Classification & Reporting of Severity

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Classification & Reporting of Severity
Farm Animal/ Fish Models
Programme

- Introduction to Workshop
- Importance of Severity Framework
- Introduction to models
- Round-table discussion of models
- Interactive presentation on actual severity
- Promoting consistency
- Discussion & questions

Workshop based on Severity Classification Workshops

Number of Workshops delivered

- **2016: 2 WS** in **2 countries**
- **2017: 26 WS** in **14 countries**
- **2018: 22 WS** in **9 countries**
- **2019: >10 WS** in **6 countries**
- **2021: > 6 WS in 6 countries (include remote)**
- **2022: FELASA Marseilles**

Estimated number of people trained

- **2016 - 2017: over 700**
- **2018 - 2019: over 1 200**

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Severity Framework under Directive 2010/63/EU (1)

- Application of **3Rs** throughout Projects
- **Prospective** classification of all Procedures
- **Threshold** for regulation
- **Upper limit**
- Reporting of **Actual Severity** for **each** animal

Severity Framework under Directive 2010/63/EU (2)

- **Re-use** dependent on severity of previous procedure
- Impacts on obligation for **Retrospective Assessment**
- Regulation of **GA creation and breeding**
- **Non-Technical Summaries** (NTS)

Promoting a consistent approach to Severity assessment

Why is this important ?

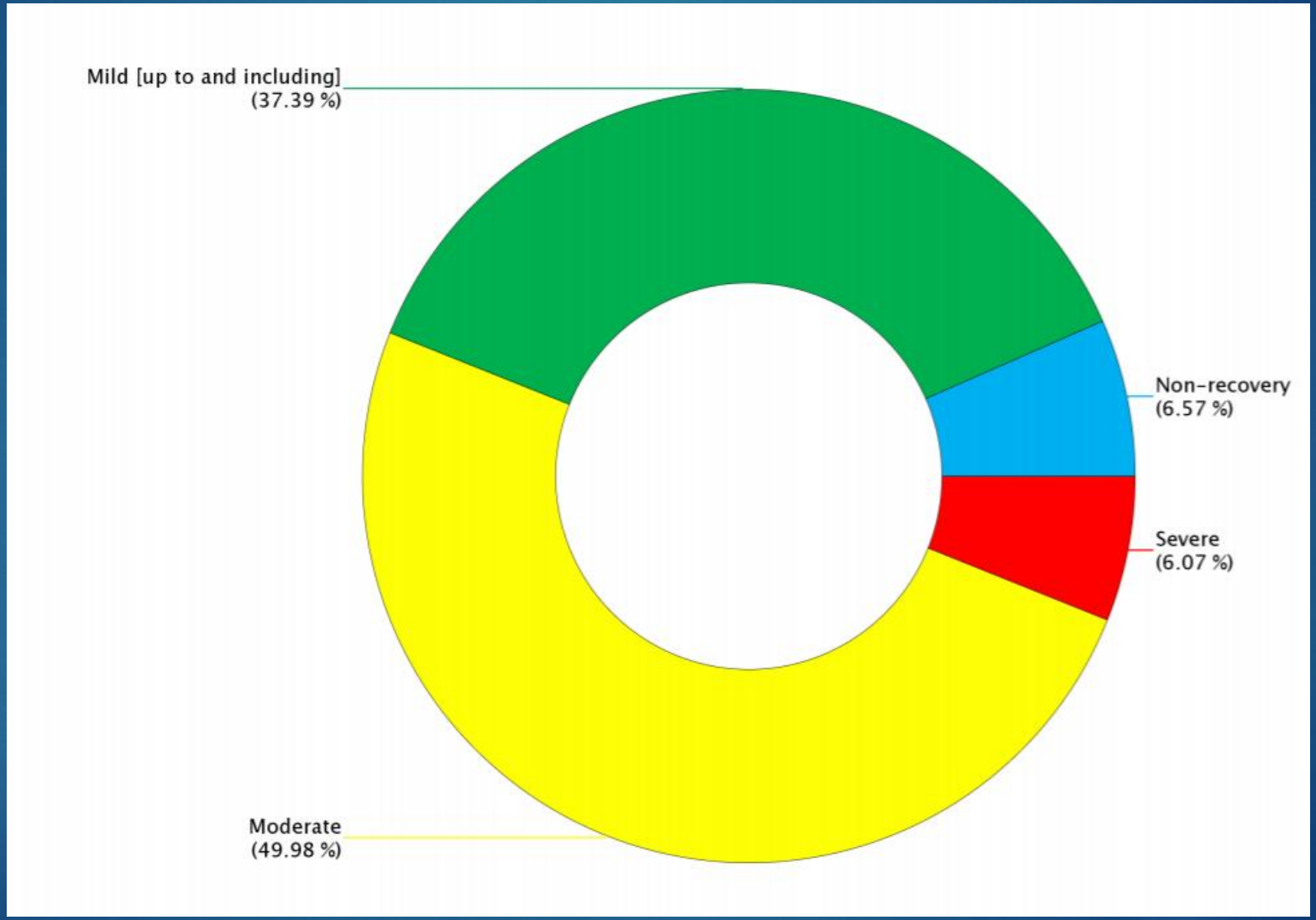
- Welfare of animals - esp. re-use
- Level playing field for scientists
- Transparency for general public

Promoting a consistent approach to Severity assessment

Why is this important ?

- Ongoing opportunities in particular to implement Refinement and reduce suffering
- Improved communication between those responsible for using, caring for and monitoring animals
- Input to retrospective project assessment when this is required
- Improved scientific data quality due to better welfare

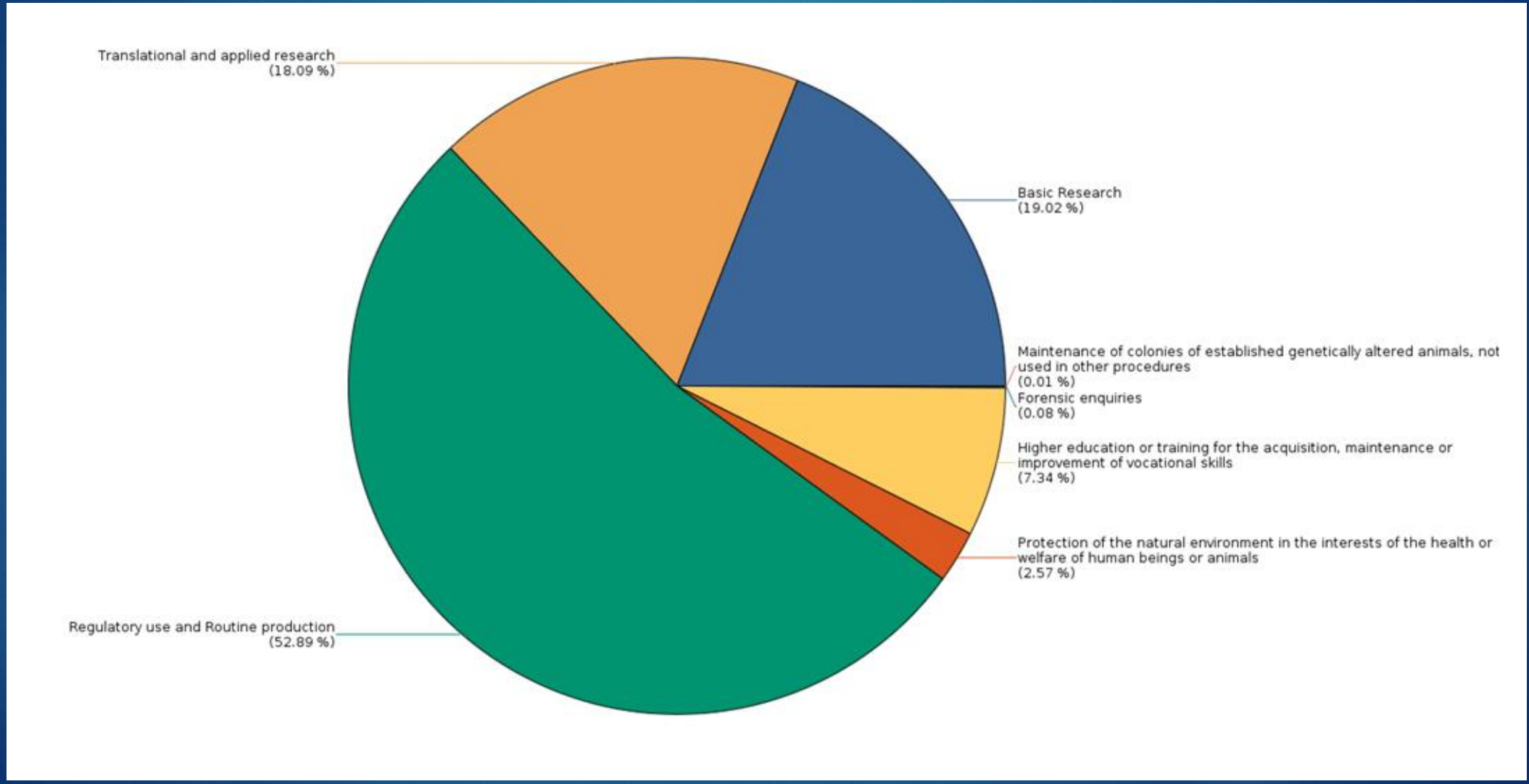
Distribution of severities



Comparison of MS annual publications

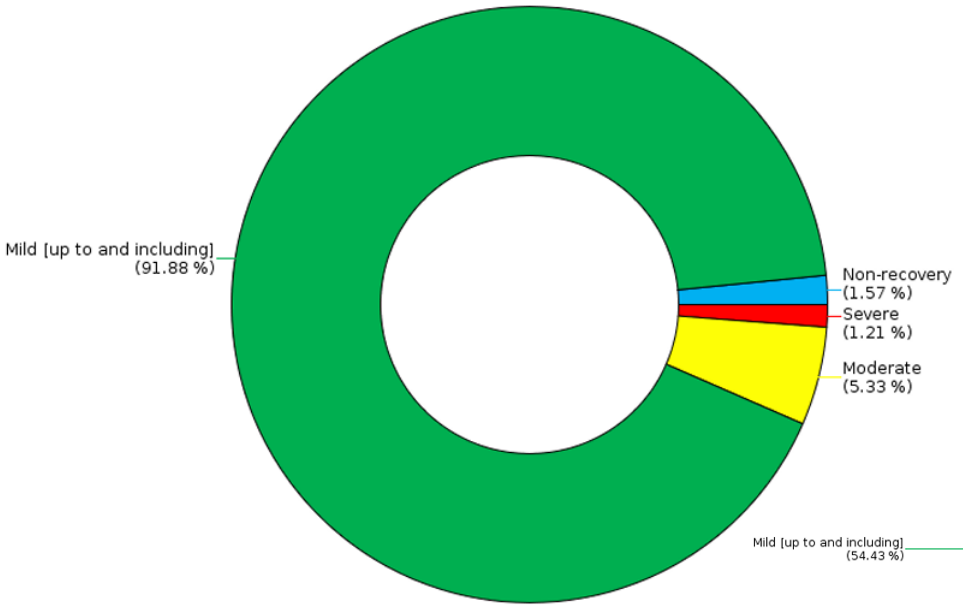
Classification	Mean (%)	Range (%)
Non-recovery	7	1 - 56
Mild	61	4 - 85
Moderate	24	5 - 65
Severe	8	0 - 35

2018 EU Statistics
Procedures - 74000 sheep ; 36,100 cattle

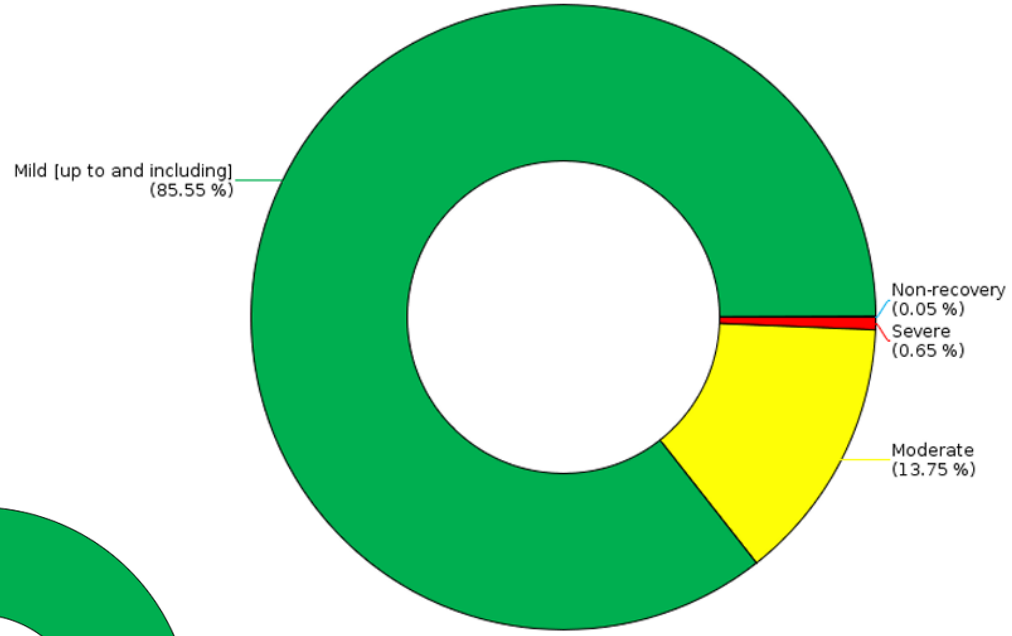


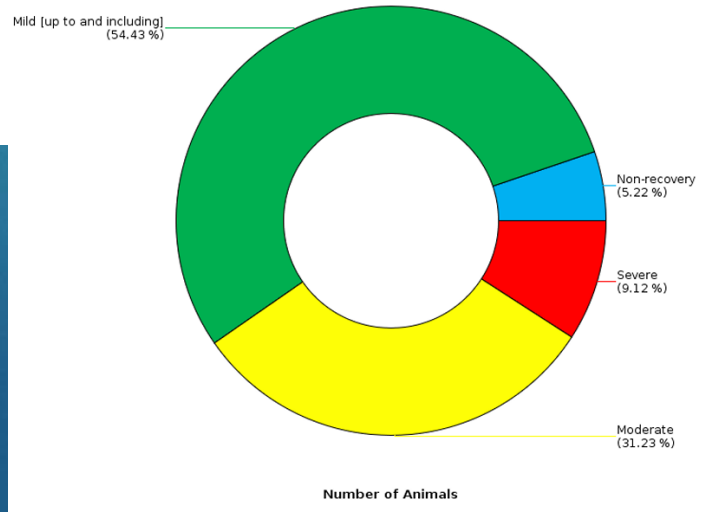
2018 EU Statistics

Sheep



Cattle





Classification & Reporting of Severity Rodent/ Farm Animal/ Fish Models Programme

- Introduction to Workshop
- Importance of Severity Framework
- Introduction to models
- Round-table discussion of models
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Procedure planning

- A number of illustrative animal models
- **For workshop purposes - accept justification for model, species and numbers/design****
- Identify steps which may impact severity
- Indicate measures to reduce severity
- Develop welfare recording/assessment sheet
- Indicate prospective severity classification

Model 1
Evaluation of the digestibility of novel Genetically Modified diets in sheep

Regulatory authorities have indicated to a pharmaceutical company that **evidence of nutritional quality in a novel group of GM diets is required** to support registration.

As part of the studies **collection and analysis of rumen fluid** will be required.

Model 1
Study Design

- **Four** Texel cross ewes will be **prepared with a rumen cannula**.
- After a period of **recovery** the animals will be **kept in single pens** to assess and monitor **food intake**.
- Over a sequence of **four one-monthly studies**, animals will be fed a concentrate diet containing the GM nutrients.
- **Rumen fluid** will be **collected daily** during the study period.
- **Blood samples** will be collected on **alternate days** to assess any impact on biochemical parameters.
- At the end of the study, the animals will be **kept** and held in the establishment.

Model 2
Evaluation of novel treatment for cryptosporidiosis in calves

Cryptosporidiosis is recognized worldwide, primarily in neonatal calves but also in lambs, kids, foals, and piglets and is caused by a **protozoan parasite**.

Calves with cryptosporidiosis usually have a **mild to moderate diarrhoea** that persists for several days regardless of treatment.

There are currently **very few treatments available**, and the present study intends to **assess the effects of a novel anti-protozoal**.

Model 2
Study design

- **Eighteen dairy cross calves** will be used. These will be delivered by **caesarean section** and held in containment conditions singly housed in pens. No colostrum will be given, but suitable artificial milk will be provided.
- At 3 days of age, all calves will be **orally dosed with xxx oocysts** (determined in previous studies to cause clinical disease).
- Two days later, 2 groups of six animals will receive the **test compound by subcutaneous injection** at two different dose levels by injection once daily for three days.
- Animals will be monitored for the **next fourteen days**. **Blood and faecal samples** will be taken daily.
- At the end of the study, the animals may be **kept alive** and held in the establishment for subsequent use in a different study.

For Each model

- Complete the table for the protocol indicating
  - the **procedures** which need to be considered (the table gives the number of steps)
  - the potential **adverse effects**
  - how the **adverse effects** will be minimised
  - The **humane endpoints**

→ **Recommend the severity classification** for the procedure.

Procedure Planning

Initial prospective assessment and consideration of specific refinements and humane endpoints

What does this study involve doing to the animals?	What will the animals experience? How much suffering might it cause? What might make it worse?	How will suffering be reduced to a minimum?	
	Adverse effects	Methodology and interventions	End-Points

Classification & Reporting of Severity

Programme

- Refresher of legal requirements
- Findings from FELASA workshops
- Introduction to models
- Round-table discussion of models
- Interactive presentation on actual severity
- Promoting consistency
- Discussion & questions

Model 1

Evaluation of the digestibility of novel Genetically Modified diets in sheep

What does this study involve doing to the animals?	What will the animals experience? How much suffering might it cause? What might make it worse?	How will suffering be reduced to a minimum?	
	Adverse effects	**Methodology and interventions**	**End-Points**
Induction & maintenance of general anaesthesia. **Implantation of rumen cannula.**	Death under anaesthesia. Failure to place cannula.	Experienced surgical team using aseptic methods. Analgesia will be provided.	Failure to recover from anaesthesia within a few hours - animal will be killed.
Maintenance of rumen cannula.	Infection ; swelling ; skin damage due to leaking of rumen liquor.	Regular cleaning. Use of skin creams. Choice of cannula is important.	Chronic infection which cannot be effectively treated. Weight loss.
Single housing.	Social isolation.	Penned in close proximity to conspecifics. Periods of single housing limited to less than 7 days. Pen will meet minimum enclosure sizes.	

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Feeding altered diet.	Weight loss ; inappetence ; bloat ; diarrhoea.	Diet expected to meet nutritional needs and be palatable. Detailed clinical monitoring in place.	Weight loss >20% of age/sex matched controls.

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Blood sampling.	Transient discomfort during sampling.	No more than 10%TVB in any 28 day period. No more sampling.	

Model 1

Evaluation of the digestibility of novel Genetically Modified diets in sheep

Prospective Severity of this Procedure

Model 1

Evaluation of the digestibility of novel Genetically Modified diets in sheep

Prospective Severity of this Procedure

MODERATE

Model 2
Evaluation of novel treatment for cryptosporidiosis in calves

Cryptosporidiosis is recognized worldwide, primarily in neonatal calves but also in lambs, kids, foals, and piglets and is caused by a **protozoan parasite**.

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Evaluation of novel treatment for cryptosporidiosis in calves

What procedures are required ?

- Single Housing
- Withholding colostrum
- Oral administration of oocytes
- Injection of test substance
- Faecal sampling
- Blood sampling

Evaluation of novel treatment for cryptosporidiosis in calves

What does this study involve doing to the animals?	What will the animals experience? How much suffering might it cause? What might make it worse?	How will suffering be reduced to a minimum?	
	Adverse effects	**Methodology and interventions**	**End-Points**
Single housing	Stress/Distress Anormal behaviour	Pens will meet requirements in Annex III. Additional bedding will be provided. Temperature controlled. Visual, auditory but no tactile contact with other calves.	Maximum duration21 days.
Withholding of colostrum	No colostrum can be provided as may interfere with science. Lack of antibodies increase susceptibility to infection	All nutritional requirements provided in substitute milk. Animals maintained in containment - all bedding/diet autoclaved	If infection, other than impact of cryptosporidia, for example navel infection, DV will be consulted and treatment applied.

Evaluation of novel treatment for cryptosporidiosis in calves

What does this study involve doing to the animals?	What will the animals experience? How much suffering might it cause? What might make it worse?	How will suffering be reduced to a minimum?	
	Adverse effects	**Methodology and interventions**	**End-Points**
Oral administration of oocytes	Administration by stomach tube necessary to ensure correct placement. Incorrect dosing may cause damage. Diarrhoea, weight loss, inappetence, demeanour/dull, inactive	Experienced staff. Very low incidence of misdosing. Animals checked 4 times daily. Clinical scoring systems. Replacement fluids, oral and injectable.	Animal collapsed, failing to respond quickly to fluid therapy will be euthanased. Diarrhoea will not exceed 7 days. Weight loss will not exceed 15%.
Injection of test substance/control	Transient discomfort following injection. No adverse effects from test substance are expected from previous data. Infection/swelling at injection sites.	Sterile technique; subcutaneous placement behind shoulder. Different sites to be used.	If swollen or infected, animals will be examined by DV and either killed or Treatment provided.

Evaluation of novel treatment for cryptosporidiosis

Calf Health Scoring Chart

Farm Name: _____

Date: _____

SCHOOL OF VETERINARY MEDICINE
University of Wisconsin-Madison

Calf Scores (Total respiratory score: 4 – watch, 5 or more – treat; fecal score: 2 or 3 –treat)							
Animal ID	Age	Nasal discharge	Eye or ear (highest number)	Cough – spontaneous or induced	Temperature	Total respiratory score	Fecal consistency

Calf Health Scoring Criteria

0	1	2	3
Rectal temperature			
100-100.9	101-101.9	102-102.9	≥103
Cough			
None	Induce single cough	Induced repeated coughs or occasional spontaneous cough	Repeated spontaneous coughs
Nasal discharge			
Normal serous discharge	Small amount of unilateral cloudy discharge	Bilateral, cloudy or excessive mucus discharge	Copious bilateral mucopurulent discharge
			
Eye scores			
Normal	Small amount of ocular discharge	Moderate amount of bilateral discharge	Heavy ocular discharge
			
Ear scores			
Normal	Ear flick or head shake	Slight unilateral droop	Head tilt or bilateral droop
			
Fecal scores			
Normal	Semi-formed, pasty	Loose, but stays on top of bedding	Watery, sifts through bedding
			

Evaluation of novel treatment for cryptosporidiosis in calves

Table 1: Summary of clinical parameters to check while performing a clinical examination in a calf

Parameter	Normal	
Temperature	38.5 to 39.5°C	
Respiratory auscultation	Rate: <1 month old	24 to 26 breaths per minute
	Rate: >1 month old	15 to 30 breaths per minute
	Effort	Normal respiration should not include abdominal muscle involvement
Heart Auscultation	80 to 120 beats per minute	
	Irregular beats	Abnormal
	Audible heart sounds	Described in Table 2
	Irregularities of rhythm	Dysrhythmias are abnormal and often seen in cases of diarrhoea due to increased blood potassium levels
	Palpation of the apex beat	Possible around the left 4th to 5th intercostal space
Pulse rate	The pulse rate can be taken from the facial artery, which is located on the medial ventral aspect of the mandible, in the vascular notch. The femoral arteries can also be used to take a pulse rate; this is located on the medial aspect of the thigh between gracilis and sartorius muscles	
Rumination	Age	This will depend upon the age at which solid feed is provided for calves; this should b three to six weeks before weaning
	Frequency of contractions	Three contractions in 2 minutes
Intestinal sounds	Frequency of borborgymi	
Abdominal palpation	It is possible to palpate the abdomen in young calves in a standing and lateral recumbent position. Percussion, ballottement and succussion with auscultation can indicate tympanic gas and fluid filled viscus	
Faeces	Normal faeces are yellow/light brown and of semisolid consistency in the first week of life, after the greenish/black meconium has been passed. Once on milk, the faeces are yellow to grey with a semisolid consistency, which becomes darker and firmer when an increased level of fibre is digested. Normal pH is 7.0 to 8.5	
Musculoskeletal system	Symmetry of the limbs, with no heat or swelling of the joints. The limbs should go straight down, without any curves or angular deformities	
Neurological system	Suckle reflex should always be present. Menace response will not be present until approximately one week of age	
Mucous membranes	Mucous membranes should be checked using oral membranes and the conjunctiva. The mucous membranes should be salmon pink and moist, with a capillary refill time of <2 seconds. Oral mucous membranes can be unreliable for capillary refill time and colour, particularly in neonates; we recommend using conjunctiva for colour for young calves, particularly if suspicious of anaemia	
Position of the head and ears	The head should be symmetrical and should not be tilted to either side. The ears should be held horizontally to the head. There should be no facial swellings under or around the jawline (indicative of diphtheria)	
Umbilicus	The navel should not be enlarged, warm or painful. The navel should be dry within 24 hours of the birth. There should be no gap between the ventral abdominal walls which can form a hernia ring	
Dentition	The total number of deciduous teeth is 20, with three premolars on the upper jaw on each side. The lower jaw contains four incisors and three premolars on each side. The 1st and 2nd pair of temporary incisors are usually present at birth, with the 3rd and 4th pair erupting either before birth or in the first two weeks of life. The permanent incisors erupt from 21 months of age	

Evaluation of novel treatment for cryptosporidiosis in calves

What does this study involve doing to the animals?	What will the animals experience? How much suffering might it cause? What might make it worse?	How will suffering be reduced to a minimum?	
	Adverse effects	**Methodology and interventions**	**End-Points**
Faecal sampling.	Clean faecal samples will require digital stimulation – minor discomfort		
Blood sampling.	Daily blood samples by jugular venepuncture	Limit volumes; appropriate needle size; clean technique	

Evaluation of novel treatment for cryptosporidiosis in calves

Prospective Severity Classification of this Procedure ?

MODERATE

Evaluation of novel treatment for cryptosporidiosis in calves

General considerations

- Use of caesarean section – is it necessary? Use of caught calves? Fate of cows? Most refined procedure is non-recovery?
- Single housing – discuss duration/severity?
- Containment facilities for farm animal work – challenges.
- Withholding colostrum – breach of Animal Welfare legislation?
- Injection & Blood sampling - site/volumes etc
- Welfare assessment
- Fate of animals – are they "cured"; residual risk; zoonosis?
- Suitability for re-use

Key challenges

- **Robust criteria** for **welfare assessment** for all species
- **Thresholds** for regulation
- **Consistent** application of legislation / guidance
- **Cumulative** suffering

How to promote consistency

- **Expertise** on animal health, welfare and behaviour
- **Communication between all** those responsible for conducting the study and monitoring the animals (top-down, bottom-up, between and within)
- **Regular** review of outcomes
- **Oversight** : locally (e.g. the Animal Welfare Body), regionally, nationally, EU

Additional Information - EU

- February 2016
- Discussion paper for the **purposes of promoting consistent reporting of statistical data** (actual severity and animal numbers) under Article 54(2) of Directive 2010/63/EU and Commission Implementing Decision 2012/707/EU

More information at:
http://ec.europa.eu/animals-in-science

Additional Information - EU

- November 2021
- Includes examples of Welfare Assessments for rodents, pigs and fish

More information at:
http://ec.europa.eu/animals-in-science

Additional Information

Working Party Report

Classification and reporting of severity experienced by animals used in scientific procedures: FELASA/ECLAM/ESLAV Working Group report

David Smith[1], David Anderson[2], Anne-Dominique Degryse[3], Carla Bol[4], Ana Criado[5], Alessia Ferrara[6], Nuno Henrique Franco[7], Istvan Gyertyan[8], Jose M Orellana[9], Grete Ostergaard[10], Orsolya Varga[11] and Hanna-Marja Voipio[12]

Laboratory Animals
2018, Vol. 52(1S) 5–57

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for Laboratory Animal Science

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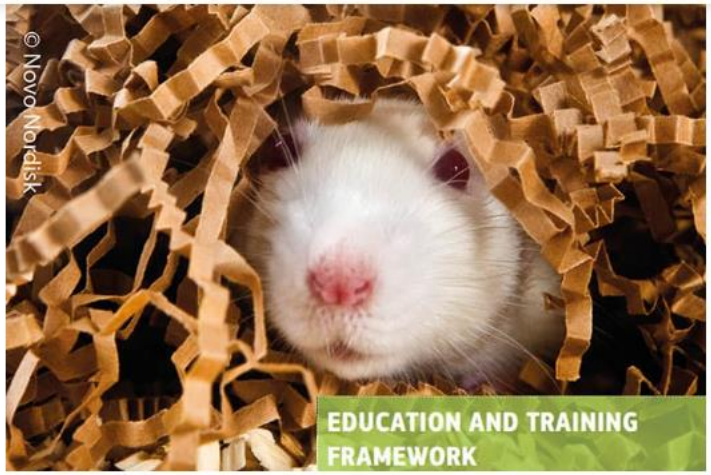
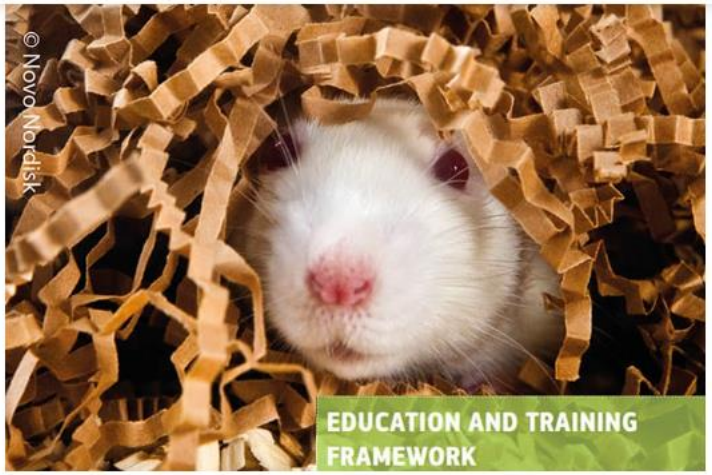


EU-10: Design of procedures and projects – level 1

Course Details



EU-11: Design of procedures and projects – level 2

Course Details

EU-12: The severity assessment framework

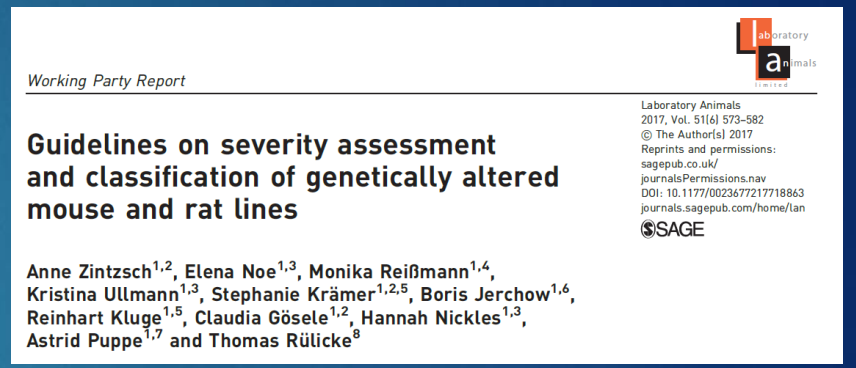
Course Details

Additional Information

Guidelines on Severity Assessment and Classification of GA mouse and rat lines – working group of Berlin Animal Welfare Officers

Zintzsch A et al. Laboratory Animals 0(0) 1-10, June 2017

https://doi.org/10.1177/0023677217718863



Working Party Report

Guidelines on severity assessment and classification of genetically altered mouse and rat lines

Anne Zintzsch[1,2], Elena Noe[1,3], Monika Reißmann[1,4], Kristina Ullmann[1,3], Stephanie Krämer[1,2,5], Boris Jerchow[1,6], Reinhart Kluge[1,5], Claudia Gösele[1,2], Hannah Nickles[1,3], Astrid Puppe[1,7] and Thomas Rülicke[8]

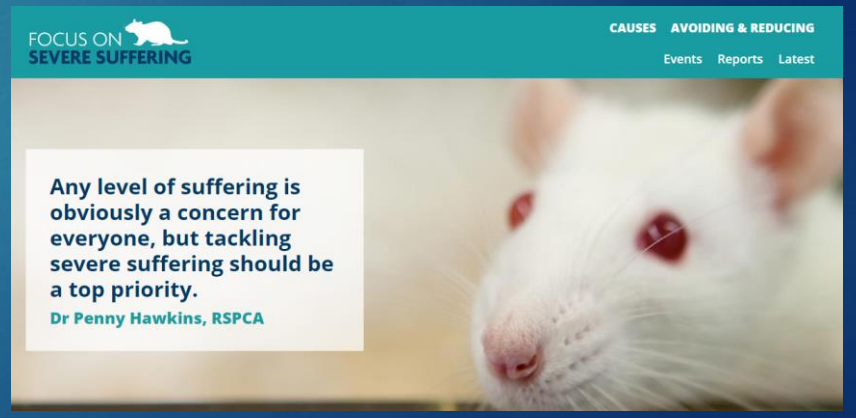
Laboratory Animals
2017, Vol. 51(6) 573–582

DOI: 10.1177/0023677217718863
journals.sagepub.com/home/lan
SAGE

UK website on Severe Procedures

Focus on Severe Suffering

https://focusonseveresuffering.co.uk/



Thank you and Questions !