Practical aspects in milk recording in Central and Eastern Europe and its effects on the guidelines

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8:30–12:00, Estrelsaal C, ICAR Dairy Cattle Milk Recording, S1

Chair: Hans Wilmink

2014
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Germany | Berlin
IDF/ISO 15–20 May
ICAR 19–23 May
Interbull 20–21 May

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Federal Ministry of Food and Agriculture
by decision of the German Bundestag

Countries and organisations participating in the project

Czech Moravian Breeders´ Corporation, Inc., Czech Republic (CZE)	
LKV Lower Austria, Austria (AUT)	
German Association for Performance and Quality Testing, Germany (DEU)	
University of Ljubljana, Slovenia (SVN)	
Polish Federation of Cattle Breeders and Dairy Farmers, Poland (POL)	
Croatian Agricultural Agency, Croatia (HRV)	
Breeding Services of the Slovak Republic, Bratislava, Slovak Republic (SVK)	
Czech Fleckvieh Breeders´ Association, Czech Republic (CZE)	

In all cases conditions cover all countries. If not, exceptions are indicated.

Outline/agenda

- Milk recording
- Transport of samples in milk recording and sampling
- Identification
- Data capturing, data processing
- Planning of milk recording visits
- Verifying test day results, technicians and certifications
- Milk recording quality checks
- ISO
- Training of technicians
- Additional traits and other services
- Delivering results to the farmer

Main goals of the project

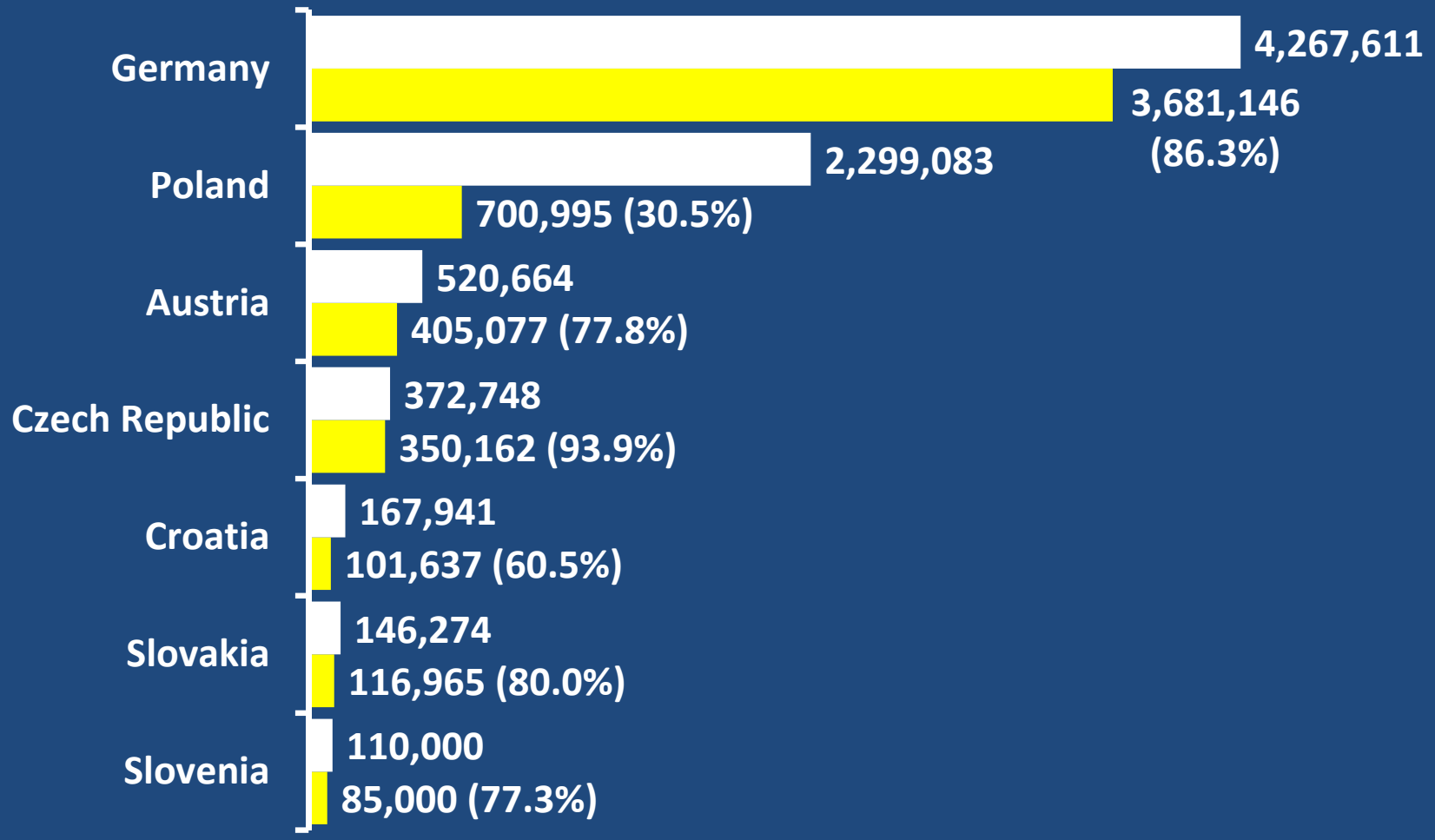
Main goals of the project

- Analyse milk recording conditions in 7 countries in Central and Eastern Europe
- Analyse key processes relevant to milk recording (mostly covered in Section 2 of ICAR Guidelines)
- Summarise the effect of the conditions in those countries on ICAR Guidelines, trends and practical recommendations for milk recording
- Test the feasibility of extending and researching the circumstances outside Central and Eastern Europe

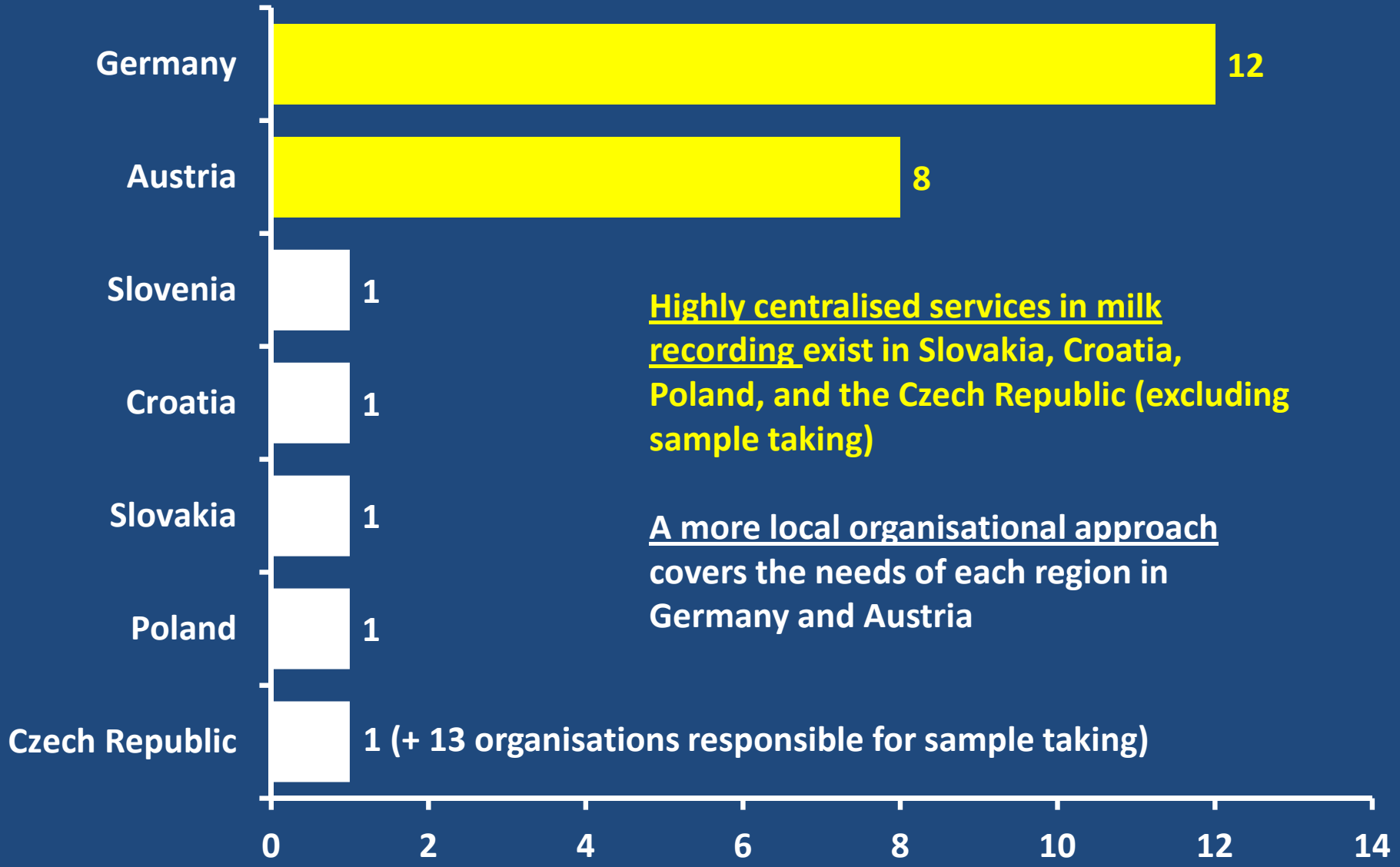
Methodology

- Questionnaire
- After discussion and approval by participating countries, a questionnaire was sent to 8 organisations in Central and Eastern Europe
- Results from 7 countries
- Preparation of a new version of the questionnaire in November 2014

Basic overview of countries participating in the project



Number of milk recording organisations in participating countries (in all cases the project covers all countries)



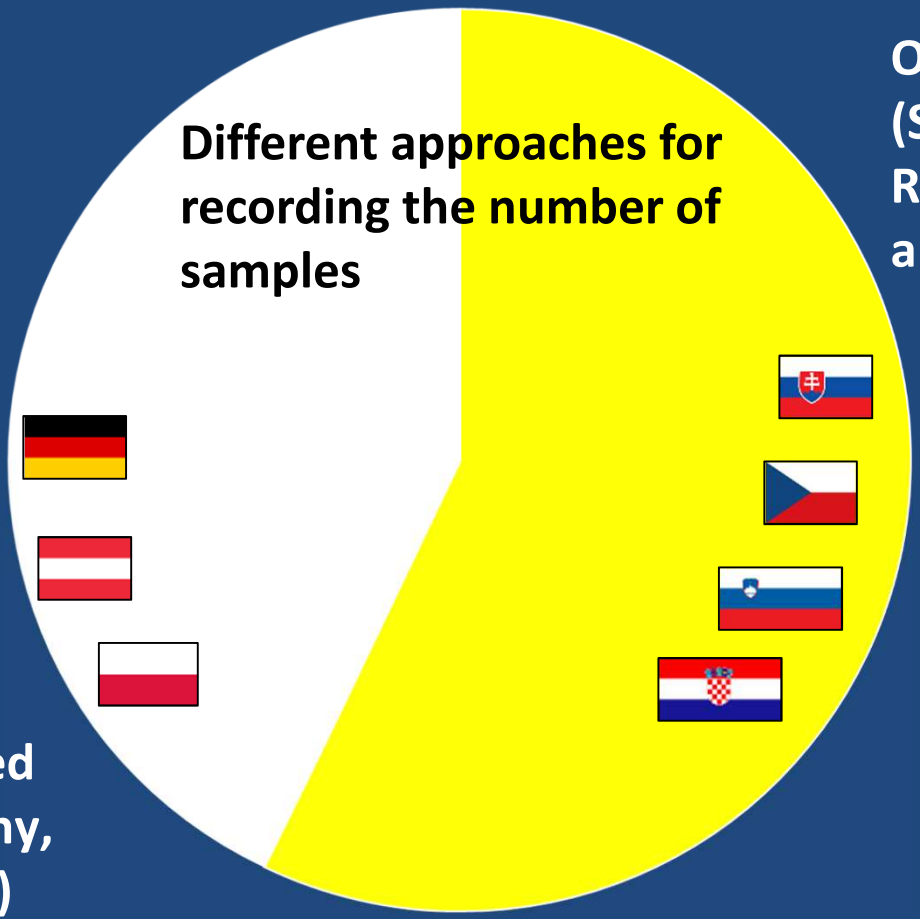
Highly centralised services in milk recording exist in Slovakia, Croatia, Poland, and the Czech Republic (excluding sample taking)

A more local organisational approach covers the needs of each region in Germany and Austria

Milk recording in the case of milking robots (AMS)

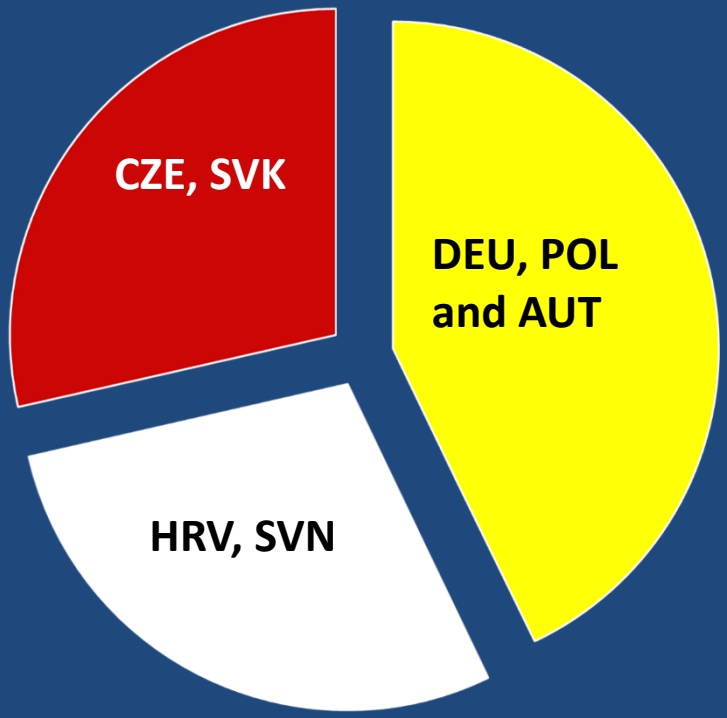
- All countries use test day 24 hours, Austria 20 – 24 hours

Number of samples in the case of milking robots



How milk production data is combined with milk content analysis

Milk content and milk yield production from the test day only (2 countries)



Combination of milk content from the test day with milk production from the test day

Milk yield production from multiple days

Combination of two types of milk production (3 countries)

Combination of milk production from multiple days with the milk content from the test day (2 countries)

Milk recording in the case of milking robots (AMS)

Country	Milk yield production, period
Czech Republic	One day (test day only)
Germany	For calculation of milk yield from the test day, all milkings are taken from a 48h period and calculated over an average 24h yield For calculation of lactation yield all milkings are used (for 305 or 365 days)
Poland	Poland uses the rules adopted by Germany, with the exception of the 305 days lactation
Austria	Test days and 168 hours (7 days) before the test day
Slovakia	One day (test day only)
Croatia	Test day + 4 days before the test day
Slovenia	Test day + 2 days before the test day

Different approaches for determining the calculation of milking robots

Country	Calculation of milk yield and protein and fat production
1st possible option	One sample, milk production from the test day and Test Interval Method.
2nd possible option Croatia	To estimate daily milk yield, ICAR procedures are used for data taken from more than one day (Lazenby et al., 2002). Fat and protein production is calculated according to the procedure: Estimation of fat and protein yield (Galesloot and Peeters, 2000). Fat % est = Fat % obs + b * (Milk_est – Milk_obs) For milk lactation quantities, the Test Interval Method is used.

3rd possible option - Lactation calculation for AMS in the case of Austria

- **Conditions:**
  - 300 milking robots from 5 manufacturers
  - Sampling from 1 day (20 to 24 hours) with two or all milkings sampled
  - Data captured via ADIS-ADED data export
    - At least 10 days before the sampling
    - Improved accuracy when all milkings are taken after the previous sampling
    - Different ADIS-ADED definitions in service
  - Data import in the RDV database
    - ADIS-ADED data from the AMS
    - Milk solids from the lab
    - Automated data merging

Calculation (ARM)

Data set

cow ID	JJJJ	MM	DD	HH	mm	milk	
Calculation start time: 2013 03 12 11:00							
219299614	**2013**	**03**	**12**	**19**	**18**		**MI (min)**
219299614	2013	03	13	07	31	97	732
219299614	2013	03	13	19	30	88	719
219299614	2013	03	14	07	36	107	725
219299614	2013	03	14	18	42	84	686
219299614	2013	03	15	07	32	94	769
219299614	2013	03	15	19	16	84	704
219299614	2013	03	16	07	42	89	745
219299614	2013	03	16	19	53	95	731
219299614	2013	03	17	09	01	103	787
219299614	2013	03	17	18	57	73	596
219299614	2013	03	18	07	24	101	747
219299614	2013	03	18	19	15	92	710
219299614	2013	03	19	02	24	40	428
219299614	**2013**	**03**	**19**	**10**	**22**	63	478
Sampling start time: 2013 03 19 11:00							Sample ID
219299614	2013	03	19	17	17	**55**	**40**
219299614	2013	03	20	03	02	**64**	**33**
Sampling end time: 2013 03 20 09:30							

Milk yield for lactation, BVE

- "7 days = 168 hours" average
- Start time = start of sampling
- 168 h preceding a complete sequence of milking results
  - Summarizing time (min) [9537 min]
  - Summarizing milk yield [121.0 kg] (subtracting the first yield – no interval)
  - Dividing milk/min [~ 0.0127 kg/min]
  - Multiplying milk/min * 60 * 24 = milk/d [18.3 kg]

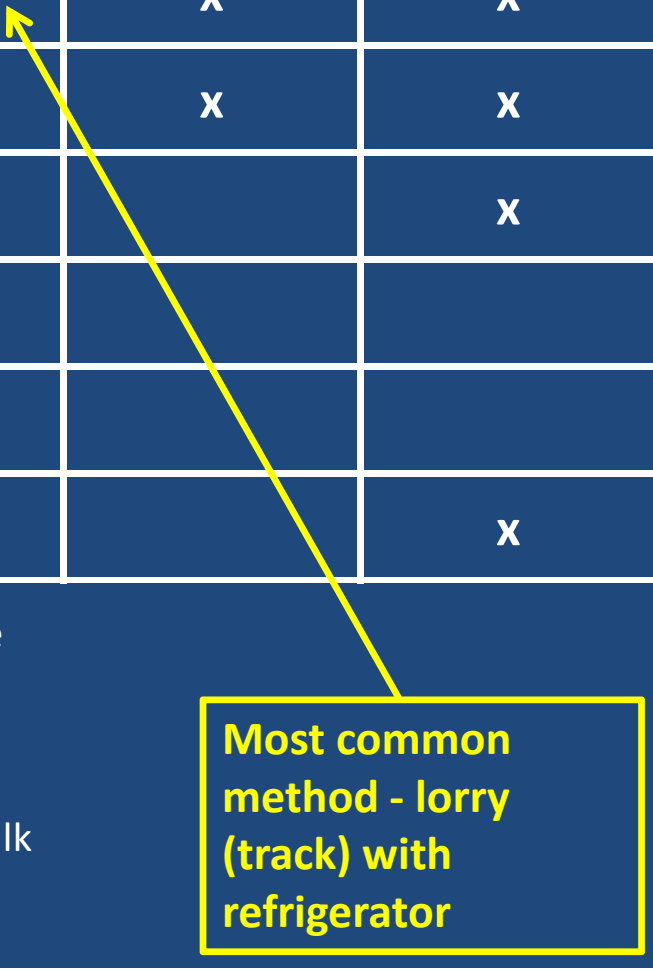
Milk solids for lactation, BVE

- "24-hour" average – each milking
- Σ (Milk * sample result) / Σ milk = % milk slid per kg milk
- Combining solids-% with milk/d

Transport of samples and sample logistics

Country	Mail A[1]	Mail B[2]	Lorry[3]	Lorry[4]	Technician[5]
Czech Republic			x		
Germany			x	x	x
Poland	x			x	x
Austria	x		x		x
Slovakia	x 30%		x 70%		
Croatia			x		
Slovenia		x	x		x

1 By mail, without special packaging, at the appropriate temperature
2 By mail, with special packaging, at the appropriate temperature
3 Lorry (truck) with refrigerator
4 Lorry (truck) without refrigerator
5 Technician transports samples directly to the laboratory after milk recording



Transport of samples and sample logistics

- Bronopol is primarily used for preserving samples (five countries)
- Azidiol is used in one country
- Germany uses different sample preservations
- The Czech Republic uses only one option for transport, while other countries mostly combine different possibilities when transporting samples
- In the case of a lorry with refrigerator, the route includes established collection points
- The appropriate temperature ranges from 1 to 8 Celsius
- In some countries laboratories involved in milk-recording milk analysis are centralised, and in other countries they are regionalised

Identification of samples

- **Most common position in stand**
  - Austria, Germany, Poland, Czech Republic
- **Barcoded vials in use**
  - Germany, Croatia, Slovakia, Slovenia
- **RFID**
  - Not in use yet
  - Germany and Poland are planning to implement RFID in the future

Data capturing

	Paper	Data handler	Laptop	Automatic data capturing from milking robots
Austria	X	X		ADIS-ADED - capture
Croatia	B	A		Print out
Czech Republic	X	X	X	
Germany	X	X	X	ADIS-ADED reciprocal data exchange
Poland	X	X		
Slovakia		X		
Slovenia	X			





- PDAs have replaced laptops
- **For milking robots cooperation between manufactures is required for reciprocal data exchange**

Milk-recording sampling

Sampling in milk recording

In the case of the AT method, a fixed amount of milk is used

In some countries all samples from milking robots are analysed separately

X

In the case of milking robots, some use only one sample

Germany and the Czech Republic use a very sophisticated system of sampling where,

in some situations mixed samples are used with a proportional amount of milk from each sample

The Czech Republic provides an example of an approach to sampling

Practical example – milk-recording sampling in the CR (method A4)

- **Halved sample** (same amount of milk from morning and evening milkings) in the case of A4 the interval between morning and evening milkings is at an interval of 10 – 14 hours
- **One-third sample** in the case of three milkings per day, the same amount of milk from each milking where the interval between the two milkings is 8 plus/minus 0.5 hours
- **One-fourth sample** in the case of four milkings per day the interval between the two milkings is 6 hours
- **For other methods of milk recording in cattle, a proportional sample is required, i.e. from 1 litre of milk, a sample of 1 millilitre of milk is taken**

Milk-recording sampling in the CR (production for all milkings and alternating sampling, milk production per test day (all milkings) and am/pm samples)

- **Interval of 8 hour milkings – 3 milkings per day,** sample alternates (one month in the evening and the other month in the morning, etc.), an afternoon sample is not taken
- **Interval of 11 and 13 hour milkings - 2 milkings per day,** a sample is taken in one month from the evening milking and in the other month from the morning, etc.)
- **Interval of 10 and 14 hour milkings - 2 milkings per day,** a sample is taken in one month from the evening milking and in the other month from the morning, etc.)
- Interval of 12 hours – alternating sampling without corrections or adjustments


Planning milk recording
Events must be planned over an entire year
Farmer inspections must be more or less unannounced
Planning milk recording
According to the Guidelines
Usually one or two days in advance
After the previous milking

Planning of milk recording on the farm (practical example from one organisation responsible for sample taking in the Czech Republic)

Key processes of planning (CRV Czech Republic)

- Monthly schedule in local organisation units
- Each third week during the month, a working meeting takes place at which the local manager plans the test days for the following month

  This includes logistics of samples, requirements for analysis, organisational aspects, etc.
- A record of this plan is submitted to the internet application Inspector, and held by the Czech Moravian Breeders´ Corporation, Inc.

Verification of test day results (repeat sampling)

	Share of cows	Share of farms[2]	Period of time	Cows	Evaluation [3]
Austria	2 %	2 %	12 or 24 hours	all	milk: 10 %
Czech Republic	1 %	1 %	48 hours (2 days)	all or selected	milk: 15 % fat: 13 %
Germany		2.5% risk based	12 hours (next milking)	all	milk and solids: stat. methods
Poland		3.2 %	up to 5 days	all or selected[1]	milk, fat and protein: 25 % [4]
Slovakia	10 %	15 %	the next day	selected	fat: 13 %
Slovenia	2.5 to 5 %	1 %	12 to 24 hours	all	milk: 5 % fat: 0.15 %-points protein: 0.10 %-points

[1] in herds with more than 20 cows, some animals were chosen

[2] random sample and/or leading herds

[3] accepted deviation

[4] different for recording schemes

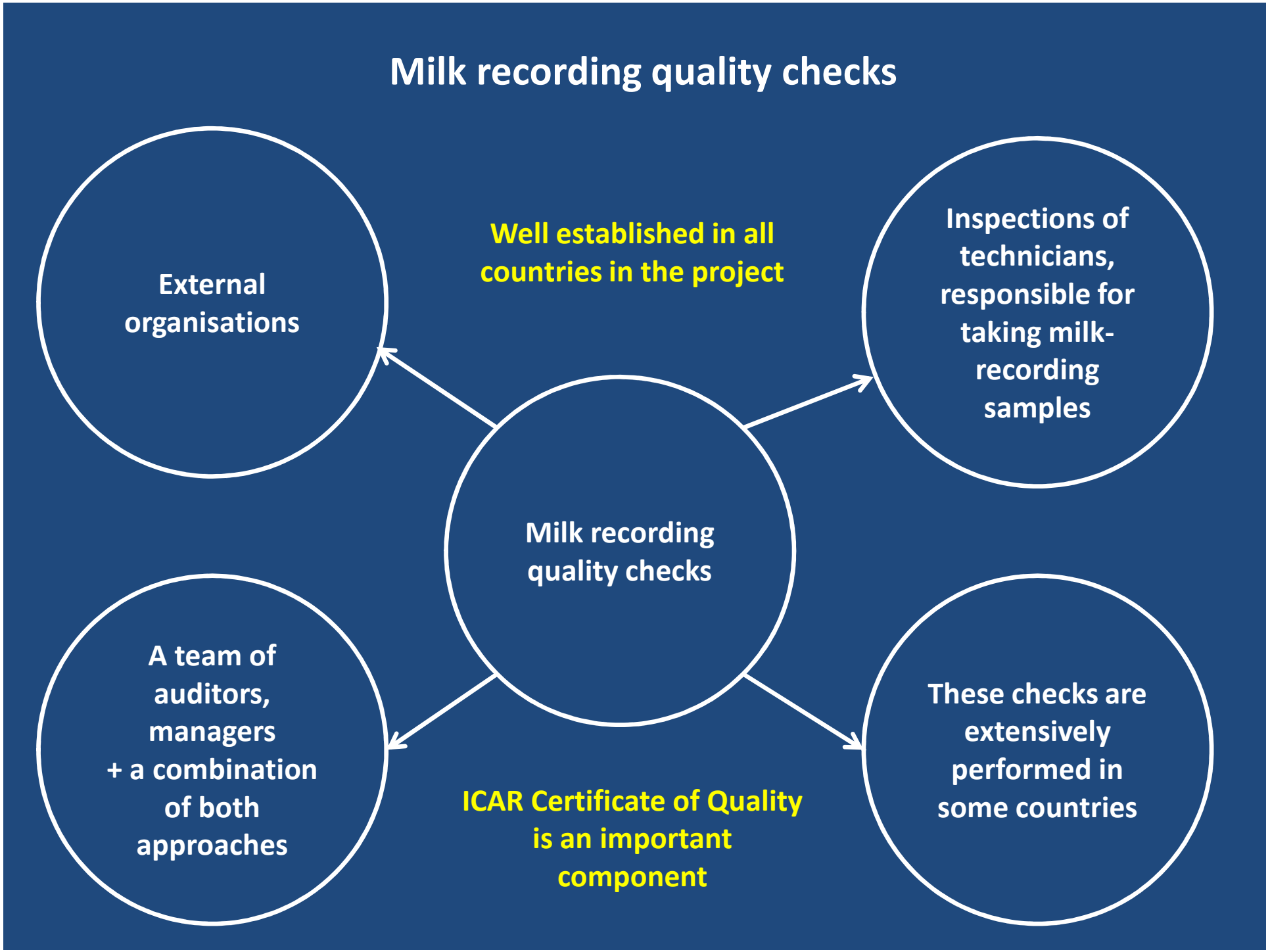
Repeat Sampling (supervisory control) - methodology

- Inspection of milk recording after the finished test day
- Repeat sampling conducted by the inspector of the Czech Moravian Breeders´ Corporation, Inc.
- **Fat percentage excluding interval**
- Herds producing bulls for AI, cows with high milk yield, etc.
- Repeat sampling is guaranteed **no later than 48 hours after the routine test day**
- There are two possibilities: repeat sampling of all animals from the test day or comparison of a group of selected animals
- **The key indicator is fat percentage:** selection of herds, average value of fat calculated from the weighted means of on-going lactations in milk recording in the Czech Republic, interval plus/minus 2 standard deviations
- **Differences are analysed separately in each particular animal**
- Cancelling of results from the test day or repeating the test day

Verification by bulk milk comparison

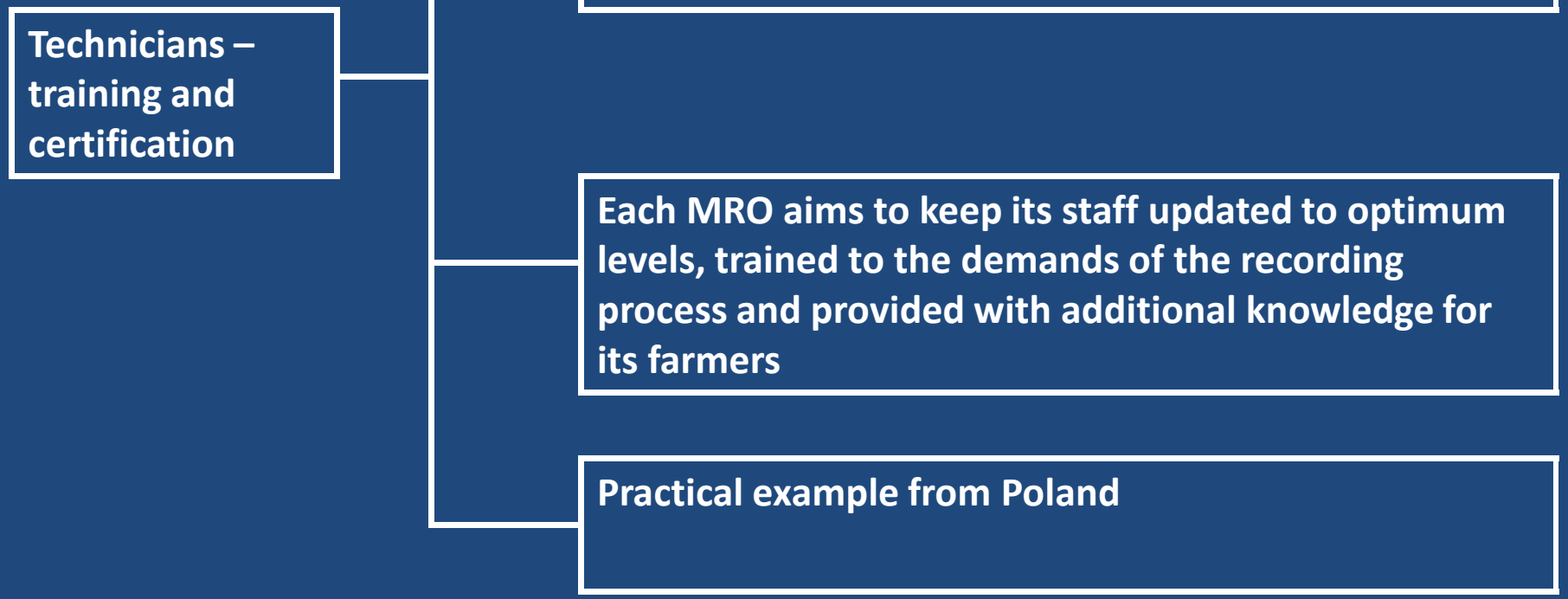
Efficient and inexpensive method for statistical plausibility checks

- For A – method is either not implemented or information is voluntary
- For B – method is implemented in Germany


Milk recording quality checks
External organisations
Well established in all countries in the project
Inspections of technicians, responsible for taking milk-recording samples
Milk recording quality checks
A team of auditors, managers + a combination of both approaches
ICAR Certificate of Quality is an important component
These checks are extensively performed in some countries

ISO accreditation/certification

Technicians – training and certification



Technicians – training and certification, practical case from Poland

- A more extensive training scheme is in use in Poland
- Technicians must undertake an initial training program at the beginning of their work
- Technicians must pass the basic exam, verified every 5 years
- Additionally they attend regular monthly meetings that cover explanations connected with current work, data input, introduction of any modifications and short topical trainings.

Milk-recording schemes

Country	A	AT	B
Czech Republic	A4	y	not accepted for herd book and BVE
Germany	***y***	***y***	***y***
Poland	A4, A8	y	
Austria		AT4, AT5	
Slovakia	A4	AT	
Croatia		AT4	BT4
Slovenia		AT4	

y … if no specific method is given

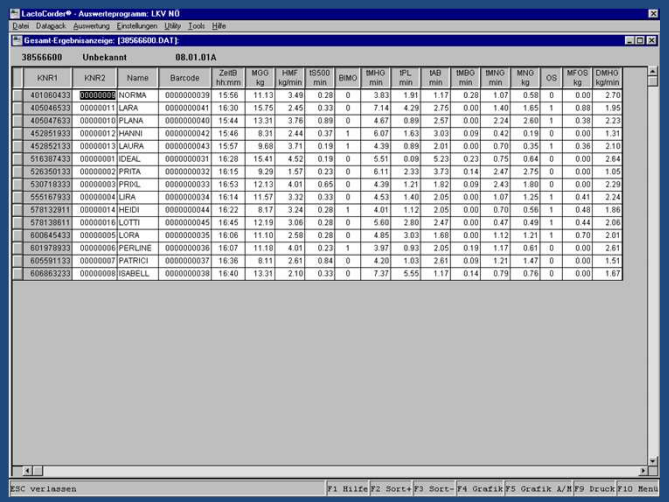
Highest flexibility and availability of milk-recording methods were found in Germany

On-farm milk meters and milk recording

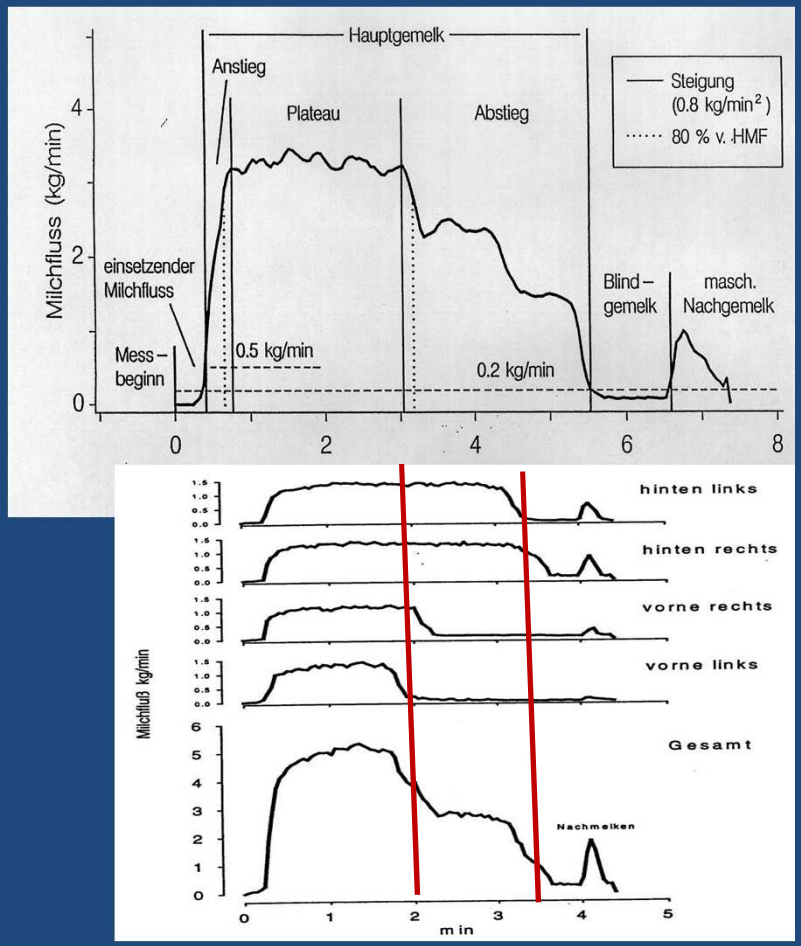
- ICAR approved on-farm meters
  similar to MRO portable meters
- **LactoCorder for recording**
  - Data supplied from the database:
    cow-IDs, latest verified milk yield
    (for sampling)
  - Samples: barcoded or RFID,
    direct sample taken during milking
  - Data delivery to the Database in ASCII-format

LactoCorder
milk recording and advisory

Tables and Ascii-file



Milk flow profile

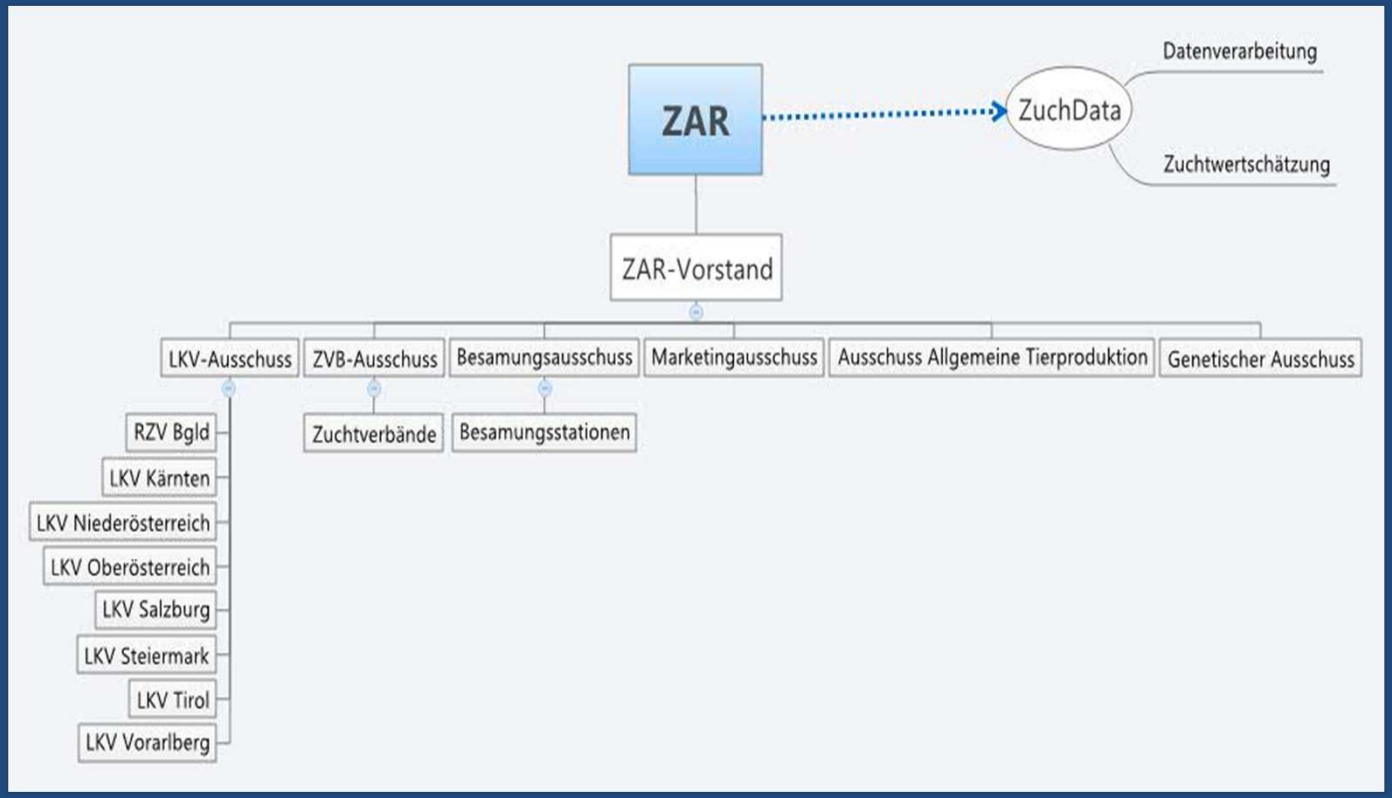


Data processing
practical case: Austria

- Formal organisation (structure and decisions; Zuchtdata)
- Workflow
- Software development in the case of RDV

Data processing practical case: Austria

- Formal organisation



- Decisions
  - Impact on the whole database: RDV meeting (4 partners)
  - Impact on Austria only: Exec. of Zuchtdata and LKV Committee

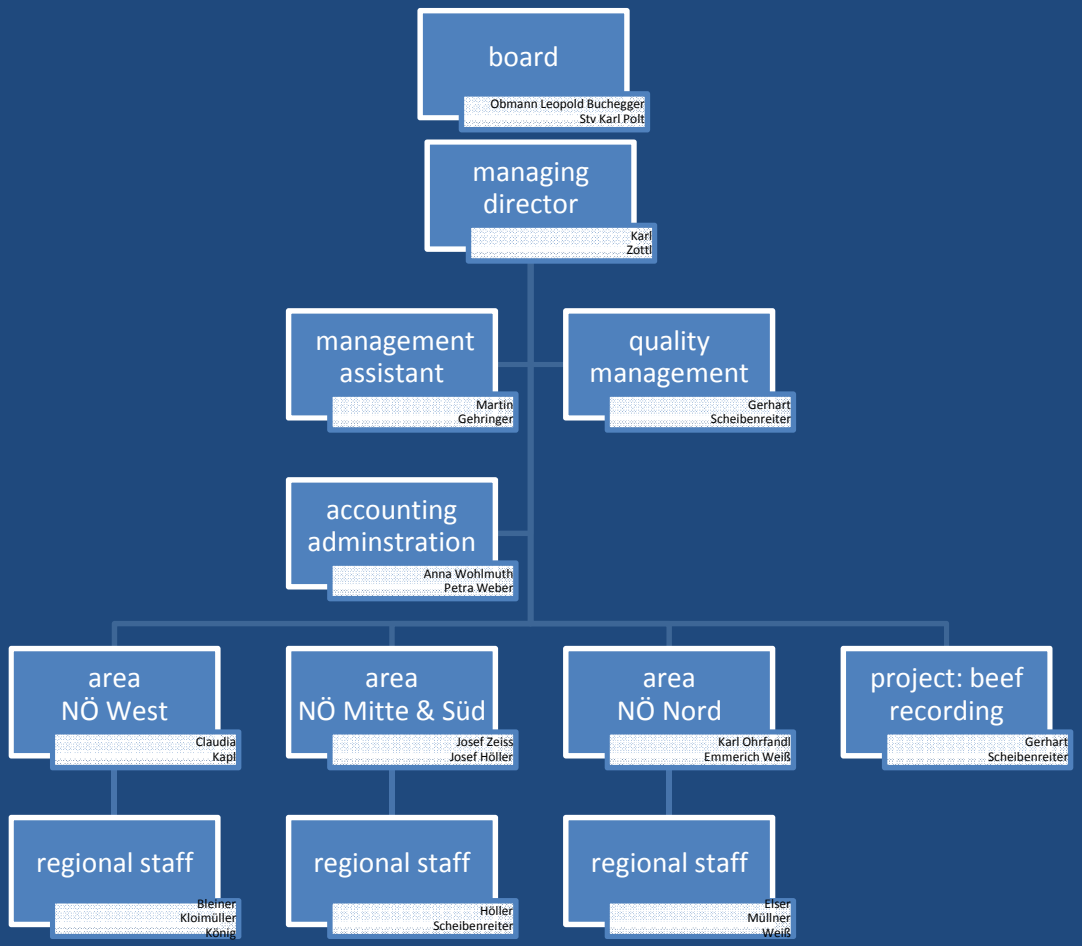
Data processing practical case: Austria

Software development in the case of RDV

- **Database core and common projects such as:**
  - RDV4M – internet service
  - RDV mobile – service for smart phones

  Proposals are prepared for the development group, which is given the freedom to make decisions
- **Bi-lateral projects or projects for a sole partner**
  - **Decision process involves partners**

Milk recording organisation in Austria (practical case: Lower Austria)



The formal organisation of the structure differs slightly between the single associations, therefore it is easier to treat it as one specific organisation (e.g. LKV Lower Austria).

Members include 3,650 milk recording farmers (avg. herd 22.5 cows),

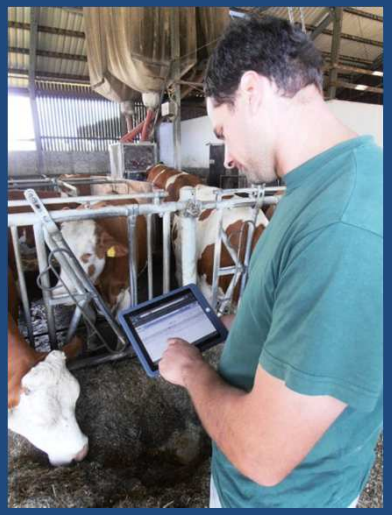
466 beef recording farmers (avg. herd 12.2 suckler cows and

296 rearing farmers (heifers).

The board is elected by the breeding organisation and the agricultural chamber.

Delivery of results to the farmer

- Reports, data files and web applications providing management information for the farmer
- Farm management software (DE, SK)
- App for mobile phones
- Information tools for the herdmanager delivered
  - in realtime and
  - in person and on-demand
- Focus on animals or situations that need attention



Additional traits

- Additional analysis brings additional benefit to farmers and enhances the reputation of the MRO.
- **Czech Republic:** citric acid and free fatty acids.
- **Poland** provides BHB and acetone for ketosis risk indication (Poland analyses BHB and acetone, but this data is equated to other information in order to calculate the possibility of ketosis risk, so BHB and acetone level data is not presented to the farmer directly).
- The freezing point is used internally for checking a sample's quality.
- **In Germany** all mentioned analyses are implemented.
- In future, some personnel plan to start using **additional milk traits** like pH for internal sample quality checks (Austria).
- For SARA, **Poland is considering** the use of either FFA or citric acid. Slovenia is thinking about introducing FFA, acetone and freezing point.

Other services offered by organisations responsible for milk recording

- Some of the organisations responsible for milk recording have diversified their activities and have also become active in other businesses
- Milk payments
- Veterinary drug sales
- Meat performance recording for dual purpose breeds
- Feeding advisory groups and others
- This could be a very valuable venture, and could bring stability and introduce the industry to new profitable business

Conclusion

- Services that are tailored to specific needs and requirements
- A sophisticated system of planning
- Trend for automatization
- The need to improve consistency among different parts of the ICAR Guidelines and to provide additional information on ICAR webpages
- Results from real time analysis and its use in milk recording are not accepted
- In the case of electronic milk meters countries follow classical conventional methods (e.g. A4, AT, etc.)
- Different approaches are used for sampling
- With regard to identification, countries primarily use classical conventional eartags as an additional tool transponder on the farm
- The number of transponders, together with official ID parts of the file are processed in the data processing centre

Conclusion

- Different approaches in transporting samples
- Sophisticated system of training and quality inspections
- The most efficient, cost effective approach for repeat tests is to use indicators, which have a connection with the quality of sample taking (e.g. fat in milk)
- A similar data processing design, with extensive plausibility checks and similar approaches on how to merge data is also in operation
- Looking to the future, there is a need to implement new traits for milk recording schemes and create new business
- For future development, there also needs to be a focus on improving the way in which data is delivered to the farmer and a focus on developing new smart phone/tablet technologies

Thank you for your attention!