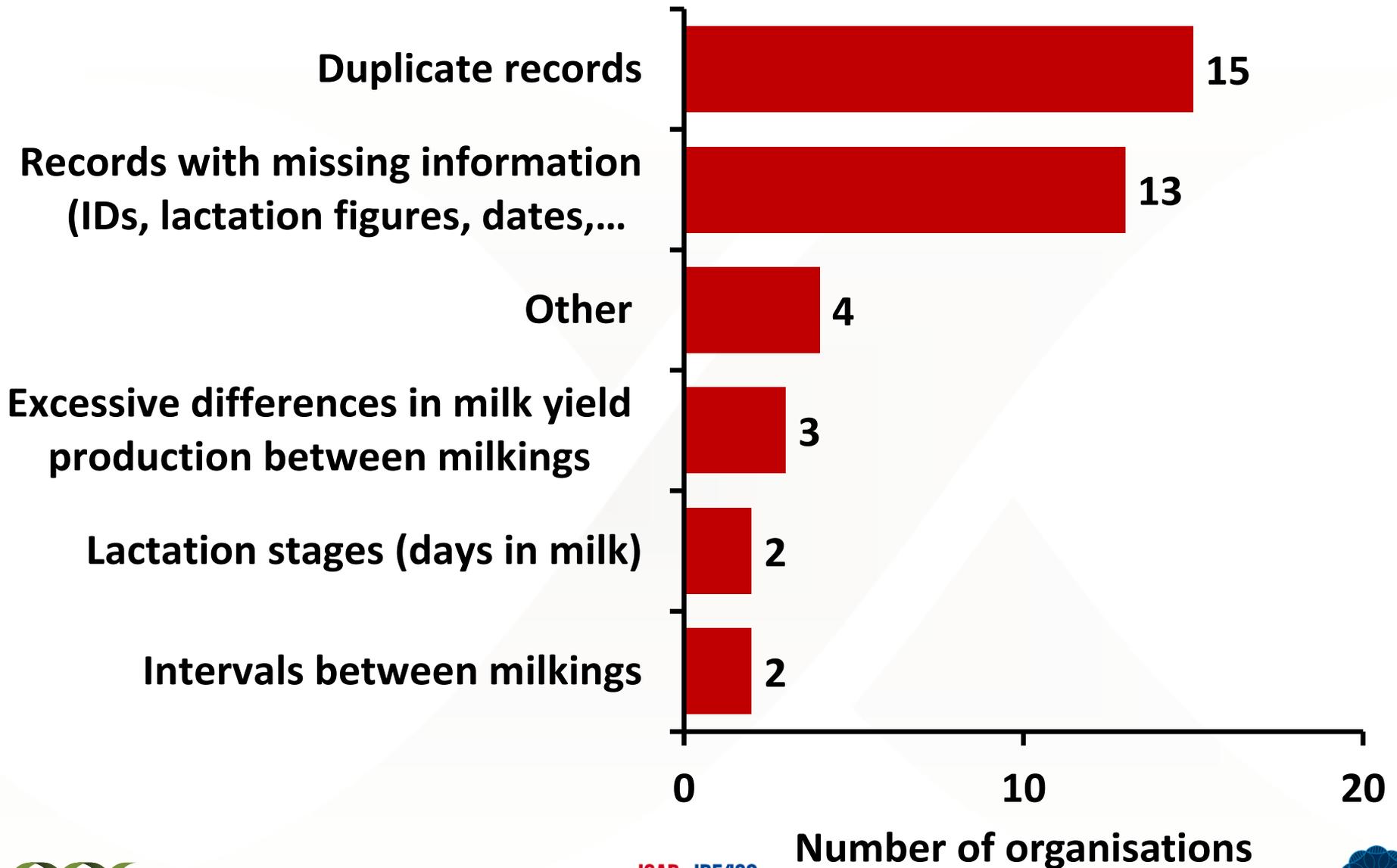
How are herds and/or cows selected for estimations or recalculations?



Do you edit or exclude raw data?



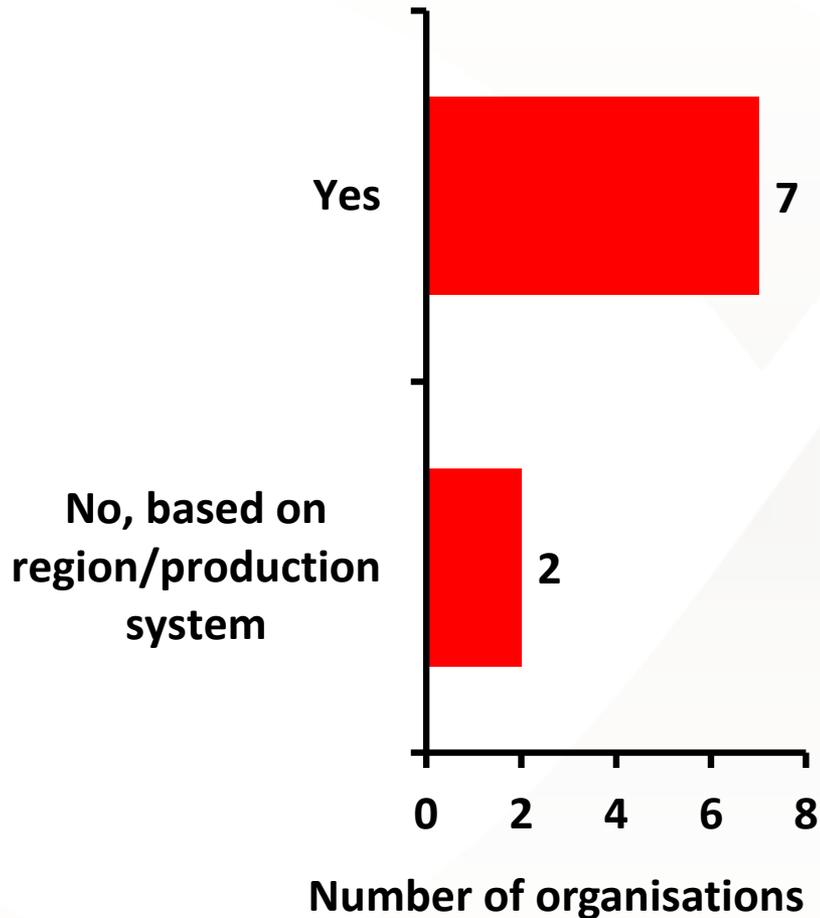
Which types of data do you exclude?



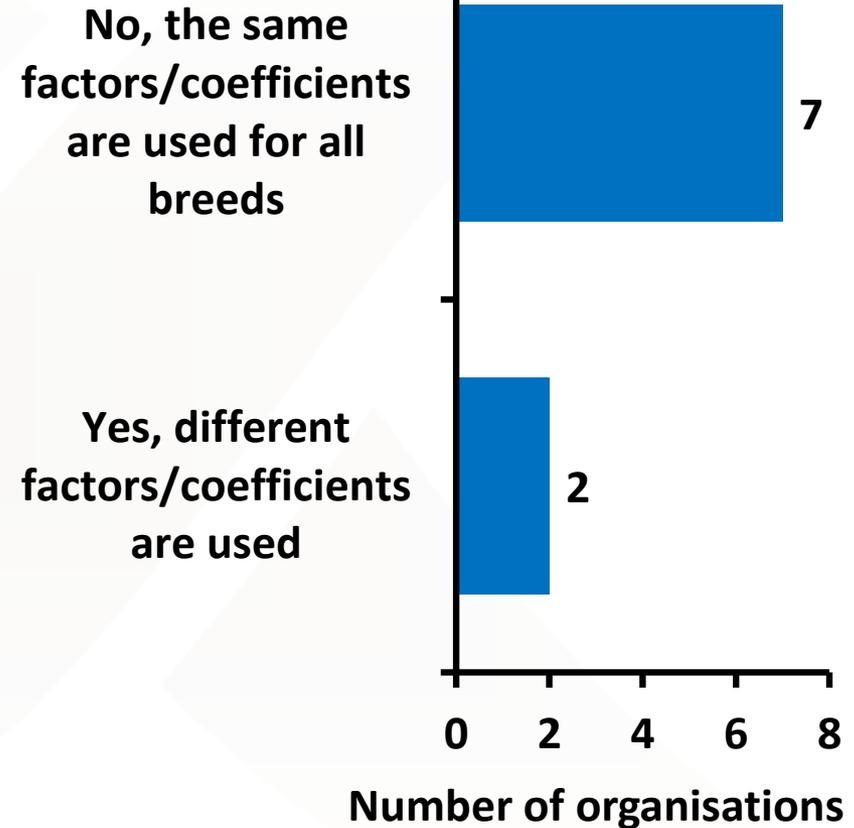
For the number of exclusion criteria applied, see below:

- **1 criterion: 8 organisations**
- **2 criteria: 7 organisations**
- **3 criteria: 3 organisations**
- **4 criteria: 2 organisations**
- **Multiple exclusion criteria are recommended.**

Do you use uniform, national factors/coefficients?

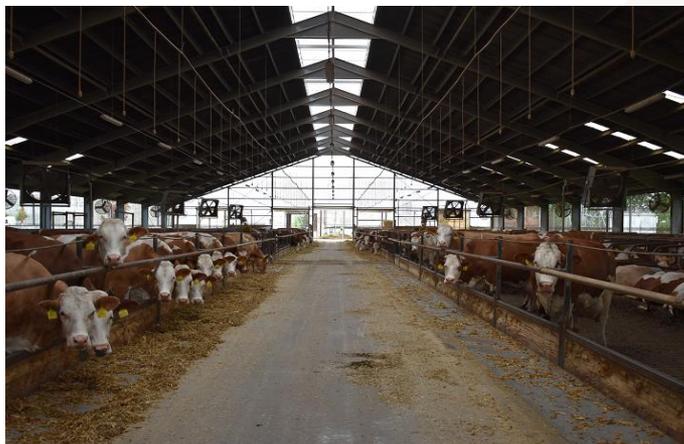


Are there any differences in factors/coefficients between breeds nationally?



What type of comparative analysis is used for AMS estimations/recalculations?

Answer options	Number of organisations
All samples are analysed separately (24-hour, golden standard)	4
Different approach	2



How do you evaluate results based on estimations/recalculations (method Z, M) and which statistical indicators do you use?

Answer options	Number of organisations
Correlation between estimated/predicted daily yields and actual/true daily yields (from reference method, golden standard)	5
Comparison of means, standard deviations and maximum difference (overall, within subgroups)	4
Systematic bias, SD for differences and accuracy (R^2)	2



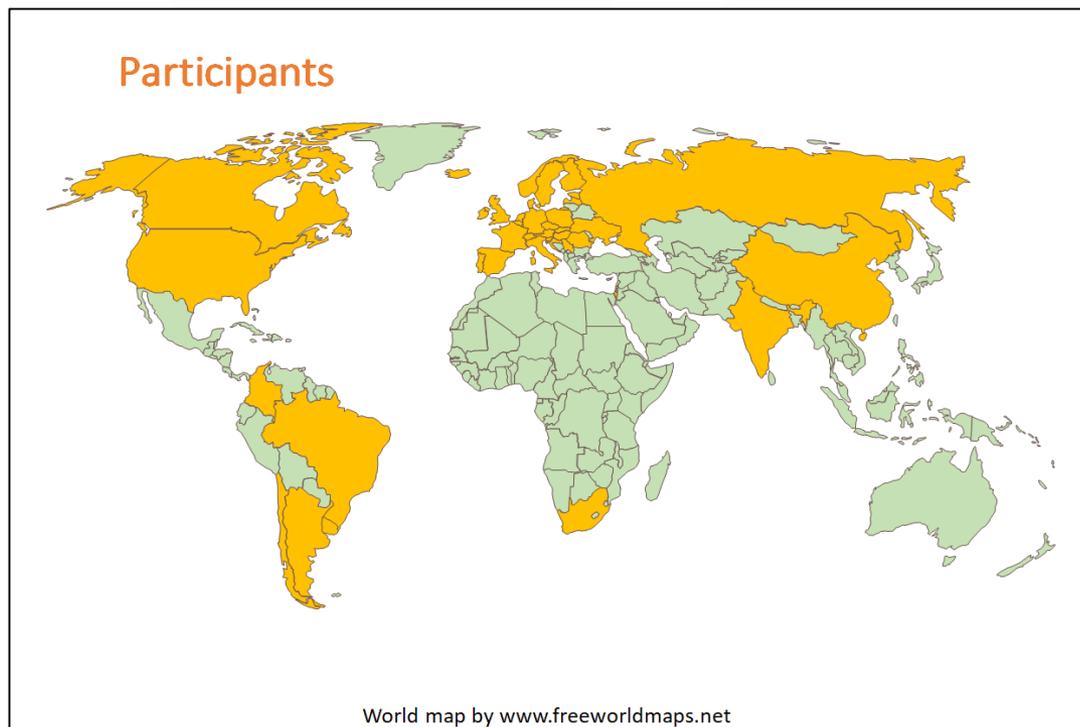
Conclusions, recommendations and future policies

- 52 organisations took part in the survey, comprising 90 questions
- A very important part of the project is to establish a future policy and set out practical recommendations for the future
- Impact of AMS on milk recording
- This trend is seeing MROs start to create new services and additional value for customers
- Data are also being combined from different sources toward future integration
- Data is mostly applied based on a multiple number of days for calculating 24-hour milk yields
- Most of the organisations use milk yield from the sampling day to calculate the fat and protein yields which is recommended practice

Conclusions, recommendations and future policies

- Data quality systems are routinely used when handling AMS
- Raw data should always be used
- The prevalence for calculating 24-hour milk yields based on one day has decreased
- The most common practice is to exclusively use scheme Z
- There is a general trend toward simplification with a view to cutting costs
- Fat % should be factored in when taking only one sample, with some MROs stating corrections are not always applied
- Not all MROs estimate their own factors and coefficients
- There is general consensus on the areas in the Guidelines that need to be prioritised

Acknowledgements: The ICAR Dairy Cattle Milk Recording WG wishes to thank all of the organisations that took part in the survey.



Thank you for your attention!

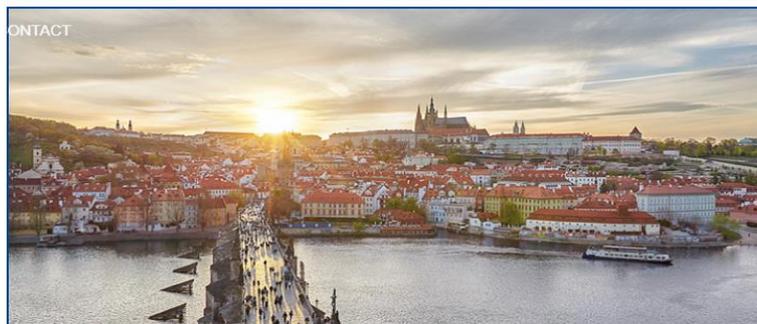


ICAR 2019 17 – 21 June
IDF/ISO 2019 21 – 25 June



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REGISTRATION ACCOMMODATION SOCIAL EVENTS TOURS SPONSORSHIP PARTNERS GENERAL INFORMATION



Welcome at the ICAR & IDF/ISO 2019 website!

Welcome Address



Dear colleagues,

On behalf of the Czech Moravian Breeders' Corporation and all of the breeder organisations in the Czech Republic, it is with great pleasure that I invite you to Prague, the venue for the 2019 ICAR Congress and IDF/ISO Analytical Week, marking the first occasion the event will have been hosted in the Czech Republic.

The Czech Republic is a vibrant, modern country situated in the heart of Europe. Boasting a rich cultural heritage, the country offers visitors a wealth of attractions and impressive historic sites. Its capital city, Prague, is famed for its magical bridges, cathedrals, gold-tipped towers and



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