The Refinement Wiki and the International Culture of Care Network

norecopa.no/CAAT-2

PREPARE guidelines:

norecopa.no/CAAT-1

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Norecopa

Norway's National Consensus Platform for the

Three Rs: Replacement, Reduction and Refinement

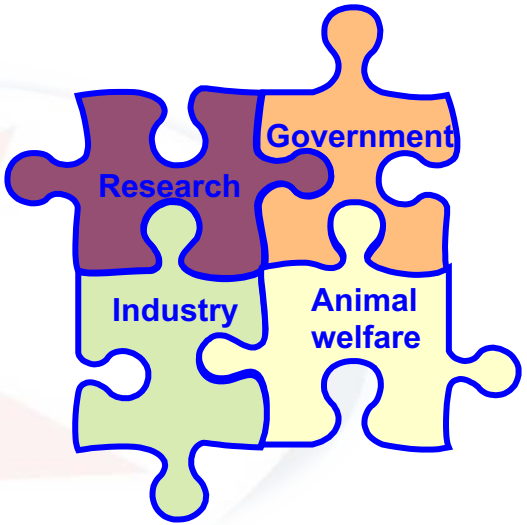
and a source of global 3R resources

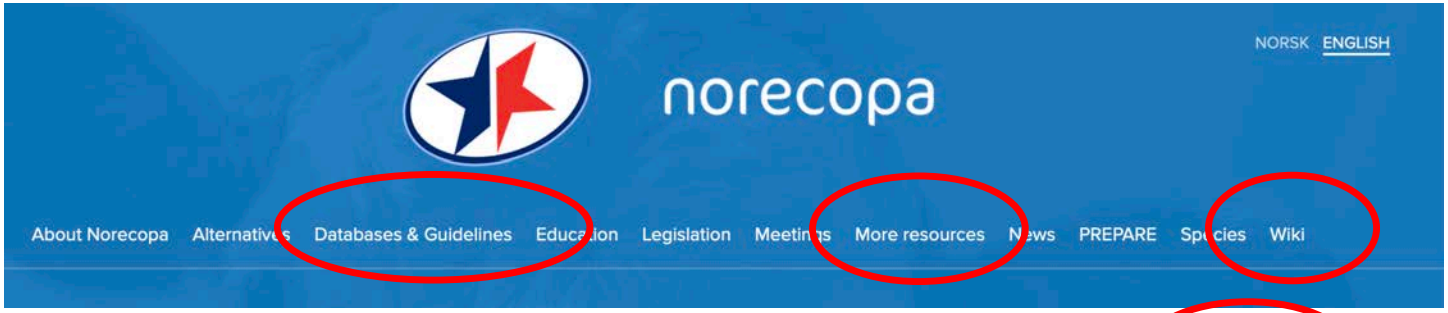
https://norecopa.no

European Consensus-Platform for Alternatives

ecopa.eu

- Established in 2000
- Recognises National Consensus Platforms (NCPs) with 4 stakeholders equally represented:





norecopa.no / Other resources / Organisations

Organisations of relevance to animal research

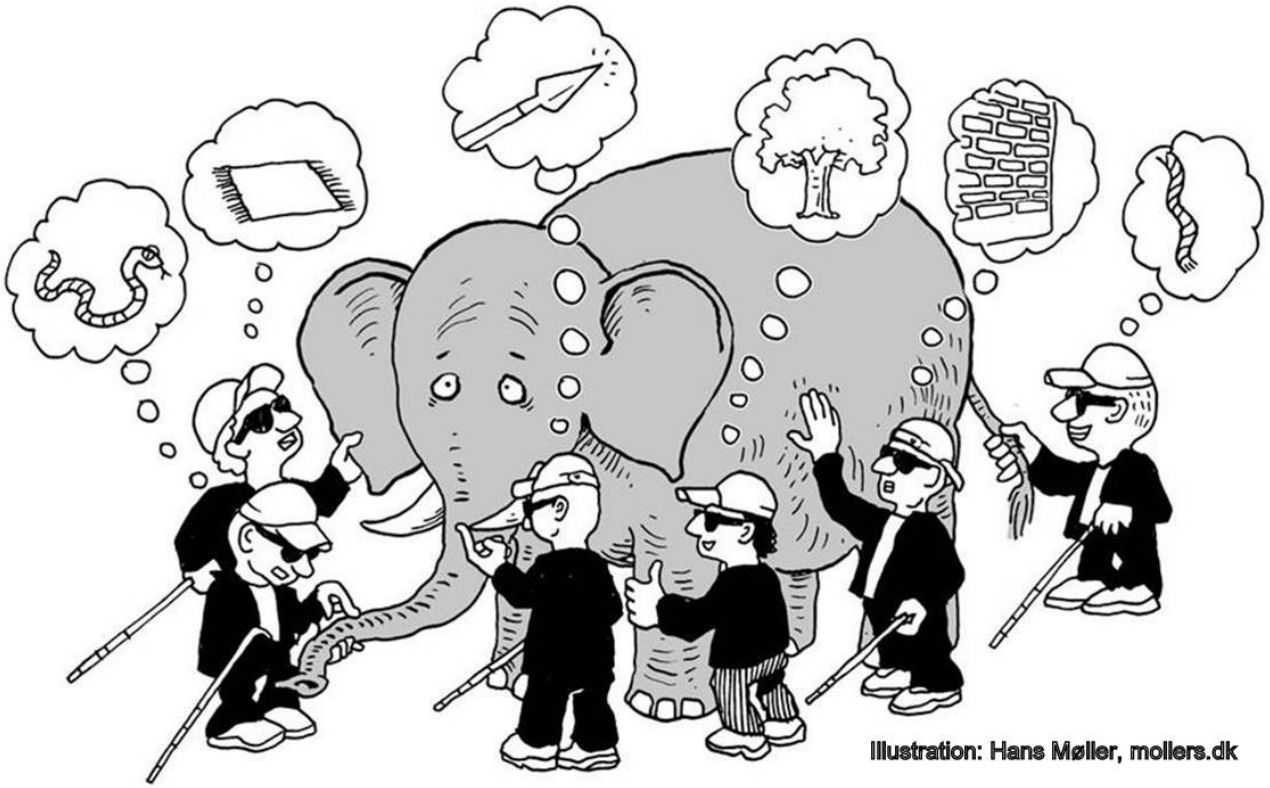
Organisations within Laboratory Animal Science

AAALAC International (Association for Assessment and Accreditation of Laboratory Animal Care International)
AALAS (American Association for Laboratory Animal Science)
ACLAM (American College of Laboratory Animal Medicine)
AniMatch (an online sharing platform for the exchange of organs and tissues)
ARSAL (Asociatia Româna pentru Stiinta Animalelor de Laborator; Romanian Laboratory Animal

9,900 webpages
350,000 pageviews per year

1. United States
2. United Kingdom
3. Canada
4. India
5. Norway
6. Australia
7. Spain
8. Germany
9. Brazil
10. France

What is Culture of Care?



Text and resources from:

The International Culture of Care Network
norecopa.no/coc

A demonstrable commitment, throughout the establishment, to improving:

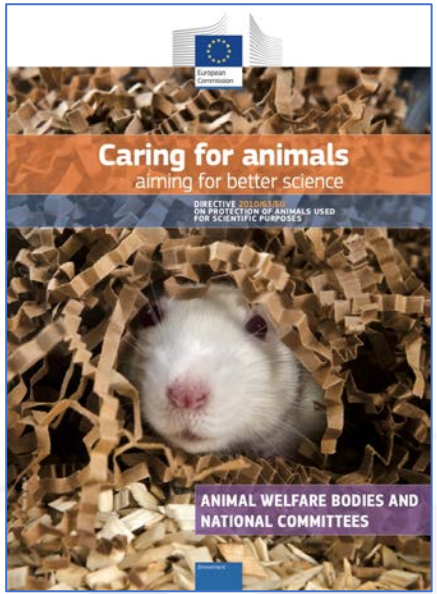
- animal welfare
- scientific quality
- care of staff
- transparency for all stakeholders, including the public

It goes beyond simply complying with the law!

A Culture of Care is anchored in the EU Directive 2010/63

Recital 31 states:

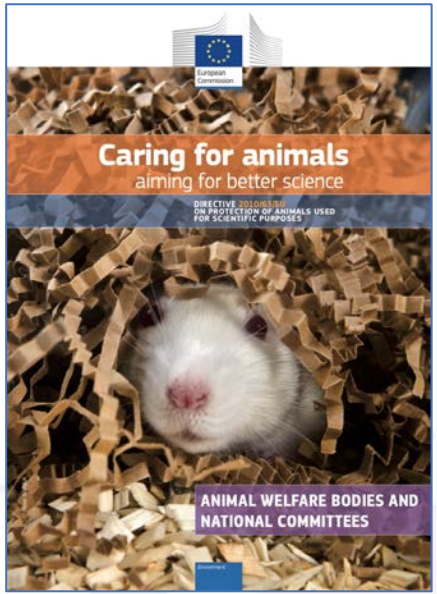
Animal-welfare considerations should be given the highest priority in the context of animal keeping, breeding and use. Breeders, suppliers and users should therefore have an ***animal-welfare body*** *in place with the primary task of focusing on giving advice on animal-welfare issues. The body should also follow the development and outcome of projects at establishment level,* ***foster a climate of care*** *and provide tools for the practical application and timely implementation of recent technical and scientific developments in relation to the principles of replacement, reduction and refinement...*



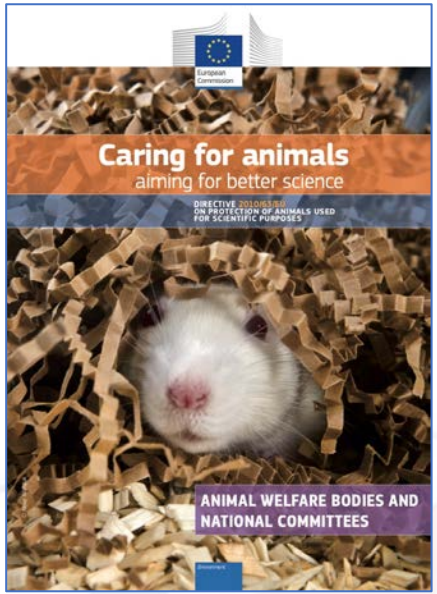
'Fostering a Culture of Care

Ensuring an appropriate culture of care is in everyone's interests, as it will promote improved animal welfare and therefore enhanced scientific outcomes, and give all those involved in the establishment confidence that delivering high quality animal care and use practices is an important priority.

ec.europa.eu/environment/chemicals/lab_animals/pdf/guidance/animal_welfare_bodies/en.pdf



- *Shared responsibility (without loss of individual responsibility) towards animal care, welfare and use.*
- *A pro-active approach towards improving standards, rather than merely reacting to problems when they arise.*
- *Effective communication throughout the establishment on animal welfare, care and use issues and the relation of these to good science*
- *A no-blame culture*



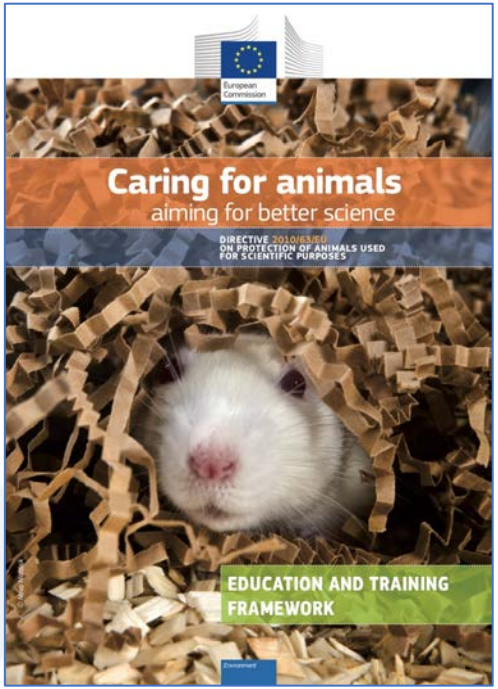
How?

Although, the culture of care should permeate throughout all levels of the establishment, it is essential that senior staff should take the lead, and visibly demonstrate their commitment to, and support for, a good culture of care within the establishment.

Management should acknowledge and appreciate efforts of staff to promote an effective culture of care, for example as part of staff appraisal criteria or by developing award programmes for Three R initiatives.

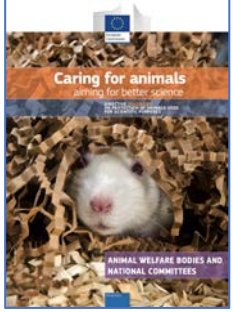
Further advice in the Guidance Documents on
Inspections and Enforcement, and **Education and Training Framework**

http://ec.europa.eu/environment/chemicals/lab_animals/pdf/guidance/inspections/en.pdf



http://ec.europa.eu/environment/chemicals/lab_animals/pdf/guidance/education_training/en.pdf

Norecopa: PREPARE for better Science



Five suggestions to help promote a Culture of Care:

1. Encourage scientists to work with (and value the contribution of) animal technologists and care staff
2. Provide for on-going involvement of project licence holders in the AWB
3. Provide the opportunity and encouragement for any staff member to raise issues with, and to attend AWB meetings
4. Communicate with all staff and spread the word about the 3Rs, welfare improvements, policy changes, roles of care staff, training persons and veterinarians, and the AWB itself
5. Provide information on the role and functions of the AWB for new staff and encourage their contributions

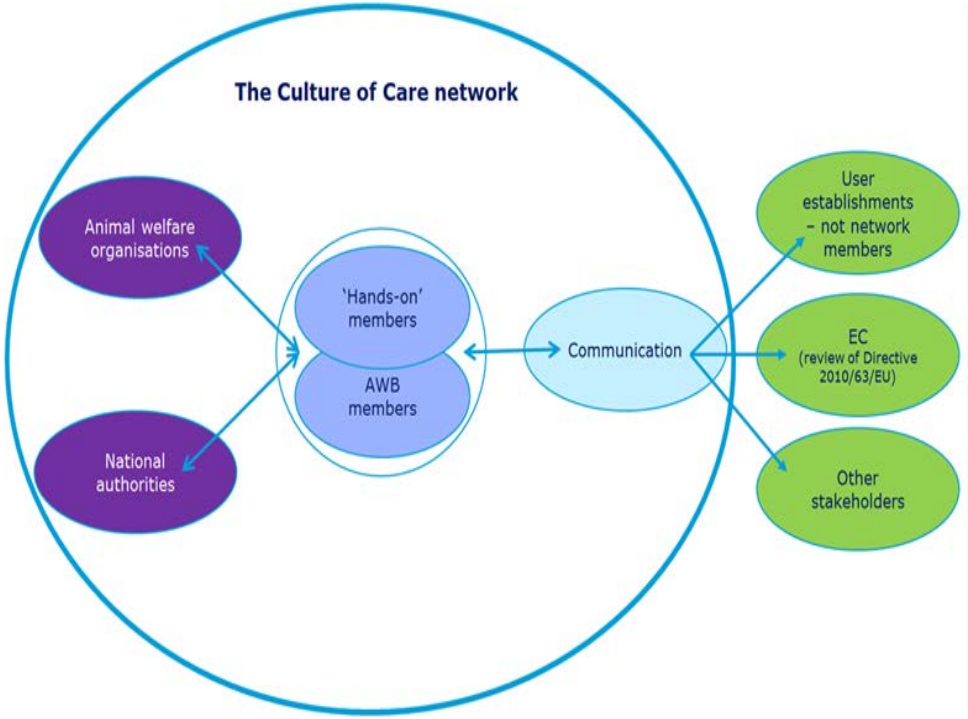
Space Shuttle (NASA)

no.wikipedia.org

cbsnews.com

Collaboration and openness is critical!

- Complex machines/animals create *known or unknown unknowns*
- Possible design weaknesses must be discussed (damage from foam, and susceptibility to low temperature, *which the engineers knew about!)*
- Avoid "pressure to launch" (political, media) = Publish or perish.
- Don't make bad management decisions:
  "We've got away with it before"
  "We've managed to publish the experiments before"
- Often a combination of many factors, each of which may be harmless until they occur simultaneously
  Don't ignore "insignificant" issues!



The International Culture of Care Network

norecopa.no/coc

39 members from user establishments, competent authorities, communication and interest organisations, in **17 countries**

Establishing a new file-sharing platform and email address in June 2020

Starting three sub-groups:

- *Animal welfare in genetically altered lab animals*
- *Anaesthesia, care, welfare, severity, humane endpoints*
- *Ethical review*

Proposed by Thomas Bertelsen at the FELASA Congress in 2016

Communication and the Culture of Care

Penny Hawkins, RSPCA Research Animals Department
on behalf of the International Culture of Care Network*

Effective two-way communication between scientists and animal technologists is essential for a good Culture of Care
The European Commission suggests the 'development of formal and informal communication channels, for mutual benefit with respect to science and animal welfare'
Here are some examples from International Culture of Care network members

Regular meetings

Scheduled meetings for scientists, animal technologists, vets, unit managers and AWERB members

Regular refresher/update meetings for all organised by NTCO

Special events

Duo-talks: researcher talks about their science, and animal technologists talk about techniques and animal care within the project

ELH organises an **informal meeting** for **all**, in which anyone can raise welfare issues

Building communication into existing processes

Each study has a **pre-start** and **wash-up** meeting involving **everybody**

Three Rs improvements **reported to AWERB** & **shared** at external user meetings

Other ideas

A **'boxless' event**: anyone can submit 'out of the box' ideas to improve practice

A **staff survey** for **all** e.g. how much do you agree with statements such as *'in our group we listen to each others' ideas about animal welfare'*

*norecopa.no/culture-of-care

norecopa

norecopa.no/CoC

Recognition of a culture of care: 3R prizes

Norecopa's 3R Prize

In 2010 Norecopa established a prize for outstanding efforts to advance "the 3Rs" (Replacement, Reduction & Refinement) in connection with animal research.
The aim of the prize is to increase awareness and use of the 3R principle in research. Special emphasis is placed on advances in research and development which benefit Norwegian conditions. The prize can be awarded for scientific, technical or administrative work.

The prize consists of NOK **30,000 and a diploma.** It is awarded in connection with Norecopa's Annual General Meetings.

Do you wish to nominate someone, or yourself, for the prize?

The deadline is 15 March each year. Nominations can be sent at any time of year to Norecopa's secretary.

The nomination form can be downloaded here
The statutes for the prize can be read here

More information in Norwegian about the prizewinners and the nominees.

Other 3R Prizes:
3R-prize from the Danish 3R-centre
3R-prize from the British 3R-centre NC3Rs
3R Science Prize and 3R Laboratory Technician Prize from EPAA (European Partnership for Alternatives to Animal Testing)
Nordic Research Prize, awarded by Alternativfondet and Forsøgsdyrenes Værn (won by Adrian og Karina Smith in 2003)
Ursula M. Händel Prize
SGV Award (3R prize from the Swiss Laboratory Animal Science Association)
Global overview of 3R Awards

norecopa.no/about-norecopa/3r-prize

- **Newsletters**
- **Events and awards for technicians**
- **Public pledge from the company**

animals

MDPI

Concept Paper

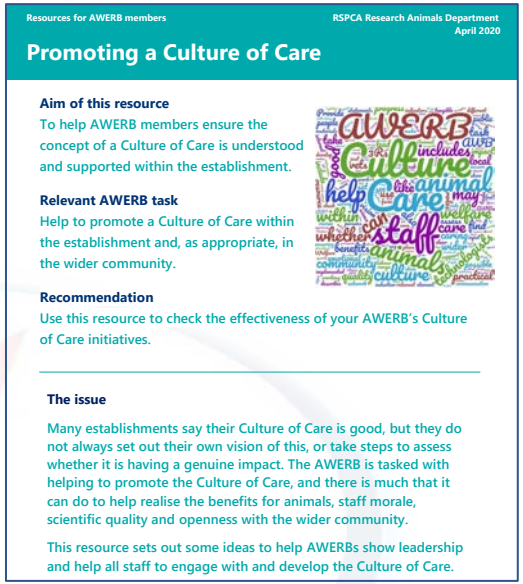
3Rs-Related and Objective Indicators to Help Assess the Culture of Care

mdpi.com/2076-2615/9/11/969/htm

Table 3. Suggestions for objective indicators of a good Culture of Care, based on [11].

- Staff numbers appropriate to the size of the establishment, type of work, and type of animals
- Low turnover of staff and minimal need for agency staff to 'fill the gaps'
- Staff have sufficient time and resource for daily, adequate routine monitoring
- Attending veterinarian visits regularly and is sufficiently available to provide advice
- Person responsible for overseeing the welfare and care of the animals (e.g., Named Animal Care and Welfare Officer in the UK, Directive Art 24 1a) meets regularly with users and is aware of their work
- Person responsible for ensuring that staff have access to species-specific information (e.g., Named Information Officer in the UK, Directive Art 24 1b) has adequate resource for the role
- Person responsible for ensuring compliance (e.g., Establishment Licence Holder in the UK, Directive Art 20 2) regularly meets with the other responsible persons and the Animal Welfare Body
- Clear audit trails of communications between scientists and animal technologists (see also examples from the Culture of Care network [12])
- A clear system for raising concerns that is supported by management
- Well-maintained training records
- Program to review and reassess competence
- Regular Animal Welfare Body meetings with feedback to staff

Real-life examples and practical advice for Animal Welfare Bodies from the RSPCA



Resources for AWERB members

RSPCA Research Animals Department
April 2020

Promoting a Culture of Care

Aim of this resource

To help AWERB members ensure the concept of a Culture of Care is understood and supported within the establishment.

Relevant AWERB task

Help to promote a Culture of Care within the establishment and, as appropriate, in the wider community.

Recommendation

Use this resource to check the effectiveness of your AWERB's Culture of Care initiatives.

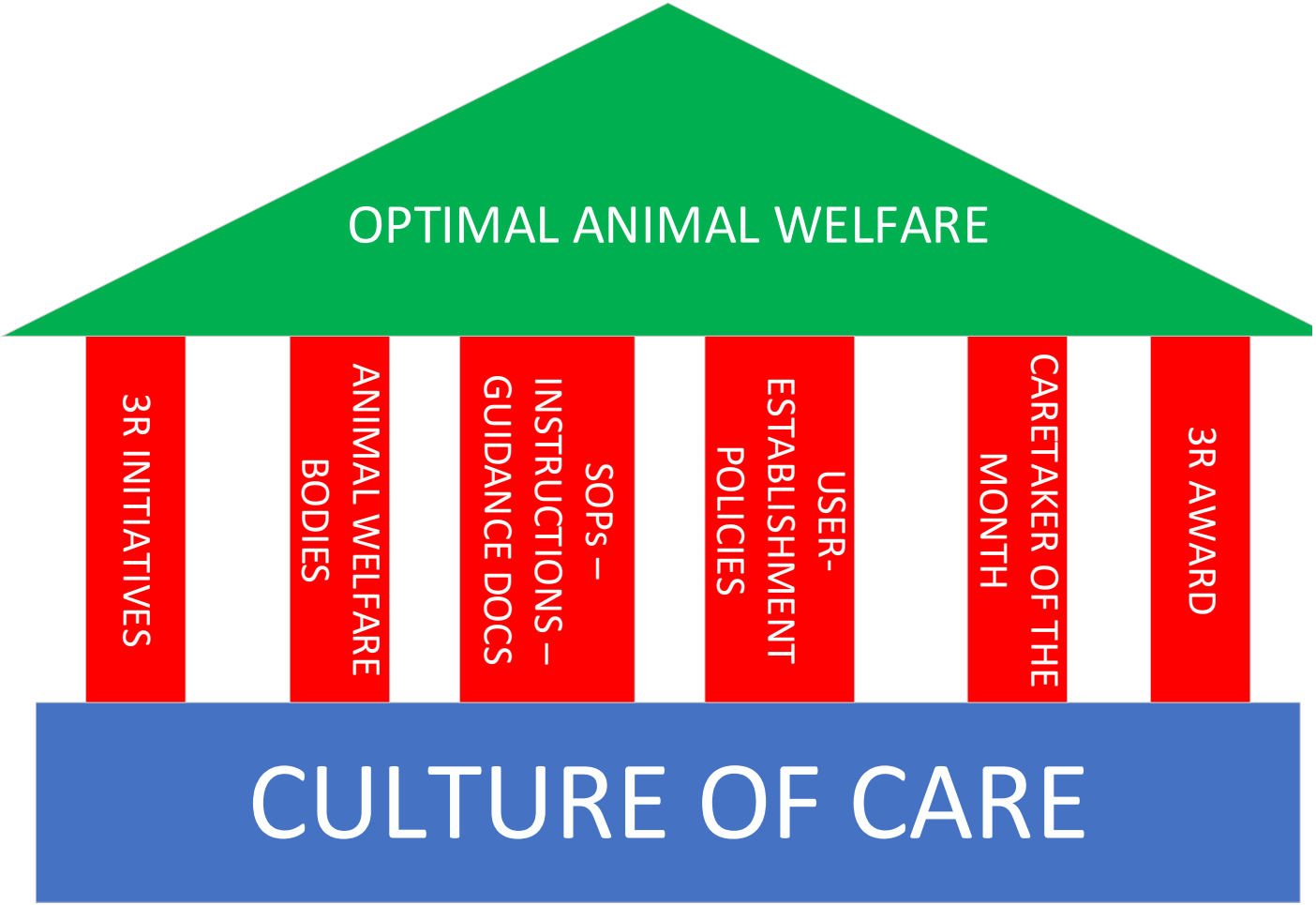
The issue

Many establishments say their Culture of Care is good, but they do not always set out their own vision of this, or take steps to assess whether it is having a genuine impact. The AWERB is tasked with helping to promote the Culture of Care, and there is much that it can do to help realise the benefits for animals, staff morale, scientific quality and openness with the wider community.

This resource sets out some ideas to help AWERBs show leadership and help all staff to engage with and develop the Culture of Care.

rspca.org.uk/webContent/staticImages/Downloads/PromotingACultureOfCare.pdf

The outcome



Supporting structures

What we **think** – and what we **do**

RSPCA AWERB sheet – Promoting a Culture of Care

References

1. The Culture of Care - a working concept: norecopa.no/media/7711/culture-of-care-working-concept.pdf
2. Norecopa Culture of Care page: norecopa.no/coc
3. A working document on Animal Welfare Bodies and National Committees to fulfil the requirements under the Directive: ec.europa.eu/environment/chemicals/lab_animals/pdf/guidance/animal_welfare_bodies/en.pdf [Note: Animal Welfare Bodies are the local committees required at each establishment under the EU Directive that regulates animal care and use. They have many tasks in common with the UK AWERB, but are not expected to review project applications or consider wider ethical issues.]
4. How effectively are Animal Welfare Bodies (AWBs) driving the Culture of Care, as set out in the EC working document on AWBs and national committees?: norecopa.no/media/8288/awbs-driving-the-culture-of-care-july-2019.pdf
5. RSPCA/LASA Guiding principles on good practice for AWERBs: tinyurl.com/AWERB-RSPCA-LASA
6. Assessing the Culture of Care: a survey of network members: rspca.org.uk/webContent/staticImages/Downloads/CultureOfCareNetworkSurveyReportFinal17.pdf
7. Assessing and benchmarking 'Culture of Care' in the context of using animals for scientific purpose (by European Federation of Pharmaceutical Industry Associations): efpia.eu/publications/downloads/efpia/assessing-and-benchmarking-culture-of-care-in-the-context-of-using-animals-for-scientific-purpose/
8. 3Rs-related and objective indicators to help assess the Culture of Care: mdpi.com/2076-2615/9/11/969/htm
9. For further information, contact asc.secretariat@homeoffice.gov.uk
10. Communication and the Culture of Care sheet of examples: norecopa.no/media/8159/communication-and-the-culture-of-care-from-the-culture-of-care-network.pdf
11. Communication and the Culture of Care poster to print and display: rspca.org.uk/webContent/staticImages/Downloads/CommunicationAndTheCultureOfCarePoster2019.pdf
12. Cost of Caring: aalas.org/education/educational-resources/cost-of-caring
13. RSPCA Culture of Care resources: science.rspca.org.uk/sciencegroup/researchanimals/reportsandresources/details/-/articleName/culture-of-care

RSPCA Research Animals Department
March 2020

rspca.org.uk/webContent/staticImages/Downloads/PromotingACultureOfCareReferences.pdf

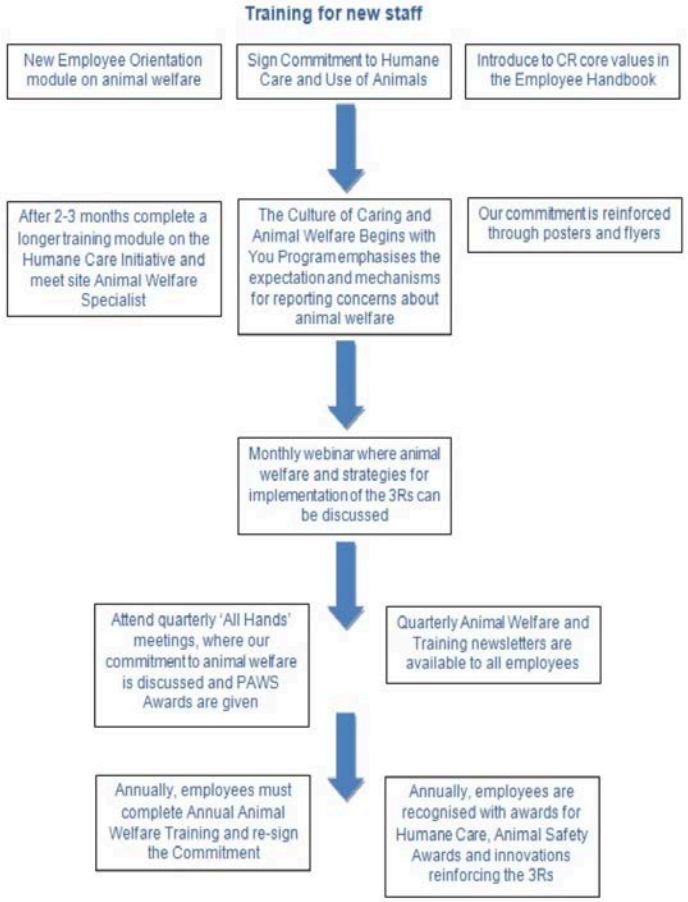
Klein HJ & Bayne KA (2007): Establishing a Culture of Care, Conscience, and Responsibility: Addressing the Improvement of Scientific Discovery and Animal Welfare Through Science-Based Performance Standards. *ILAR Journal*, 43(1), 3-11.
http://ilarjournal.oxfordjournals.org/content/48/1/3.full

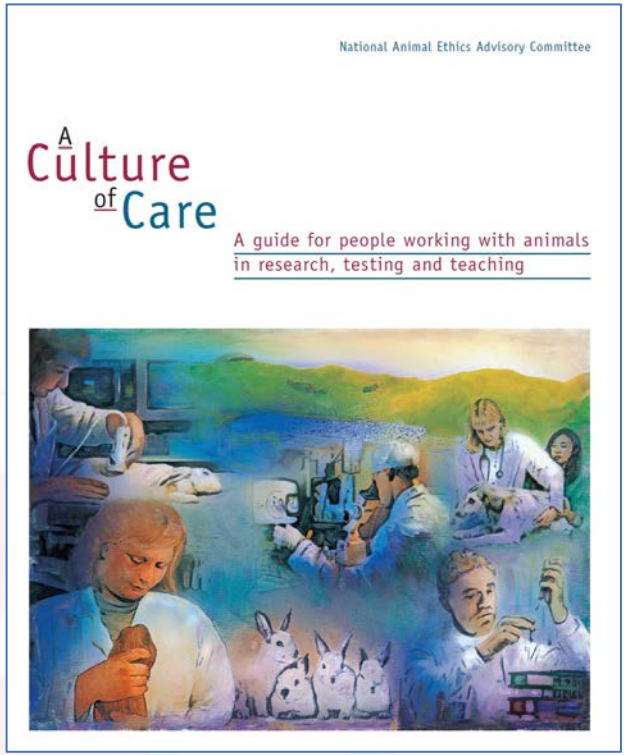
A culture of care, conscience, and responsibility relies on the establishment of an effective program of self-monitoring. This process entails building a trust relationship with oversight bodies (e.g., US Department of Agriculture, Office of Laboratory Animal Welfare, and AAALAC International); the application of sound ethical principles, which will ensure an appropriate level of resources for the program; and establishing and sustaining an appropriate institutional organization that includes vigilant monitoring of the program.

As Dr. Alan C. Rosenquist, Chair of the University of Pennsylvania Institutional Animal Care and Use Committee has stated, **“Let's regulate ourselves or someone with a “.gov” address will do it for us.”**

Marilyn Brown, Charles River: Creating a Culture of Care

https://www.nc3rs.org.uk/news/creating-culture-care





mpi.govt.nz/dmsdocument/1473

Closely related to a culture of care is the concept of a **Culture of Challenge** (Louhimies, 2015)**.**

Look for the acceptable, rather than choosing the accepted.

"because we've always done it that way»

«as often as necessary»

https://medium.com/the-composite/in-defence-of-the-emperors-new-clothes-dd23b1c04455

Carol M. Newton (1925-2014)

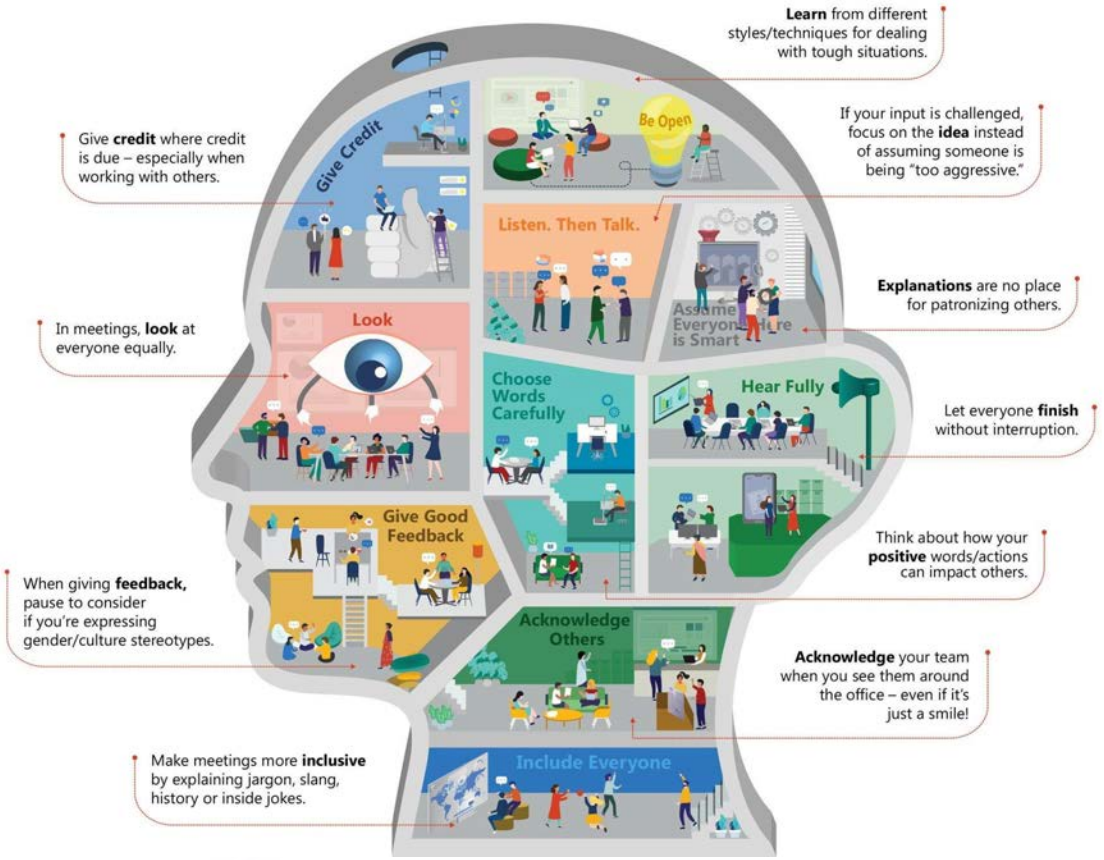
National Library of Medicine

The three S's

- *Good Science*
- *Good Sense*
- *Good Sensibilities*

https://norecopa.no/3S

Be Human at Work



Lola Ball, @MicrosoftWomen

Compassion fatigue

dbth.nhs.uk/news/the-going-home-checklist

KNOWLEDGE – SKILLS – ATTITUDE

C ommitment to continually improve standards of animal welfare, ethics, health and safety
U ndertake training regularly and keep informed of the latest 3R developments
L ip service banned: a positive and optimistic mind-set is needed
T ransparency, including the general public and all other stakeholders
U nderstand the need for individual responsibility to nurture the culture
R ight to challenge and question the use of animals, the choice of husbandry methods and the procedures
E ducate about alternatives at an early stage of employment

O n the ball: a pro-active approach, rather than just reacting to problems when they arise
F ind the time needed

C oncerns can be aired without consequences for the whistleblower
A ward good initiatives and promote individual thinking
R esearchers and staff interact well, ensuring research integrity and quality
E veryone, from leadership downwards, is willing to implement a CoC

Would you like to join the Network? Details on norecopa.no/coc

wiki.norecopa.no

The Refinement Wiki

Born from the knowledge that a lot of good ideas on refinement circulate on discussion forums, but never get published.

Designed to be

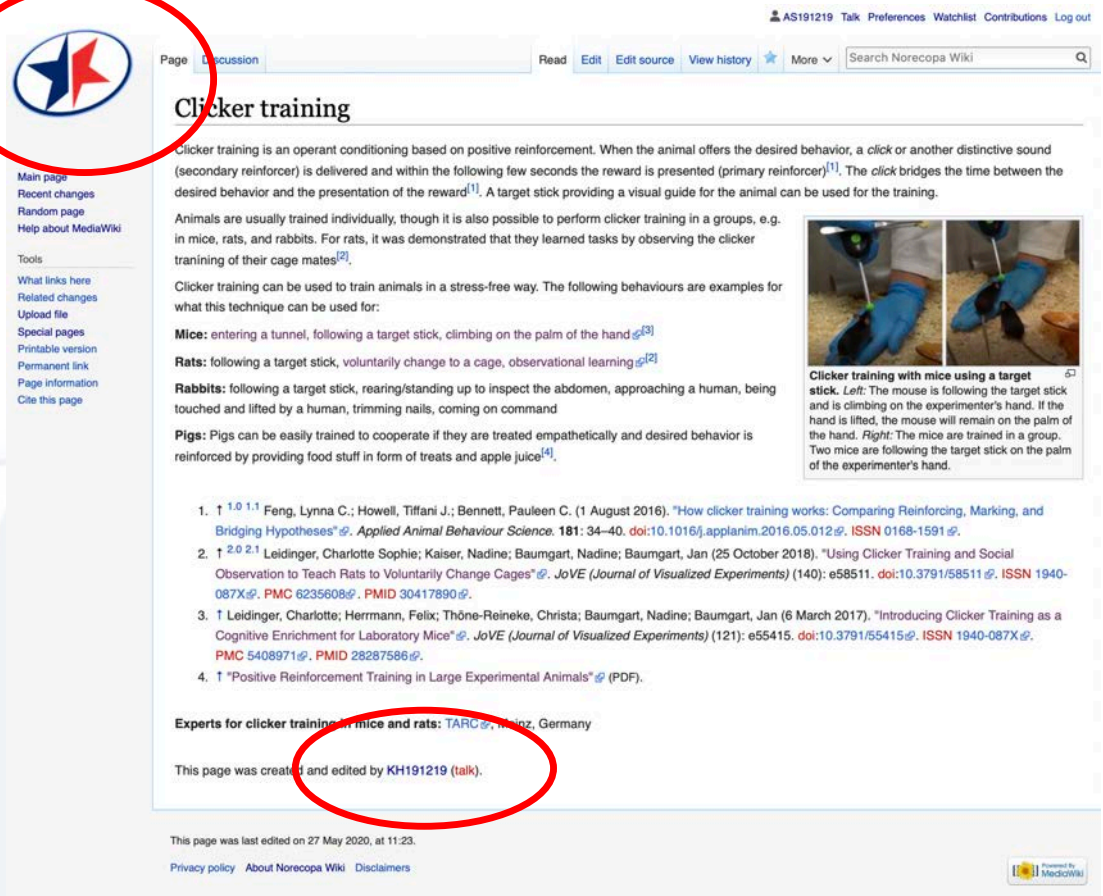
- a portal for rapid publication and dissemination of these ideas
- a place to identify experts on specific refinement techniques
- an aid to finding collaborators for multi-lab studies on refinement
- a "bulletin board" where colleagues can be encouraged to share experiences or develop new strategies

wiki.norecopa.no

- All *bona fide* members of the research animal community are welcome to contribute
- Cannot create or edit pages unless you are logged in as a registered user
- Contents are not curated by Norecopa
- Anonymous usernames, e.g. AS191219
- Talk page for every user where comments or questions can be posted
- 26 registered users at present (end of May 2020)
- Simple instruction manual written by Norecopa
- No special computing skills needed!

wiki.norecopa.no

Return to homepage



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Clicker training

Clicker training is an operant conditioning based on positive reinforcement. When the animal offers the desired behavior, a *click* or another distinctive sound (secondary reinforcer) is delivered and within the following few seconds the reward is presented (primary reinforcer)[1]. The *click* bridges the time between the desired behavior and the presentation of the reward[1]. A target stick providing a visual guide for the animal can be used for the training.

Animals are usually trained individually, though it is also possible to perform clicker training in a groups, e.g. in mice, rats, and rabbits. For rats, it was demonstrated that they learned tasks by observing the clicker tranining of their cage mates[2].

Clicker training can be used to train animals in a stress-free way. The following behaviours are examples for what this technique can be used for:

Mice: entering a tunnel, following a target stick, climbing on the palm of the hand[3]

Rats: following a target stick, voluntarily change to a cage, observational learning[2]

Rabbits: following a target stick, rearing/standing up to inspect the abdomen, approaching a human, being touched and lifted by a human, trimming nails, coming on command

Pigs: Pigs can be easily trained to cooperate if they are treated empathetically and desired behavior is reinforced by providing food stuff in form of treats and apple juice[4].

Clicker training with mice using a target stick. *Left:* The mouse is following the target stick and is climbing on the experimenter's hand. If the hand is lifted, the mouse will remain on the palm of the hand. *Right:* The mice are trained in a group. Two mice are following the target stick on the palm of the experimenter's hand.

1. ↑ [1.0] [1.1] Feng, Lynna C.; Howell, Tiffani J.; Bennett, Pauleen C. (1 August 2016). "How clicker training works: Comparing Reinforcing, Marking, and Bridging Hypotheses". *Applied Animal Behaviour Science*. **181**: 34–40. doi:10.1016/j.applanim.2016.05.012. ISSN 0168-1591.
2. ↑ [2.0] [2.1] Leidinger, Charlotte Sophie; Kaiser, Nadine; Baumgart, Nadine; Baumgart, Jan (25 October 2018). "Using Clicker Training and Social Observation to Teach Rats to Voluntarily Change Cages". *JoVE (Journal of Visualized Experiments)* (140): e58511. doi:10.3791/58511. ISSN 1940-087X. PMC 6235608. PMID 30417890.
3. ↑ Leidinger, Charlotte; Herrmann, Felix; Thöne-Reineke, Christa; Baumgart, Nadine; Baumgart, Jan (6 March 2017). "Introducing Clicker Training as a Cognitive Enrichment for Laboratory Mice". *JoVE (Journal of Visualized Experiments)* (121): e55415. doi:10.3791/55415. ISSN 1940-087X. PMC 5408971. PMID 28287586.
4. ↑ "Positive Reinforcement Training in Large Experimental Animals" (PDF).

Experts for clicker training in mice and rats: TARC, Mainz, Germany

This page was created and edited by KH191219 (talk).

This page was last edited on 27 May 2020, at 11:23.

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Pages created as of today

- Adrian Smith
- Analgesia
- Clicker training
- Contingency plans
- Detection of pain and distress in mice
- Experimental Autoimmune Encephalomyeltis (EAE)
- Facial expression analysis
- Intraperiteonal injection
- Lumpfish
- Main Page
- Mouse Grimace Scale
- Mouse handling
- Nest building material
- Rotarod Test
- TTEAM and TTouch
- Tail vein injection
- Tumour cell implant into mammary fat pad
- Ulcerative Dermatitis in Mice

The Refinement Wiki can help to highlight new refinements

photo:NMBU

SCID-Hu mice immunized with a pneumococcal vaccine produce specific human antibodies and show increased resistance to infection.

Saphenous vein puncture for

blood sampling of the mouse, rat, hamster,

gerbil, guinea-pig,

ferret and mink

Visibility! Not necessarily in a high-impact journal.

The title and abstract are critical, because they are often the only parts that are indexed. They must be informative and contain 3R-terms!

The development of Response Surface Pathway Design in toxicity studies

The development of Response Surface Pathway Design to reduce animal numbers in toxicity studies

norecopa.no/PREPARE/prepare-checklist

PREPARE

norecopa

The PREPARE Guidelines Checklist

Planning Research and Experimental Procedures on Animals: Recommendations for Excellence

Adrian J. Smith[a], R. Eddie Clutton[b], Elliot Lilley[c], Kristine E. Aa. Hansen[d] & Trond Bratteli[e]

[a]Norecopa, c/o Norwegian Veterinary Institute, P.O. Box 750 Sentrum, 0106 Oslo, Norway; [b]Royal (Dick) School of Veterinary Studies, Easter Bush, Midlothian, EH25 9RG, U.K.; [c]Research Animals Department, Science Group, RSPCA, Wilberforce Way, Southwater, Horsham, West Sussex, RH13 9RS, U.K.; [d]Section of Experimental Biomedicine, Department of Production Animal Clinical Sciences, Faculty of Veterinary Medicine, Norwegian University of Life Sciences, P.O. Box 8146 Dep., 0033 Oslo, Norway; [e]Division for Research Management and External Funding, Western Norway University of Applied Sciences, 5020 Bergen, Norway.

PREPARE[1] consists of planning guidelines which are complementary to reporting guidelines such as ARRIVE[2].
PREPARE covers the three broad areas which determine the quality of the preparation for animal st...

1. **Formulation of the study**
2. **Dialogue between scientists and the animal facility**
3. **Quality control of the components in the study**

The topics will not always be addressed in the order in which they are presented here, and some topi... checklist can be adapted to meet special needs, such as field studies. PREPARE includes guidance on ... facilities, since in-house experiments are dependent upon their quality. The full version of the guideline... website, with links to global resources, at **https://norecopa.no/PREPARE**.
The PREPARE guidelines are a dynamic set which will evolve as more species- and situation-specific guidelines are produced, and as best practice within Laboratory Animal Science progresses.

Three Rs!

Topic	Recommendation
(A) Formulation of the study	
1. Literature searches	☐ Form a clear hypothesis, with primary and secondary outcomes. ☐ Consider the use of systematic reviews. ☐ Decide upon databases and information specialists to be consulted, and construct search terms. ☐ Assess the relevance of the species to be used, its biology and suitability to answer the experimental questions with the least suffering, and its welfare needs. ☐ Assess the reproducibility and translatability of the project.
2. Legal issues	☐ Consider how the research is affected by relevant legislation for animal research and other areas, e.g. animal transport, occupational health and safety. ☐ Locate relevant guidance documents (e.g. EU guidance on project evaluation).
3. Ethical issues, harm-benefit assessment and humane endpoints	☐ Construct a lay summary. ☐ In dialogue with ethics committees, consider whether statements about this type of research have already been produced. ☐ Address the 3Rs (replacement, reduction, refinement) and the 3Ss (good science, good sense, good sensibilities). ☐ Consider pre-registration and the publication of negative results. ☐ Perform a harm-benefit assessment and justify any likely animal harm. ☐ Discuss the learning objectives, if the animal use is for educational or training purposes. ☐ Allocate a severity classification to the project. ☐ Define objective, easily measurable and unequivocal humane endpoints. ☐ Discuss the justification, if any, for death as an end-point.
4. Experimental design and statistical analysis	☐ Consider pilot studies, statistical power and significance levels. ☐ Define the experimental unit and decide upon animal numbers. ☐ Choose methods of randomisation, prevent observer bias, and decide upon inclusion and exclusion criteria.

Topic	Recommendation
(B) Dialogue between scientists and the animal facility	
5. Objectives and timescale, funding and division of labour	☐ Arrange meetings with all relevant staff when early plans for the project exist. ☐ Construct an approximate timescale for the project, indicating the need for assistance with preparation, animal care, procedures and waste disposal/decontamination. ☐ Discuss and disclose all expected and potential costs. ☐ Construct a detailed plan for division of labour and expenses at all stages of the study.
6. Facility ...tion	☐ Conduct a physical inspection of the facilities, to evaluate building and equipment standards and needs. ☐ Discuss staffing levels at times of extra risk.
...ation and	☐ Assess the current competence of staff members and the need for further education or training prior to the study.
...risks, ...waste disposal and decontamination	☐ Perform a risk assessment, in collaboration with the animal facility, for all persons and animals affected directly or indirectly by the study. ☐ Assess, and if necessary produce, specific guidance for all stages of the project. ☐ Discuss means for containment, decontamination, and disposal of all items in the study.
(C) Quality control of the components in the study	
9. Test substances and procedures	☐ Provide as much information as possible about test substances. ☐ Consider the feasibility and validity of test procedures and the skills needed to perform them.
10. Experimental animals	☐ Decide upon the characteristics of the animals that are essential for the study and for reporting. ☐ Avoid generation of surplus animals.
11. Quarantine and health monitoring	☐ Discuss the animals' likely health status, any needs for transport, quarantine and isolation, health monitoring and consequences for the personnel.
12. Housing and husbandry	☐ Attend to the animals' specific instincts and needs, in collaboration with expert staff. ☐ Discuss acclimatization, optimal housing conditions and procedures, environmental factors and any experimental limitations on these (e.g. food deprivation, solitary housing).
13. Experimental procedures	☐ Develop refined procedures for capture, immobilisation, marking, and release or rehoming. ☐ Develop refined procedures for substance administration, sampling, sedation and anaesthesia, surgery and other techniques.
14. Humane killing, release, reuse or rehoming	☐ Consult relevant legislation and guidelines well in advance of the study. ☐ Define primary and emergency methods for humane killing. ☐ Assess the competence of those who may have to perform these tasks.
15. Necropsy	☐ Construct a systematic plan for all stages of necropsy, including location, and identification of all animals and samples.

References

1. Smith AJ, Clutton RE, Lilley E, Hansen KEA & Brattelid T. PREPARE: Guidelines for Planning Animal Research and Testing. *Laboratory Animals*, 2017, DOI: 10.1177/0023677217724823.
2. Kilkenny C, Browne WJ, Cuthill IC *et al.* Improving Bioscience Research Reporting: The ARRIVE Guidelines for Reporting Animal Research. *PLoS Biology*, 2010; DOI: 10.1371/journal.pbio.1000412.

Further information
https://norecopa.no/PREPARE | *post@norecopa.no* | @norecopa

Norecopa: PREPARE for better Science

The ARRIVE guidelines 2019: updated guidelines for reporting animal research

ARRIVE Essential 10		
Study design	1	For each experiment, provide brief details of study design including: a. The groups being compared, including control groups. If no control group has been used, the rationale should be stated. b. The experimental unit (e.g. a single animal, litter, or cage of animals).
Sample size	2	a. Specify the exact number of experimental units allocated to each group, and the total number in each experiment. Also indicate the total number of animals used. b. Explain how the sample size was decided. Provide details of any *a priori* sample size calculation, if done.
Inclusion and exclusion criteria	3	a. Describe any criteria established *a priori* for including and excluding animals (or experimental units) during the experiment, and data points during the analysis. b. For each experimental group, report any animals, experimental units or data points not included in the analysis and explain why. c. For each analysis, report the exact value of N in each experimental group.
Randomisation	4	Describe the methods used: a. To allocate experimental units to control and treatment groups. If randomisation was used, provide the method of randomisation. b. To minimise potential confounding factors such as the order of treatments and measurements, or animal/cage location.
Blinding	5	Describe who was aware of the group allocation at the different stages of the experiment (during the allocation, the conduct of the experiment, the outcome assessment, and the data analysis).
Outcome measures	6	a. Clearly define all outcome measures assessed (e.g. cell death, molecular markers, or behavioural changes). b. For hypothesis-testing studies, specify the primary outcome measure, i.e. the outcome measure that was used to determine the sample size.
Statistical methods	7	a. Provide details of the statistical methods used for each analysis. b. Specify the experimental unit that was used for each statistical test. c. Describe any methods used to assess whether the data met the assumptions of the statistical approach.
Experimental animals	8	a. Provide details of the animals used, including species, strain and substrain, sex, age or developmental stage, and weight. b. Provide further relevant information on the provenance of animals, health/immune status, genetic modification status, genotype, and any previous procedures.
Experimental procedures	9	For each experimental group, including controls, describe the procedures in enough detail to allow others to replicate them, including: a. What was done, how it was done and what was used. b. When and how often. c. Where (including detail of any acclimation periods). d. Why (provide rationale for procedures).
Results	10	For each experiment conducted, including independent replications, report: a. Summary/descriptive statistics for each experimental group, with a measure of variability where applicable. b. If applicable, the effect size with a confidence interval.

biorxiv.org/content/10.1101/703181v1

Reference to 3R-related issues

The ARRIVE guidelines 2019: updated guidelines for reporting animal research

Recommended Set		
Abstract	11	Provide an accurate summary of the research objectives, animal species, strain and sex, key methods, principal findings, and study conclusions.
Background	12	a. Include sufficient scientific background to understand the rationale and context for the study, and explain the experimental approach. b. Explain how the animal species and model used address the scientific objectives and, where appropriate, the relevance to human biology.
Objectives	13	Clearly describe the research question, research objectives and, where appropriate, specific hypotheses being tested.
Ethical statement	14	Provide the name of the ethical review committee or equivalent that has approved the use of animals in this study and any relevant licence or protocol numbers (if applicable). If ethical approval was not sought or granted, provide a justification.
Housing and husbandry	15	Provide details of housing and husbandry conditions, including any environmental enrichment.
Animal care and monitoring	16	a. Describe any interventions or steps taken in the experimental protocols to reduce pain, suffering and distress. b. Report any expected or unexpected adverse events. c. Describe the humane endpoints established for the study and the frequency of monitoring.
Interpretation /scientific implications	17	a. Interpret the results, taking into account the study objectives and hypotheses, current theory and other relevant studies in the literature. b. Comment on the study limitations including potential sources of bias, limitations of the animal model, and imprecision associated with the results.
Generalisability /translation	18	Comment on whether, and how, the findings of this study are likely to generalise to other species or experimental conditions, including any relevance to human biology (where appropriate).
Protocol registration	19	Provide a statement indicating whether a protocol (including the research question, key design features, and analysis plan) was prepared before the study, and if and where this protocol was registered.
Data access	20	Provide a statement describing if and where study data are available.
Declaration of interests	21	a. Declare any potential conflicts of interest, including financial and non-financial. If none exist, this should be stated. b. List all funding sources (including grant identifier) and the role of the funder(s) in the design, analysis and reporting of the study.

biorxiv.org/content/10.1101/703181v1

Reference to 3R-related issues

Some of the other resources on the Norecopa website

- Databases embedded in the site
- Webinars and meetings calendar
- Presentations
- Position statements
- Overview of severity classification
- Overview of European 3R centres
- Newsletters

Databases & Guidelines

Published lists of resources are difficult to search and quickly become outdated. Lists on a website are easier to search, but do not enable the use of filters or intelligent search engines.
Norecopa has therefore constructed four databases, which together with all the text on this website can be searched simultaneously using the search field at the top of every page.

- 3R Guide: a global overview of **databases, guidelines, information centres, journals, email lists, regulations and policies** which may be of use when planning experiments which might include animals. A quick overview of all the guidelines can be accessed here. Norecopa has written several of these, including the PREPARE guidelines for planning animal research and testing.
- NORINA: a global overview of audiovisual aids and other items which may be used as **alternatives or supplements to animals in education and training** at all levels from junior school to University, including dissection alternatives and surgical simulators.
- TextBase: a global overview of **textbooks and other literature within laboratory animal science** and related topics.
- Classic AVs: a subset of NORINA covering **audiovisual aids that are based on older technology**.

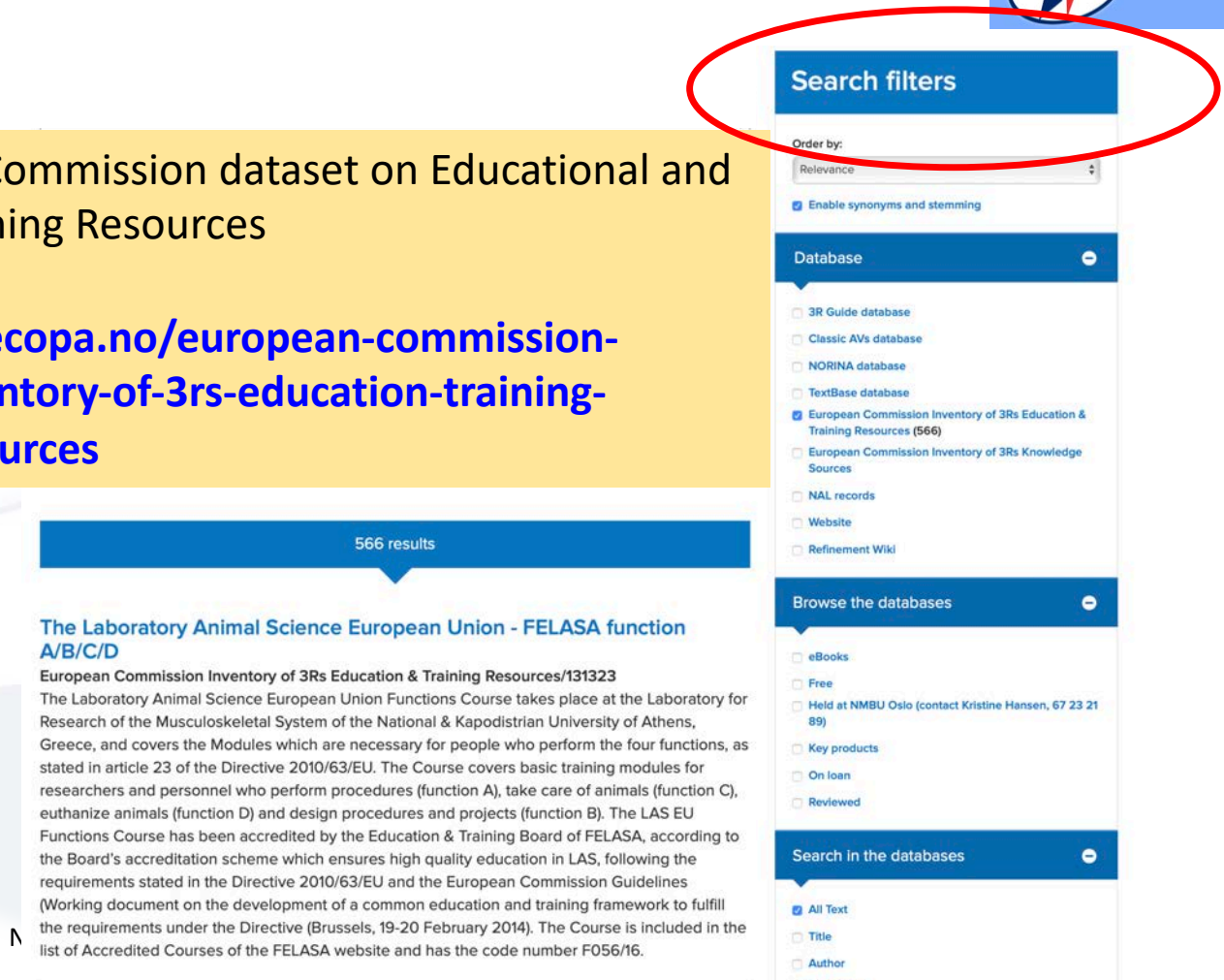
These databases are updated regularly. Please give us feedback if you discover errors or omissions.
The Norecopa website also includes three other collections:

- NAL: a collection of literature references relating to the 3Rs from the US National Agricultural Library
- European Commission Inventory of 3Rs Knowledge Sources: a collection of over 800 resources collected by the Commission in 2016
- European Commission Inventory of 3Rs Education and Training Resources, a collection of over 560 items collected in 2018

norecopa.no/databases-guidelines

EU Commission dataset on Educational and Training Resources

norecopa.no/european-commission-inventory-of-3rs-education-training-resources



norecopa.no / Meetings / Meetings Calendar

norecopa.no/meetings/meetings-calendar

Webinar and Meetings calendar

Links to past meetings can be accessed here (Many of these links will eventually die out, but they still give a useful overview of organisers and locations of relevant meetings within laboratory animal science, and it is often possible to contact the organisers for more information).

N.B. For information about ***courses*** **in laboratory animal science**, click here.

June 2020

- Minor procedures on mice, Stockholm, 2 June 2020 (cancelled)
- Gut microbiota: variability and translability in rodent models, webinar, 2 June 2020
- Advances in Cell and Tissue Culture (ACTC2020), Cardiff, 2-3 June 2020, postponed, details to be announced
- Introduction to Biosecurity, England, 3 June 2020, postponed until Autumn 2020
- 7th Annual 3Rs Symposium: Practical Solutions and Success Stories, Beltsville, 4-5 June 2020, virtual meeting
- 21st International ESTIV conference, Barcelona, 8-11 June 2020, postponed to 2021
- Communicating Animal Research - An Education and Training workshop, Bergen, 9-10 June 2020, postponed to 2021

Pdf files of 80+ presentations held at Norecopa's meetings

Norecopa: PREPARE for better Science

norecopa.no/meetings/presentations

Most of the presentations on this page are from events arranged by Norecopa. A few of them are from external events where Norecopa's staff have lectured. They are grouped into

Koenig 101017.pdf

- General presentations
- Care and use of animals in field research
- Care and use of farm animals in research
- Care and use of fish in research

Title	Speaker	Affiliation	Year
General presentations			
Design of animal studies: Increasing reproducibility and animal welfare	Adrian Smith	Norecopa	2020
PREPARE before you ARRIVE: Good reporting relies on good planning	Adrian Smith	Norecopa	2019
Animal-free testing and humans-on-a-chip: How far have we come?	Leopold Koenig	TissUse GMBH, Berlin, Germany	2017
Nordic 3R-Centres: What can we offer?	Tom Bengtsen	Denmark's 3R-Center	2017
Prize-winning 3R activity in Norway	Gøril Eide	University of Tromsø, Norway	2017
Have the 3Rs made any difference?	Elliot Lilley	RSPCA, UK	2017

Homemade educational materials

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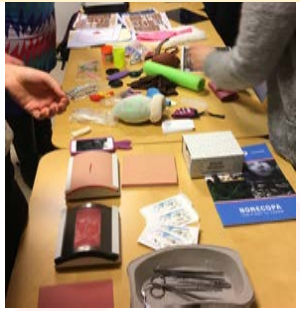
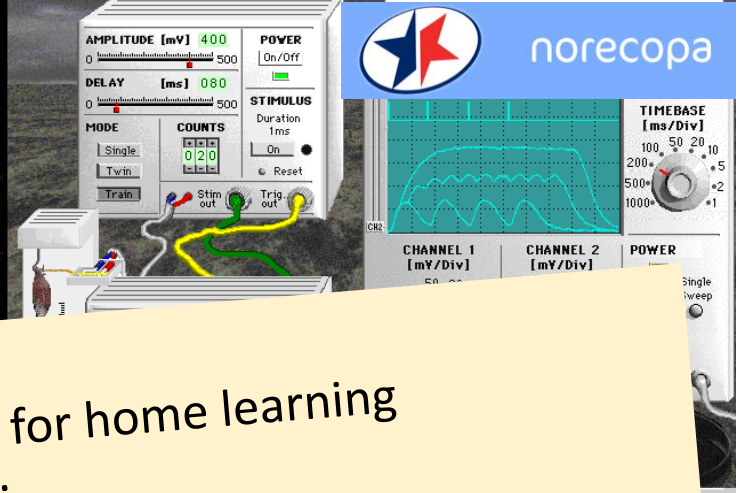
norecopa.no/education-training/homemade-educational-materials

+ the **NORINA database** of approx. 3,000 audiovisual aids for use in education and training
Established in 1991, updated weekly. norecopa.no/NORINA





NEW:
overview of resources suitable for home learning
during the Covid-19 pandemic:

norecopa.no/norina-database/resources-for-home-learning

From **3R-Guide** (380 guidelines for animal research and testing)
norecopa.no/3r-guide

Working Party Report

Guidance on the severity classification of scientific procedures involving fish: report of a Working Group appointed by the Norwegian Consensus-Platform for the Replacement, Reduction and Refinement of animal experiments (Norecopa)

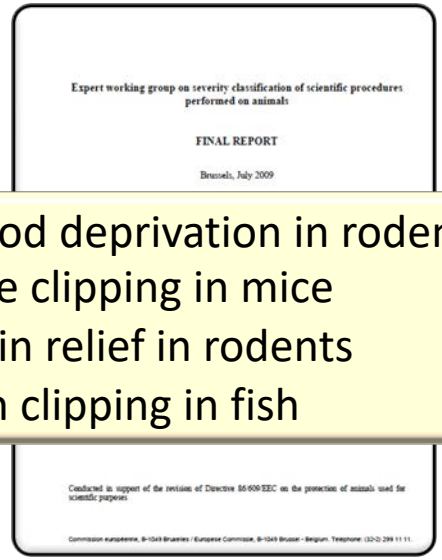
P Hawkins (Convenor)[1], N Dennison[2], G Goodman[3], S Hetherington[4], S Llywelyn-Jones[5], K Ryder[2] and A J Smith[6]

Abstract

Background

Guidance on the severity classification of procedures involving fish

Report from a Working Group
convened by Norecopa



Expert working group on severity classification of scientific procedures performed on animals

FINAL REPORT

Brussels, July 2009

Conducted in support of the revision of Directive 86/609/EEC on the protection of animals used for scientific purposes

Food deprivation in rodents
Toe clipping in mice
Pain relief in rodents
Fin clipping in fish

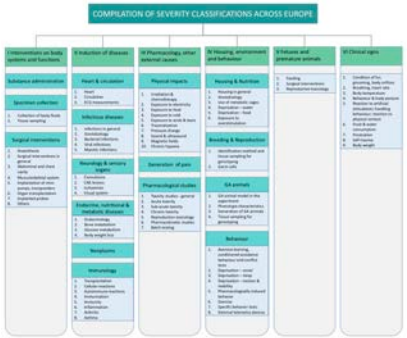
http://ec.europa.eu/environment/chemicals/lab_animals/pdf/report_ewg.pdf

P Hawkins, N Dennison, G Goodman, S Hetherington,
S Llywelyn-Jones, K Ryder and AJ Smith

Laboratory Animals, 45: 219-224, 2011

norecopa.no/categories

Mild, Moderate or Severe? A compilation of severity classification



norecopa.no/severity

The compilation covers

- Interventions on body systems and functions
  - Substance administration
  - Specimen collection
  - Surgical interventions
- Induction of diseases
  - Heart and circulation
  - Infectious diseases
  - Neurology and sensory organs
  - Endocrine, nutritional and metabolic diseases
  - Neoplasms
  - Immunology
- Pharmacology and other external causes
  - Physical impacts
  - Generation of pain
  - Pharmacological studies
- Housing, environment and behaviour
  - Housing and nutrition
  - Breeding and Reproduction
  - GA animals
  - Behaviour
- Foetuses and premature animals
- Clinical signs

Source	Non-harmful / below threshold / severity degree 0	Mild / severity degree 1	Moderate / severity degree 2	Severe / severity degree 3
Directive 2010/63/EU, Annex VIII		Administration of substances by subcutaneous, intramuscular, intraperitoneal routes, gavage and intravenously via superficial blood vessels, where the substance has no more than mild impact on the animal, and the volumes are within appropriate limits for the size and species of the animal.	Frequent application of test substances which produce moderate clinical effects, and withdrawal of blood samples (> 10 % of circulating volume) in a conscious animal within a few days without volume replacement.	
Home Office (2014 a)		Injection by conventional routes, i.e. subcutaneous, intravenous, intraperitoneal or intramuscular (assuming competence of the person performing the procedure and that best practice guidelines for volume, pH, needle size, etc. are followed). Multiple injections by these routes may remain in the mild category if there are no cumulative effects.		
Federal Food Safety and Veterinary Office FSVO (2018)	Single injection of small volumes s.c. and i.v. (species-specific), including repeated injections at long intervals (at least 24 hours).	i.v. or i.p. injections in sedated animals by catheter or tube and substances introduced into the body such as enemas. Implants and permanent accesses that can be created and used by means of a minimally invasive (superficial) procedure. Examples: Repeated iv or sc injection of small volumes (species-specific). Insertion of cannulae into peripheral blood vessels. Subcutaneous injection of tumour tissue. Single subcutaneous implantations of osmotic minipumps and transponders. Subcutaneously channelled venous catheters.	Repeated injections at short intervals (several times within 24 hours). Implants and permanent accesses that have to be created by means of a deep surgical procedure or causing mild long-term constraint on an animal. Examples: Chronic iv catheters. Duodenal infusion cannula. Hepatic portal vein catheter. Gastric tube or chronic intragastric infusion cannula. Intraperitoneal or intravenous osmotic minipumps. Gavage. Telemetry transmitters. Implanted iv catheters with pumps in a jacket worn by dogs. Implantation of indwelling catheters in	Implants and permanent accesses that have to be created by means of a deep surgical procedure and causing severe long-term strain on an animal. Examples: Attachment of implants on the locomotor apparatus or other large implants that restrict movement (e.g. dorsal skinfold chamber in mice). Implantation of catheters in the abdominal aorta or bile duct. Implantation of an arterial blood-pressure catheter in the aortic arch via the left carotid artery or in the abdominal aorta via the femoral artery. Implantation of a combination of a venous and arterial catheter.

NORSK ENGLISH

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About Norecopa | Alternatives | Databases & Guidelines | Education | Legislation | Meetings | More resources | News | PREPARE | Species | Wiki

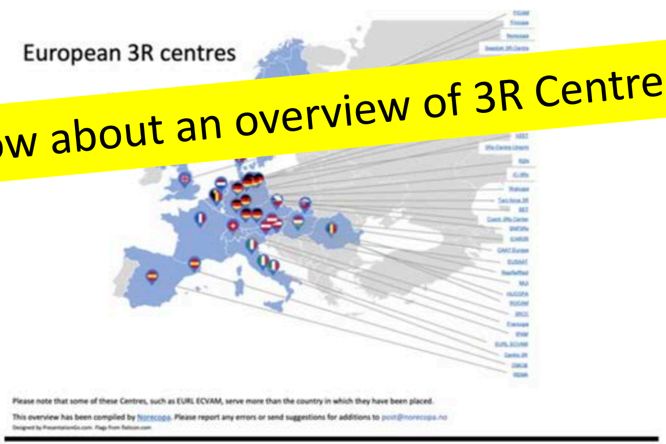
norecopa.no / Overview of European 3R Centres

norecopa.no/3REuropeOverview

This page gives an overview of European 3R Centres.

Click on the map below, or here, to access an interactive pdf file of this image, with links to information about each centre. On the interactive map you can click on the flags or the text, for more information about each Centre.

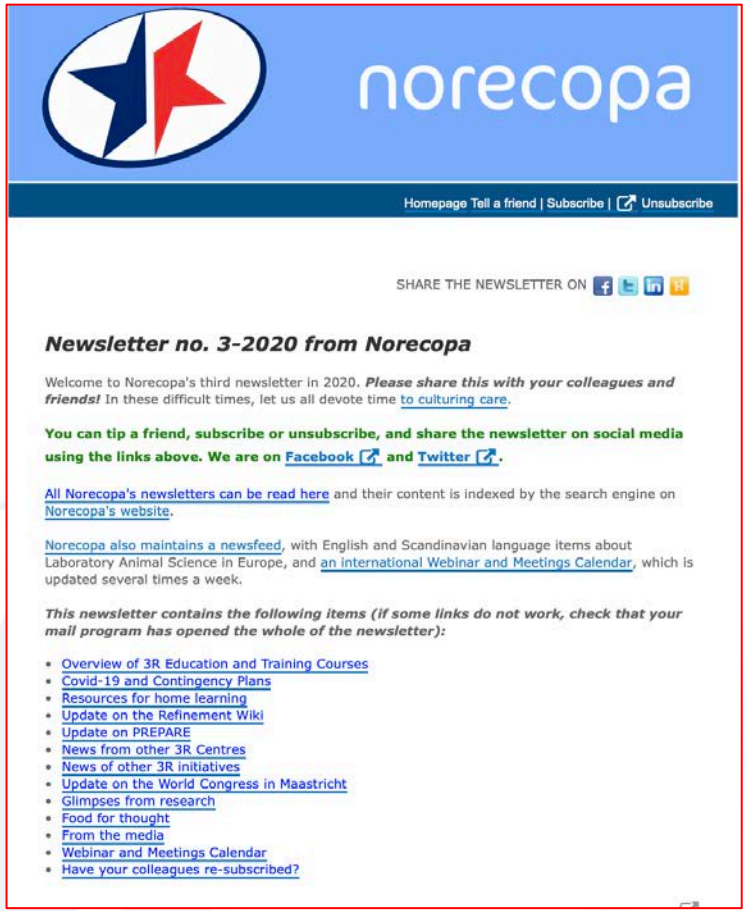
A simple list of the European centres can be accessed here.



How about an overview of 3R Centres in the USA & Canada?

Minutes from the meetings of European 3R Centres held at EURL ECVAM, Ispra, in 2015 and 2016.

Norecopa: This map should be used in conjunction with Norecopa's worldwide overview of Laboratory Animal Science associations and other relevant organisations.



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7-8 times a year, in English

800 international subscribers

https://kmonadollaraday.files.wordpress.com/2011/03/information-silos.jpg

Coming together is a beginning

Keeping together is progress

Working together is success

Edward Everett Hale

Thanks to Norecopa's main sponsors:

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- Norwegian Society for Animal Protection (Dyrebeskyttelsen Norge)
- Norwegian Animal Protection Alliance (Dyrevernalliansen)
- Novo Nordisk
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- Scottish Accreditation Board (SAB)
- Stiansen Foundation
- Universities Federation for Animal Welfare (UFAW)
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PREPARE

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norecopa.no/CAAT-2

English-language newsletters