How to use the 3Rs to plan for better Science

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norecopa.no/SAAE-I

”better science?"

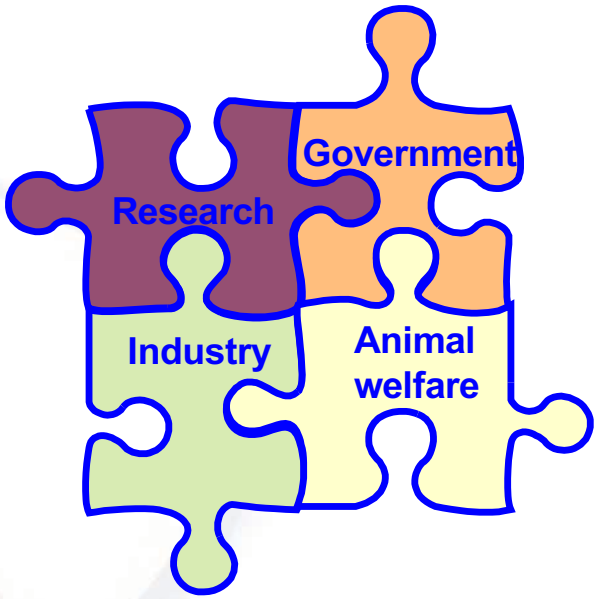
- replacement if possible
- reduction and refinement if not possible to replace
- valid data (a true treatment effect)
- reproducible and translatable experiments
- best possible animal welfare
- health & safety (of animals and people)
- a culture of care at the animal facility
- communication of best practice to others

colourbox.com

Norecopa is a National Consensus Platform for the 3Rs:
Replacement*, *Reduction *and* ***Refinement*** *of animal experiments*

A member of ***ecopa****:*
European Consensus-Platform for Alternatives
which recognises National Consensus Platforms with
4 stakeholders equally represented:

ecopa.eu



Norecopa: PREPARE for better Science

40-slide powerpoint presentation about the 3Rs

ccac.ca

All three Rs of Russell and Burch:

Replacement, Reduction & Refinement

English, French and Spanish versions (soon German)

Free download from norecopa.no/3Rs

norecopa.no : an updated overview of global 3R resources

approx. 10,000 webpages
approx. 1,000 hits per day

7-8 detailed newsletters per year

November 2023

- Puzzles for mice - investigating intelligence and improving well-being, webinar (Katharina Hohlbaum), registration, 2 November 2023
- Different strategies on the way to in-vitro bone modelling, webinar (Moritz Pfeiffenberger), registration, 2 November 2023
- Danish 3R-Center's Annual Symposium, Copenhagen, 6-7 November 2023
- Fin3R Annual Symposium: Improving the quality and translatability of biomedical research through the 3R principle, Helsinki/online, 6-7 November 2023
- GA Rodent Colony Management, London, 6-7 November 2023
- CBMAlt 2023, Rio de Janeiro, 6-9 November 2023
- International Forum on Cell Manufacturing & Engineering, Berlin, 7-8 November 2023
- Launch of the Norwegian Forum for Animal Law, Oslo, 8 November 2023
- Improving Openness in Animal Research in Denmark, Copenhagen, 8 November 2023
- The COLAAB: The Author Guide for Addressing Animal Methods Bias in Publishing, webinar, 8 November 2023
- The new OECD (Q)SAR Assessment Framework: guidance for assessing (Q)SAR models and predictions, webinar, 9 November 2023
- Veterinary Skills Net - simulation-based education in Berlin, webinar (Samira Schlesninger), registration, 9 November 2023
- Assessment and refinement of the wellbeing of mice during metabolic cage housing, webinar (Philipp Villiger), registration, 9 November 2023
- Altertox and EPITHELIX: Lung *in vitro* models, Geneva, 9-10 November 202
- Systematic review and meta-analysis of animal studies, workshop, 10 Novem
- Designing a good score sheet for animal welfare assessment, webinar (Philip
- 18th Transgenic Technology Meeting, Houston, 12-15 November 2023
- Practical course in zebrafish husbandry and procedures, Stockholm, 13-15 November 2023
- EPAA annual conference, Brussels, 15 November 2023
- Biomimetic robots - a new way to fulfil the 3Rs requirements, webinar (David Bierbach), registration, 16 November 2023
- Brain organoids to model human brain diseases, webinar (Agnieszka Rybak-Wolf), registration, 16 November 2023
- RSPCA Focus on Severe Suffering: Humane Endpoints in Regulatory Toxicology, Surrey, 16 November 2023
- Importance of systematic assessment of scientific validity in *in vivo* study design, webinar, 16 November 2023
- Networking meeting for Nordic zebrafish managers, Stockholm/online, 16-17 November 2023
- Practical approaches and challenges for microbiological monitoring of rodents and zebrafish, Milan, 16-17 November 2023
- Mice learning in social interaction and consequences for welfare and data quality, webinar (Benjamin Lang), 17 November 2023
- Online media training for veterinarians, EARA webinar, 20 November 2023
- 6th Annual SAAE-India Conference: Alternatives to Higher Animals in Biological Research, Aligarh
- Oxford / Berlin Autumn School on Open and Responsible Research, Oxford, 20-24
- LASA Annual Meeting, 21-23 November 2023
- QASH2 *(Quantitative Atlantic Salmon Health*
- announced, Bergen, 22 Nov
- EALAS-2023
- wetlabs, Rome, 22-24 November 2023
- 23 November 2023
- Copenhagen, 23 November 2023
- webinar (Michael Sigal), registration, 23 November 2023
- to tackle inflammatory and genetic diseases of human epithelia, webinar (Sarah Hedtrich), registration, 23 November 2023
- Pain Recognition and Analgesia in Zebrafish, webinar (Lynne Sneddon), 27 November 2023
- Rodent Surgery Course (3 or 5 days), Almere, 27 November - 1 December 2023
- Assessment, Prevention and Alleviation of Pain in Laboratory Animals workshop, online, 27-30 November 2023
- SGV Annual Meeting, Zurich, 28-29 November 2023
- Lab Animal Publication School, online course, 28-30 November 2023
- CLAST course on Researching data and using information, start 30 November 2023
- Brain organoids for the discovery of novel mechanisms and targets in stroke and neurodegeneration, webinar (Philipp Mergenthaler), registration, 30 November 2023
- 6R: Robustness, Registration and Reporting aspects in 3R *in vitro* research, webinar (Maren Hülsemann), registration, 30 November 2023

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norecopa.no/meetings/meetings-calendar

+ webpages for recorded meetings, sorted by PREPARE topics

Norecopa: PREPARE for better Science

Norecopa: PREPARE for better Science

Price: £15 !

Registration:
https://frame.beaconforms.com/form/5dea91b6

Programme:
https://frame.org.uk/app/uploads/2023/10/3Rs-and-Ethics-by-Design-Training-Programme-DRAFT-Online-V2.pdf

Databases & Guidelines

- 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 five other collections:

- NAL: a collection of literature references relating to the 3Rs from the US National Agricultural Library
- European Commission datasets:
  - 3Rs Knowledge Sources: over 800 resources collected by the Commission in 2016
  - 3Rs Education and Training Resources, over 560 items collected in 2018
  - Non-animal models for respiratory tract diseases, over 280 models identified in a literature review of over 21,000 papers, published in 2020
  - Non-animal models for cardiovascular diseases, citing over 400 models, identified in a literature review of over 14,000 papers, published in 2022

The EU Commission has now published 30 datasets of this type.

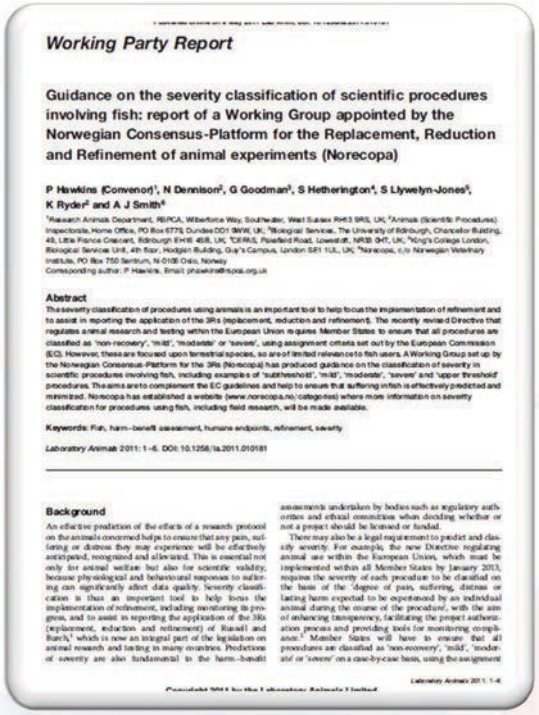
Here is an alphabetical global list of all the databases cited on the Norecopa website.

norecopa.no/databases-guidelines

links to over 70 other databases

3R-Guide (over 400 guidelines for implementation of the 3Rs)

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]

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Abstract

The severity classification of procedures using animals is an important tool to help focus the implementation of refinement and to assist in reporting the application of the 3Rs (replacement, reduction and refinement). The recently revised Directive that regulates animal research and testing within the European Union requires Member States to ensure that all procedures are classified as 'non-recovery', 'mild', 'moderate' or 'severe', using assignment criteria set out by the European Commission (EC). However, these are focused upon terrestrial species, so are of limited relevance to fish users. A Working Group set up by the Norwegian Consensus-Platform for the 3Rs (Norecopa) has produced guidance on the classification of severity in scientific procedures involving fish, including examples of 'subthreshold', 'mild', 'moderate', 'severe' and 'upper threshold' procedures. The aim is to complement the EC guidelines and help to ensure that suffering in fish is effectively predicted and minimized. Norecopa has established a website (www.norecopa.no/categorydec) where more information on severity classification for procedures using fish, including field research, will be made available.

Keywords: Fish, harm–benefit assessment, humane endpoints, refinement, severity

Laboratory Animals 2011; 1–6. DOI: 10.1258/la.2011.010181

Background

An effective prediction of the effects of a research protocol on the animals concerned helps to ensure that any pain, suffering or distress they may experience will be effectively anticipated, recognized and alleviated. This is essential not only for animal welfare but also for scientific validity, because physiological and behavioural responses to suffering can significantly affect data quality. Severity classification is thus an important tool to help focus the implementation of refinement, including monitoring its progress, and to assist in reporting the application of the 3Rs (replacement, reduction and refinement) of Russell and Burch,[1] which is now an integral part of the legislation on animal research and testing in many countries. Predictions of severity are also fundamental to the harm–benefit assessments undertaken by bodies such as regulatory authorities and ethical committees when deciding whether or not a project should be licensed or funded.

There may also be a legal requirement to predict and classify severity. For example, the new Directive regulating animal use within the European Union, which must be implemented within all Member States by January 2013, requires the severity of each procedure to be classified on the basis of the 'degree of pain, suffering, distress or lasting harm expected to be experienced by an individual animal during the course of the procedure', with the aim of enhancing transparency, facilitating the project authorization process and providing tools for monitoring compliance.[2] Member States will have to ensure that all procedures are classified as 'non-recovery', 'mild', 'moderate' or 'severe' on a case-by-case basis, using the assignment

AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*

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*The AVMA Panel on Euthanasia develops the content of the guidelines, with support from its working groups. The panel is required to do a comprehensive review and update of the report at least every 10 years, although more frequent major revisions are possible based on substantive information gleaned from new research and experience with practical implementation. To ensure the guidelines remain as up-to-date as possible, interim revisions (reaffirmed, substantive updates, but of a less extensive nature than a major revision) are also recommended

A Gold Standard Publication Checklist to Improve the Quality of Animal Studies, to Fully Integrate the Three Rs, and to Make Systematic Reviews More Feasible

Carlijn R. Hooijmans, Marlies Leenaars and Merel Ritskes-Hoitinga

Radboud University Nijmegen Medical Centre, Central Animal Laboratory and 3R Research Centre, Nijmegen, The Netherlands

Summary — Systematic reviews are generally regarded by professionals in the field of evidence-based medicine as the highest level of medical evidence, and they are already standard practice for clinical studies. However, they are not yet widely used nor undertaken in the field of animal experimentation, even though there is a lot to be gained from the process. Therefore, a gold standard publication checklist (GSPC) for animal studies is presented in this paper. The items on the checklist have been selected on the basis of a literature analysis and the resulting scientific evidence that these factors are decisive in determining the outcome of animal studies. In order to make future systematic reviews and meta-analyses of animal studies possible, to allow others to replicate and build on work previously published, diminish the number of animals needed in animal experimentation (reduction), improve animal welfare (refinement) and, above all, improve the quality of scientific papers on animal experimentation, this publication checklist needs to be used and followed. We have discussed and optimised this GSPC through feedback from interviews with experts in the field of animal experimentation. From these interviews, it became clear that scientists will adopt this GSPC when journals demand it. The GSPC was compared with the current instructions for authors from nine different journals, selected on the basis that they featured a high number of publications on animal studies. In general, the journals' demands for the description of the animal studies are so limited that it is not possible to repeat the studies, let alone carry out a systematic review. By using the GSPC for animal studies, the quality of scientific papers will be improved. The use of the GSPC and the concomitant improvement in the quality of scientific papers will also contribute to decreased variation and increased standardisation and, as a consequence, a reduction in the numbers of animals used and a more reliable outcome of animal studies. It is of major importance that journal editors become convinced of and adopt these recommendations, because only then will scientists follow these guidelines to the full extent.

Key words: *animal experimentation, meta-analysis, publication checklist, scientific quality, systematic review*

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Introduction

A systematic review (SR) is a literature review focused on a single question which tries to identify, appraise, select and synthesise all available high-quality research evidence relevant to that question (1). SRs are generally regarded by evidence-based medicine professionals as the highest level of medical evidence, and they are already standard practice in clinical studies. However, SRs are not yet widely used nor undertaken in the animal experimentation field, although there would be a lot to be gained from the process. A systematic approach to incorporate all available relevant literature into the design of an animal experiment is a prerequisite for research which is of high scientific quality. Good science, from a scientific as well as an animal welfare point of view, is the basis of the book, *The Principles of Humane Experimental Technique*, by Russell and Burch (2). In this book, they recommend that the Three Rs principles (*Refinement, Reduction* and *Replacement*) should be applied whenever possible in animal studies. Besides producing high-quality research, SRs of animal experiments will result in direct implementation of the Three Rs. SRs may provide the proper argumentation to decide which animal model will give the best answer to the (clinical) research question (3, 4) and to detect whether there are gaps in scientific knowledge that require new animal experiments (*replacement and refinement*). This will also aid in preventing unnecessary duplication of animal experiments (*reduction*), and thus discourage unnecessary animal use and time loss. A SR of animal studies will also lead to a better interpretation of the already existing scientific results from animal experiments, through which a better

Tim Allen, USDA

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TextBase:

1,500 books related to Lab Animal Science, welfare and alternatives:

norecopa.no/textbase

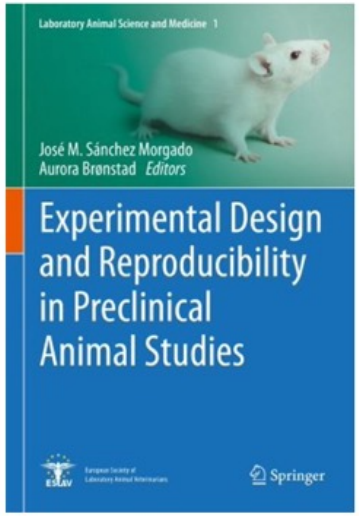
Experimental Design and Reproducibility in Preclinical Animal Studies

By José M. Sánchez Morgado & Aurora Brønstad (Eds.)

Record number: 8619d

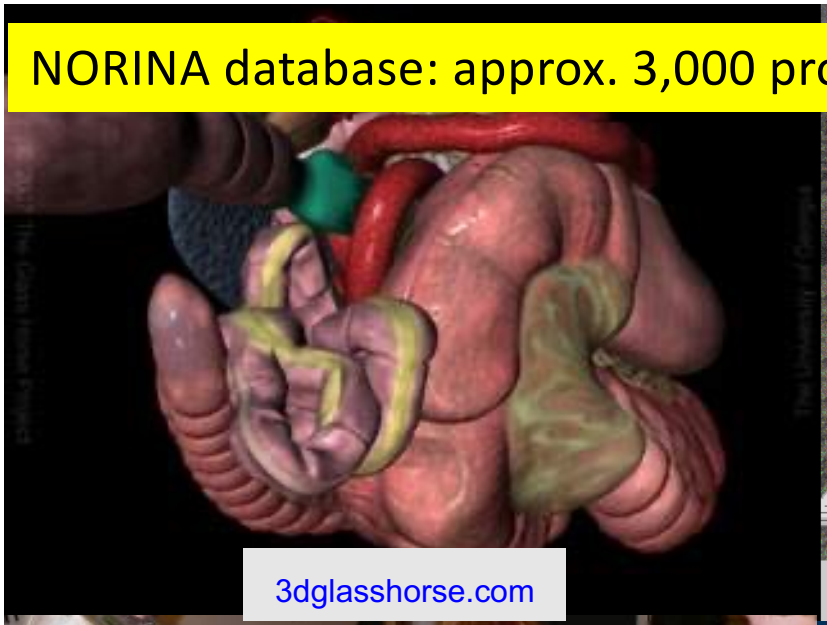
This book provides grounds on how to plan and conduct animal experiments that can be reproduced by others. It touches on factors that may impact the reproducibility of animal studies including: the animal genetic background, the animal microbial flora, environmental and physiological variables affecting the animal, animal welfare, statistics and experimental design, systematic reviews of animal studies, and the publishing process.

The book addresses advanced undergraduates, graduate students and all scientists working with animals.

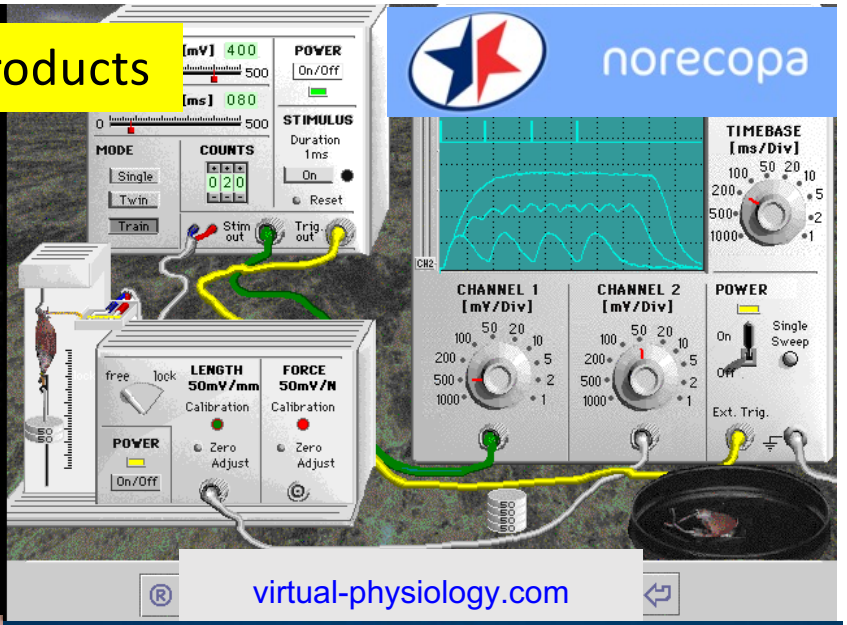


norecopa.no/textbase/experimental-design-and-reproducibility-in-preclinical-animal-studies

NORINA database: approx. 3,000 products

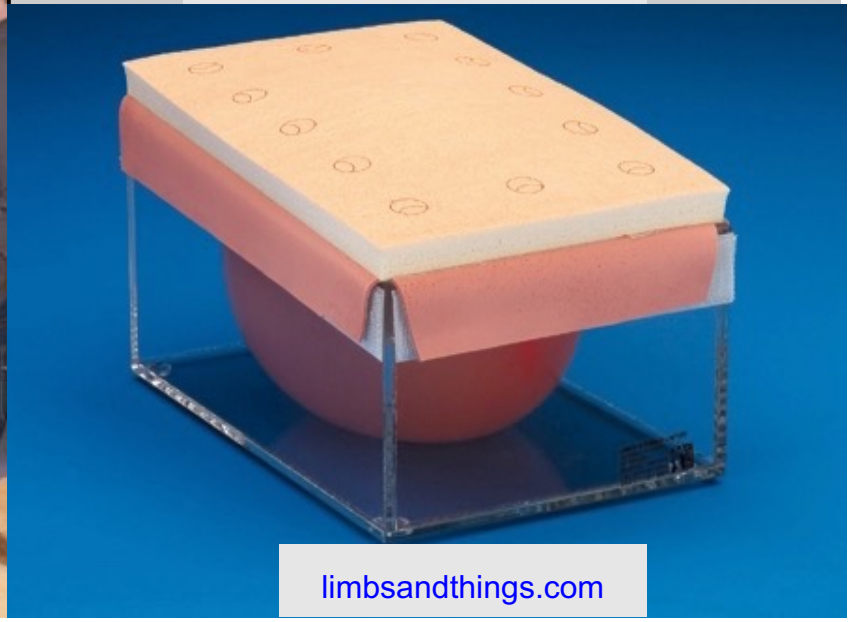


3dglasshorse.com



virtual-physiology.com

rescuecritters.com



limbsandthings.com

The pathway to better science

Norecopa: PREPARE for better Science

norecopa.no/PREPARE *and*
ivd-utrecht.nl/en/news/better-animal-research-through-open-science-1

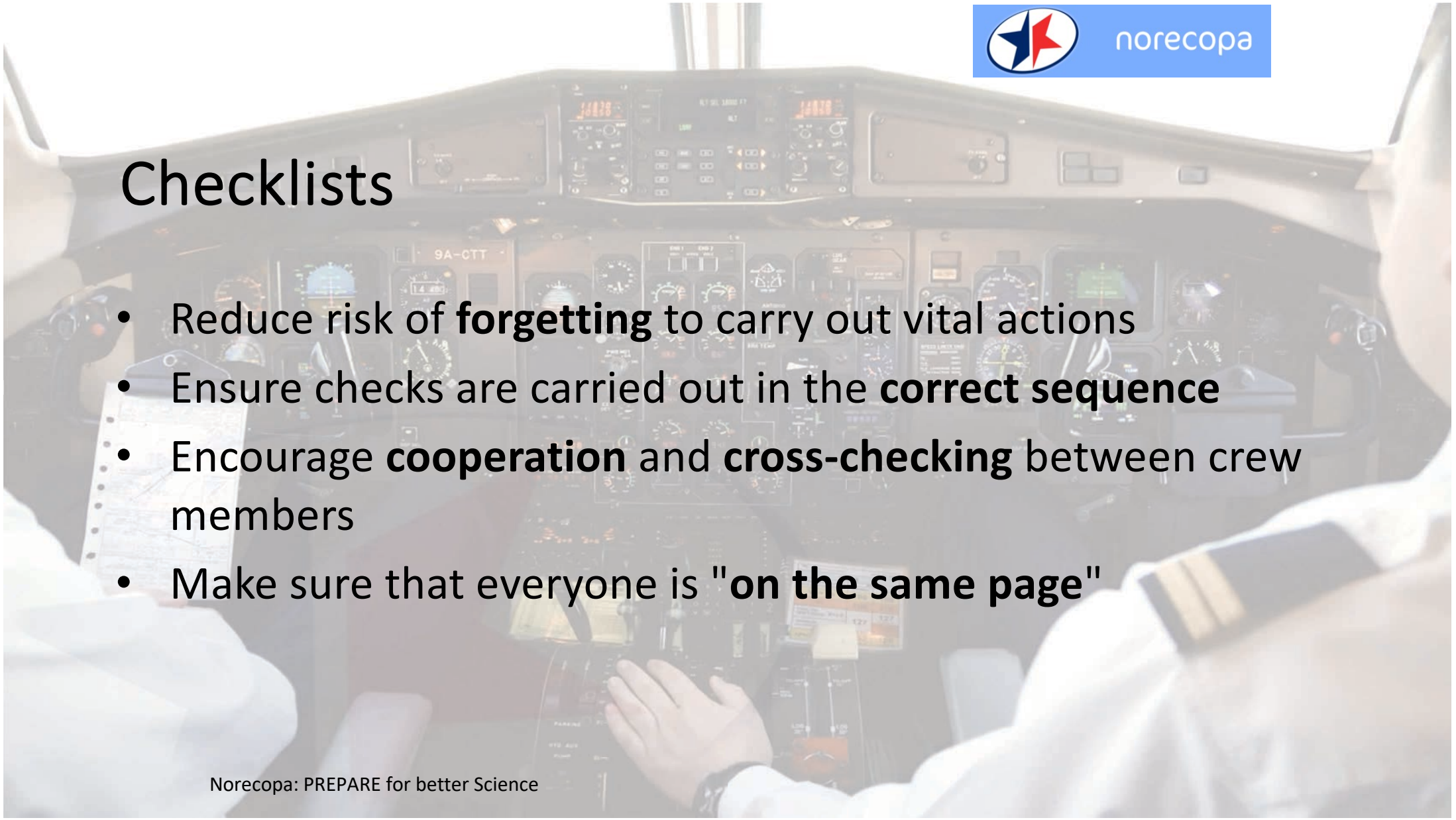
We cannot improve our research by

better reporting alone...

reddit.com

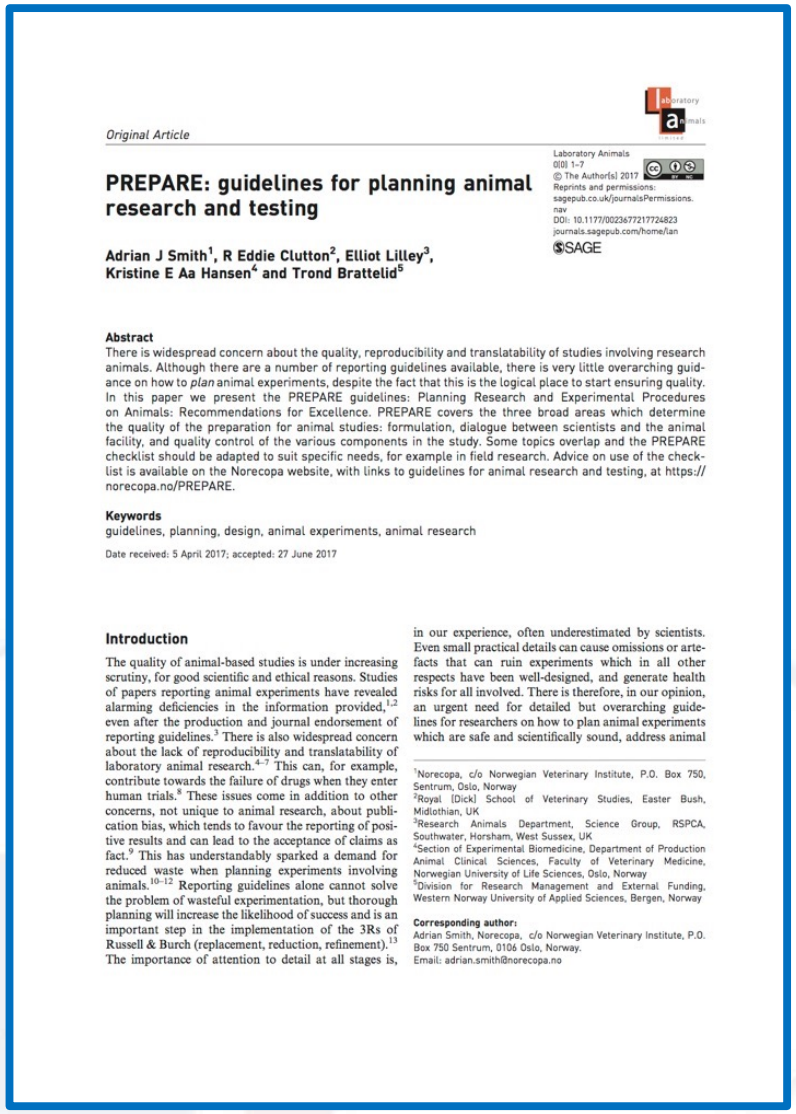
Precision and replicability in the aviation industry:

10-15 checklists even on short routine flights



Checklists

- Reduce risk of **forgetting** to carry out vital actions
- Ensure checks are carried out in the **correct sequence**
- Encourage **cooperation** and **cross-checking** between crew members
- Make sure that everyone is "**on the same page**"



Original Article

PREPARE: guidelines for planning animal research and testing

Adrian J Smith[1], R Eddie Clutton[2], Elliot Lilley[3], Kristine E Aa Hansen[4] and Trond Brattelid[5]

Laboratory Animals
0(0) 1–7

DOI: 10.1177/0023677217724823
journals.sagepub.com/home/lan
SAGE

Abstract

There is widespread concern about the quality, reproducibility and translatability of studies involving research animals. Although there are a number of reporting guidelines available, there is very little overarching guidance on how to *plan* animal experiments, despite the fact that this is the logical place to start ensuring quality. In this paper we present the PREPARE guidelines: Planning Research and Experimental Procedures on Animals: Recommendations for Excellence. PREPARE covers the three broad areas which determine the quality of the preparation for animal studies: formulation, dialogue between scientists and the animal facility, and quality control of the various components in the study. Some topics overlap and the PREPARE checklist should be adapted to suit specific needs, for example in field research. Advice on use of the checklist is available on the Norecopa website, with links to guidelines for animal research and testing, at https://norecopa.no/PREPARE.

Keywords

guidelines, planning, design, animal experiments, animal research

Date received: 5 April 2017; accepted: 27 June 2017

Introduction

The quality of animal-based studies is under increasing scrutiny, for good scientific and ethical reasons. Studies of papers reporting animal experiments have revealed alarming deficiencies in the information provided,[1,2] even after the production and journal endorsement of reporting guidelines.[3] There is also widespread concern about the lack of reproducibility and translatability of laboratory animal research.[4–7] This can, for example, contribute towards the failure of drugs when they enter human trials.[8] These issues come in addition to other concerns, not unique to animal research, about publication bias, which tends to favour the reporting of positive results and can lead to the acceptance of claims as fact.[9] This has understandably sparked a demand for reduced waste when planning experiments involving animals.[10–12] Reporting guidelines alone cannot solve the problem of wasteful experimentation, but thorough planning will increase the likelihood of success and is an important step in the implementation of the 3Rs of Russell & Burch (replacement, reduction, refinement).[13] The importance of attention to detail at all stages is, in our experience, often underestimated by scientists. Even small practical details can cause omissions or artefacts that can ruin experiments which in all other respects have been well-designed, and generate health risks for all involved. There is therefore, in our opinion, an urgent need for detailed but overarching guidelines for researchers on how to plan animal experiments which are safe and scientifically sound, address animal

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Over 32,000 views/downloads from the journal website so far

PREPARE:

Planning **R**esearch and **E**xperimental **P**rocedures on **A**nimals: **R**ecommendations for **E**xcellence

PREPARE covers 15 topics:

Formulation of the study

1. Literature searches
2. Legal issues
3. Ethical issues, harm-benefit assessment and humane endpoints
4. Experimental design and statistical analysis

Dialogue between scientists and the animal facility

5. Objectives and timescale, funding and division of labour
6. Facility evaluation
7. Education and training
8. Health risks, waste disposal and decontamination

Methods

9. Test substances and procedures
10. Experimental animals
11. Quarantine and health monitoring
12. Housing and husbandry
13. Experimental procedures
14. Humane killing, release, reuse or rehoming
15. Necropsy

Items in pink are not typically highlighted in reporting guidelines

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 Brattelid[e]

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PREPARE[1] består av retningslinjer for planlegging av dyreforsøk. Disse
som f.eks. ARRIVE[2]. PREPARE dekker de tre store områdene som beste

1. **Designet av studiet**
2. **Dialogen mellom forskerne og dyreavdelingen**
3. **Kvalitetskontroll av de ulike komponentene i studiet**

I praksis vil ikke temaene alltid behandles i den rekkefølgen som er pr
PREPARE-sjekklisten kan endres for å ivareta spesielle behov, f.eks. ve
dyreavdelinger, fordi laboratorieforsøk er helt avhengige av deres kvalif
Norecopas nettsider, med lenker til globale ressurser, på **https://norec**
PREPARE-retningslinjene er et dynamisk sett som vil videreutvikles ette
produseres, og etterhvert som "best praksis" innenfor forsøksdyrmiljøet forbedres.

Tema	Anbefaling
(A) Designet av studiet	
1. Litteratursøk	☐ Formulere en klar hypotese, med primære og sekundære mål. ☐ Vurdere å foreta en systematisk undersøkelse av litteraturen (Systematic Review). ☐ Bestemme hvilke databaser og informasjonsspesialister som skal brukes, og konstruere søkebegrep. ☐ Vurdere relevansen av dyrearten som skal brukes, dens biologi og egnethet til å svare på de eksperimentelle spørsmålene med minst mulig lidelse, og artens velferdsbehov. ☐ Evaluere prosjektets reproduserbarhet og overførbarhet.
2. Juridiske spørsmål	☐ Vurdere hvordan forsøket er påvirket av relevant lovgivning for dyreforsøk og andre aktuelle områder som f.eks. dyretransport og helse, miljø og sikkerhet. ☐ Finne relevante veiledningsdokumenter (f.eks. EUs retningslinjer for prosjektevaluering).
3. Etiske spørsmål, kostnad-nytteanalyse og humane endepunkter	☐ Skrive et sammendrag av prosjektet på legmannsspråk. ☐ I dialog med etiske komitéer, vurdere om uttalelser om denne typen forsøk er allerede blitt produsert. ☐ Adressere "de 3 R-ene" (Replacement, Reduction, Refinement) og "de 3 S-ene" (Good Science, Good Sense, Good Sensibilities). ☐ Vurdere forhåndsregistrering av forsøket og publisering av negative resultater. ☐ Foreta en kostnad-nytteanalyse ("Harm-Benefit Assessment") og diskutere eventuelle lidelser som kan oppstå under forsøket. ☐ Diskutere læringsmålene dersom dyrene skal brukes i undervisnings- eller treningsøyemed. ☐ Klassifisere prosjektet etter belastningsgraden. ☐ Definere objektive, lett målbare og utvetydige humane endepunkter. ☐ Diskutere behovet (hvis det er noe) for å bruke død som endepunktet for forsøket.
4. Eksperimentelt design og statistisk analyse	☐ Vurdere pilotforsøk og diskutere statistisk styrke og signifikansnivåer. ☐ Definere den eksperimentelle enheten og bestemme antallet forsøksdyr. ☐ Bestemme metodene for randomisering, forhindre observasjonsskjevheter, og bestemme inklusjons- og eksklusjonskriterier.

+ 2 online versions
35 languages

Tema	Anbefaling
(B) Dialogen mellom forskerne og dyreavdelingen	
5. Mål og tidshorisont, finansiering og arbeidsfordeling	☐ Arrangere møter med alle relevante personell når tidlige planer for prosjektet foreligger. ☐ Lag en omtrentlig tidsramme for prosjektet, som viser behovene for assistanse med forberedelser, dyrestell, prosedyrer og avfallshåndtering/dekontaminasjon. ☐ Diskutere og legge frem alle forventede og potensielle kostnader. ☐ Lage en detaljert plan for fordelingen av både arbeidsoppgavene og utgiftene, på alle stadiene i forsøket.
	fasilitetene, for å evaluere bygningsmassen, standarden på utstyret og
	ved perioder med ekstra risiko.
	rtansen hos personalet og evaluere behovet for videreutdanning og
	en, foreta en risikoevaluering som omfatter alle personene og dyrene direkte, av studiet. dusere, spesifikke retningslinjer for alle stadiene av prosjektet. , dekontaminere og avhende alt utstyret som skal brukes i studiet.
(C) Kvalitetskontroll av de ulike komponentene i studiet	
9. Testsubstanser og -prosedyrer	☐ Oppgi så mye informasjon som mulig om testsubstansene. ☐ Evaluere gjennomførbarheten og validiteten av testprosedyrene, og de praktiske ferdighetene som er nødvendige for å gjennomføre dem.
10. Forsøksdyr	☐ Bestemme egenskapene til dyrene som er essensielle for studiet og som må rapporteres. ☐ Unngå produksjon av overskuddsdyr.
11. Karantene og helsemonitorering	☐ Diskutere dyrenes sannsynlige helsestatus, og eventuelle behov for transport, karantene og isolasjon, samt helsemonitorering og konsekvensene for personalet.
12. Oppstalling og stell	☐ Ta hensyn til dyrenes spesifikke instinkter og behov, i samråd med eksperter. ☐ Diskutere akklimatisering, optimale oppstallingsforhold og prosedyrer, miljøfaktorer og eventuelle begrensninger på disse (f.eks. fasting eller oppstalling i enebur).
13. Eksperimentelle prosedyrer	☐ Utvikle optimale metoder for fangst, immobilisering, merking og frisetting eller omplassering. ☐ Utvikle optimale metoder for å gi dyrene behandling, samt for prøvetaking, sedasjon og anestesi, kirurgi og andre inngrep.
14. Human avliving, frisettelse eller omplassering	☐ Konsultere relevant lovgivning og retningslinjer i god tid før studiet. ☐ Definere de primære metodene for avliving, samt metoder som kan brukes i en nødssituasjon. ☐ Evaluere kompetansen til personene som må foreta disse handlingene.
15. Obduksjon	☐ Lage en systematisk plan for alle stadiene i obduksjonen, inkl. hvor den skal foregå, og identifikasjon av alle dyrene og prøvene som tas.

Referanser

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.

Mer informasjon
https://norecopa.no/PREPARE / *post@norecopa.no* / @norecopa

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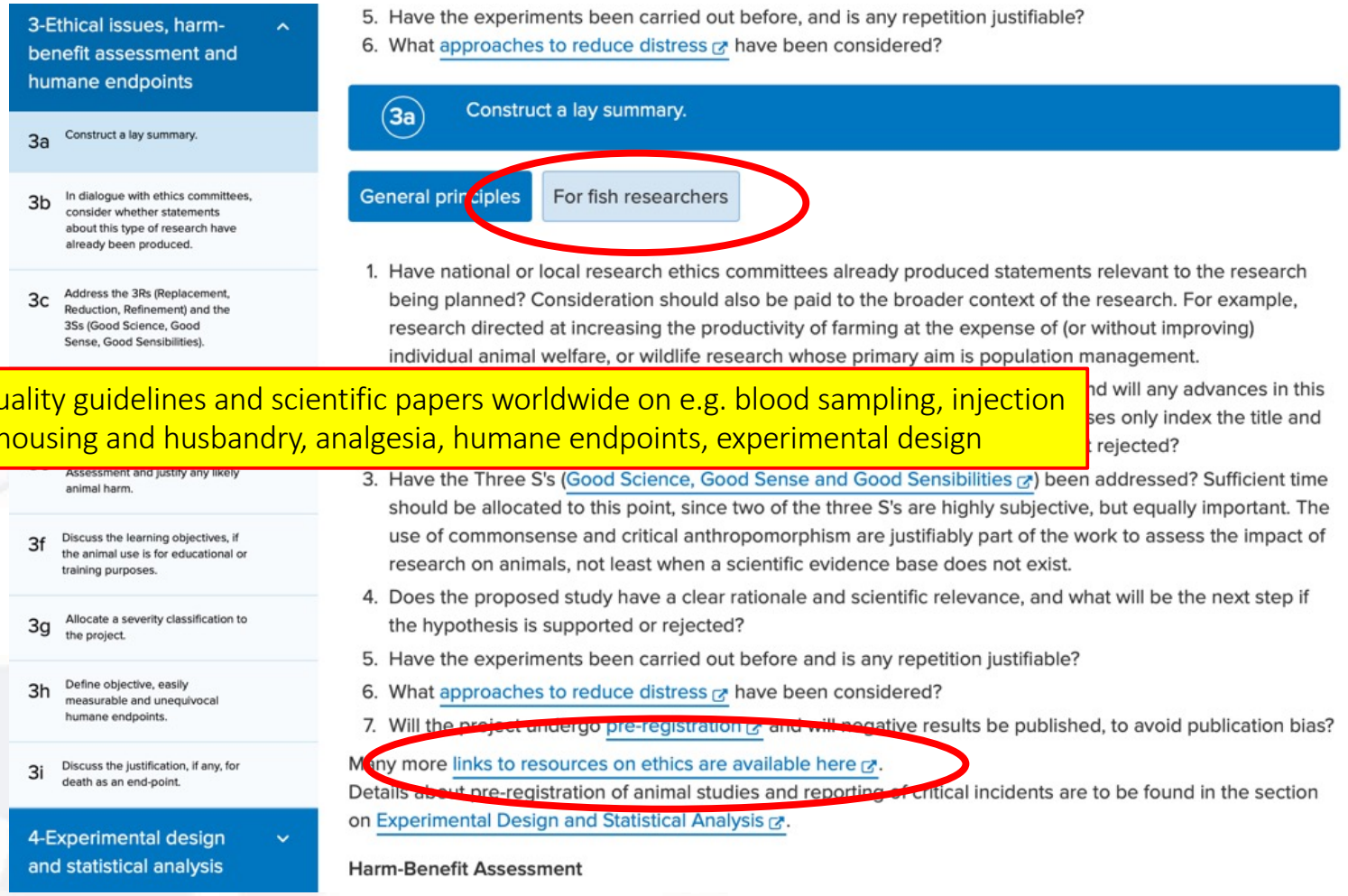
***In addition to the checklist*, much more information is available on:**

norecopa.no/PREPARE

norecopa.no/PREPARE



Links to quality guidelines and scientific papers worldwide on e.g. blood sampling, injection volumes, housing and husbandry, analgesia, humane endpoints, experimental design

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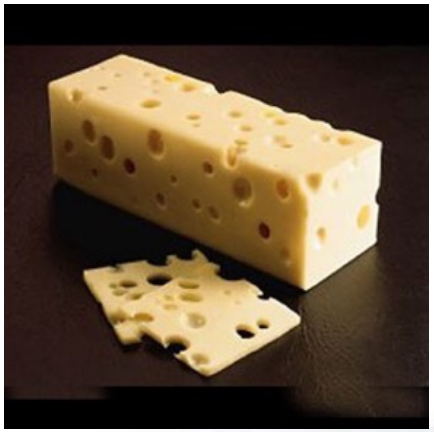
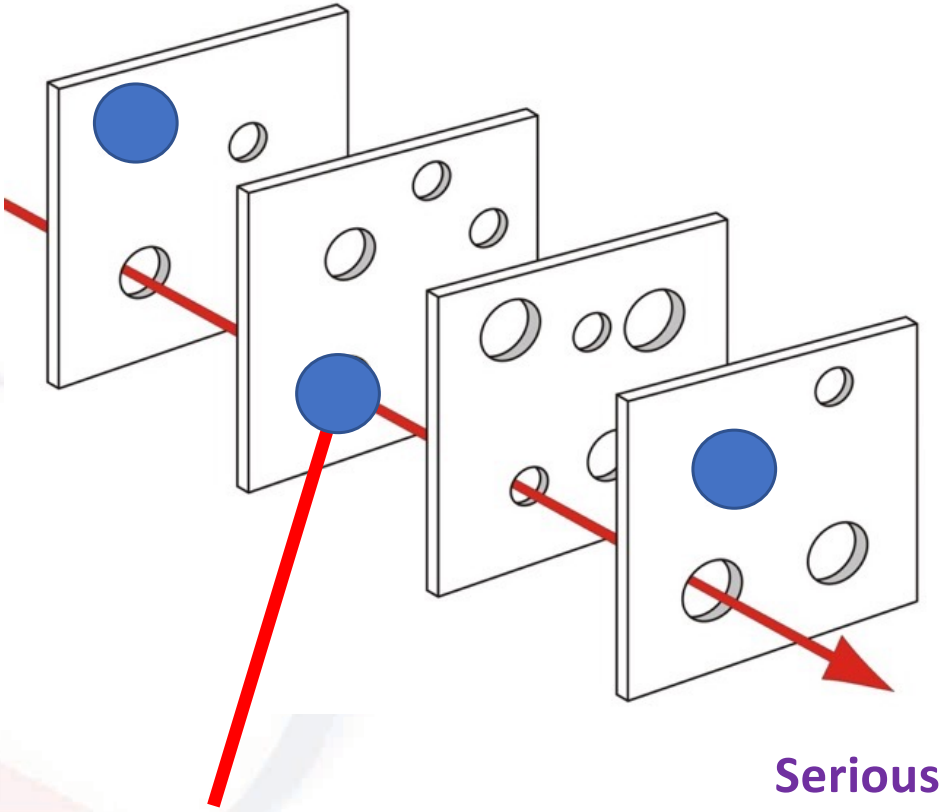
“Threat and Error Management”



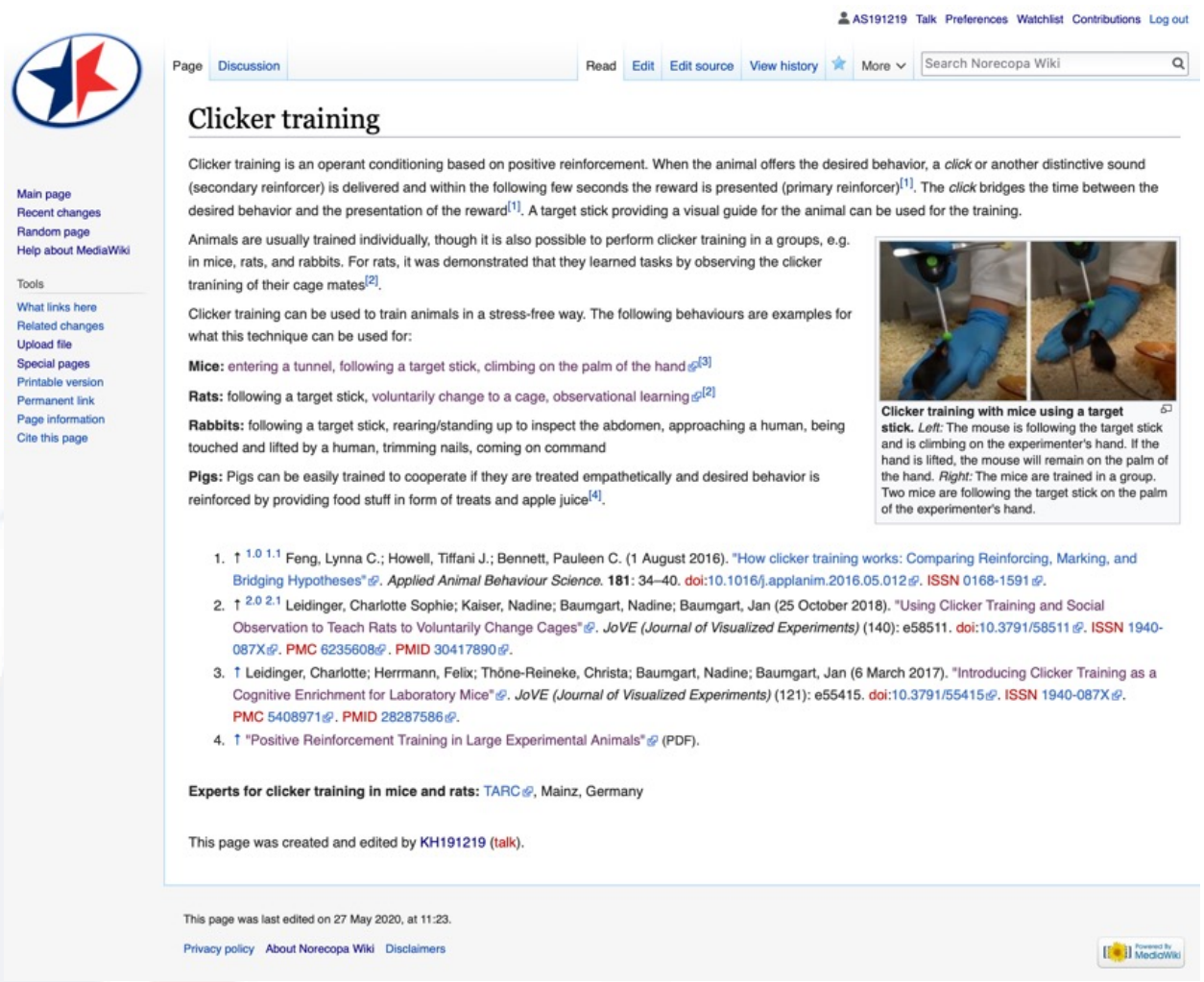
eaugallecheese.com/Swiss-Cheese



wikipedia.org/wiki/Swiss_cheese_model


CIRS-LAS Portal
Critical incident reporting system in laboratory animal science
Refine - Reduce - Replace
Homepage
Project
Team
FAQ
Detect a critical incident
Anonymous report
CIRS-LAS.de
Get involved!
We all learn from it!
Expert analysis

Refinement Wiki: wiki.norecopa.no



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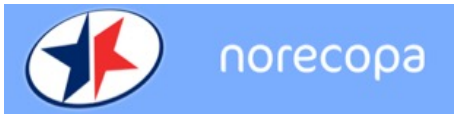


- Acclimatisation
- Adrian Smith
- Alphaxalone
- Anaesthesia in neonates
- Analgesia
- Asepsis
- Blood sampling of hamsters
- Blood sampling of pigs
- Blood sampling of rainbow trout
- Breeding strategies for mice
- Clicker training
- Contingency plans
- Decapitation
- Detecting early onset of clinical signs in the mouse model of Covid-19
- Detection of pain and distress in mice
- EMLA cream
- Embryo transfer
- Experimental Autoimmune Encephalomyeltis (EAE)
- Facial expression analysis
- Food crunchers
- General discusson on use of analgesics
- Genotyping mice
- Habituation training
- High-fat diets
- Hot Bead Sterilisers
- Housing nude mice
- Housing research fish
- Humane endpoints
- Hydrodynamic gene delivery
- Intra-ocular injections
- Intranasal administration
- Intraperitoneal injection
- Intraperitoneal pentobarbitone
- Ketamine and alpha-2 agonist combinations
- Long-term anaesthesia in rodents
- Lumpfish
- Main Page
- Marble Burying Test
- Metabolic cages
- Minipumps
- Montanide adjuvant
- Mouse Grimace Scale
- Mouse handling
- Nest building material
- Oestrus suppression in ferrets
- Pneumocystis murina
- Recapping needles
- Rotarod Test
- Screening cell lines
- Sedation of cattle
- Splenectomy
- Sterilisation of instruments
- TTEAM and TTouch
- Tail vein injection
- Tramadol
- Transport stress
- Tumour cell implant into mammary fat pad
- Ulcerative Dermatitis in Mice
- Water quality
- Xenopus laevis
- Zebrafish swabbing

Culture of Care

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

Culture of Care facilitates honest discussion along the path

"because we've always done it that way"

"as often as necessary"

"there are no alternatives"

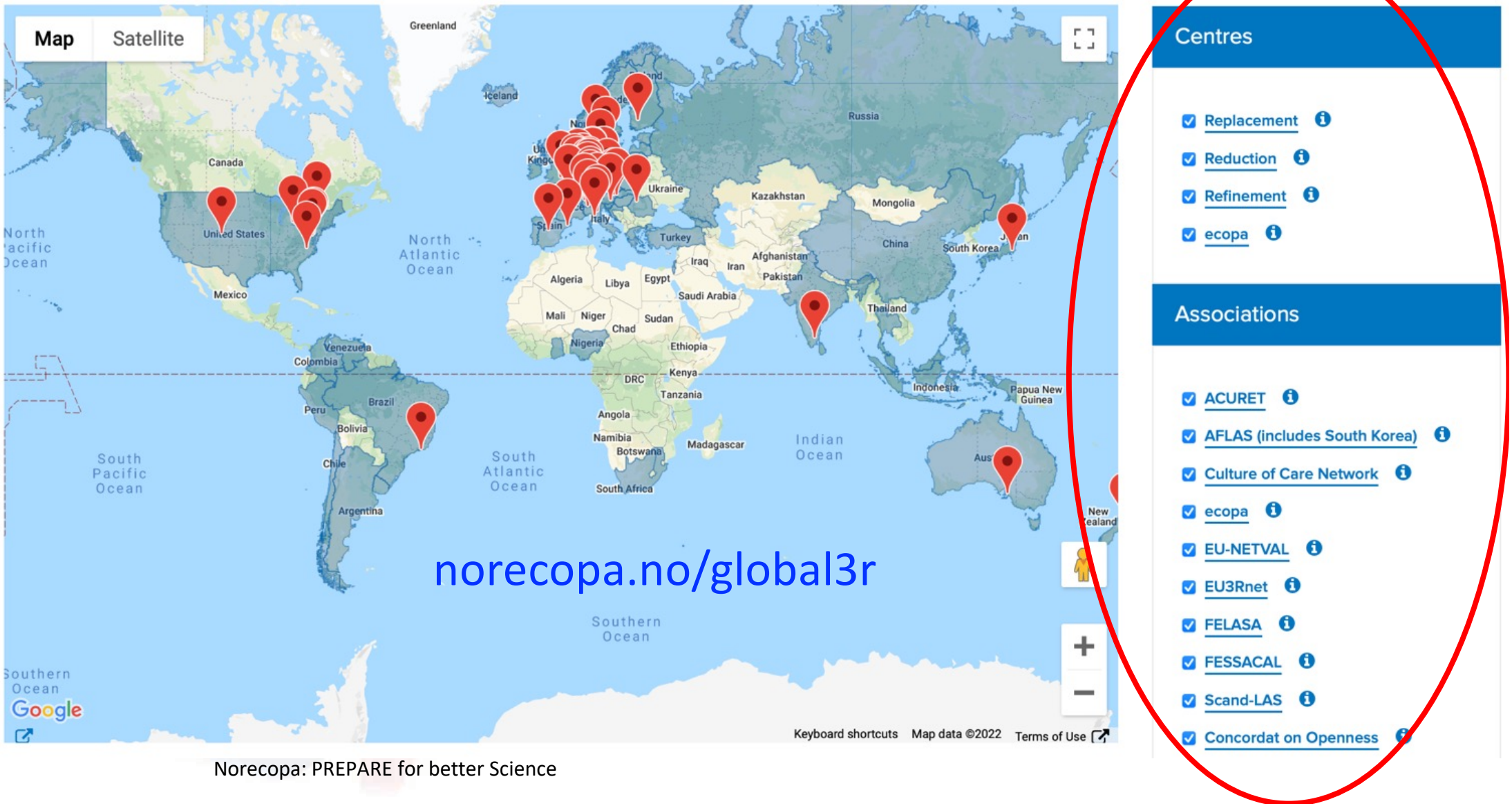
Closely related to a culture of care is

a **Culture of Challenge** (Louhimies, 2015)**.**

Look for the acceptable, rather than choosing the accepted.

norecopa.no/coc

Culture of Care Network



Centres

- Replacement
- Reduction
- Refinement
- ecopa

Associations

- ACURET
- AFLAS (includes South Korea)
- Culture of Care Network
- ecopa
- EU-NETVAL
- EU3Rnet
- FELASA
- FESSACAL
- Scand-LAS
- Concordat on Openness

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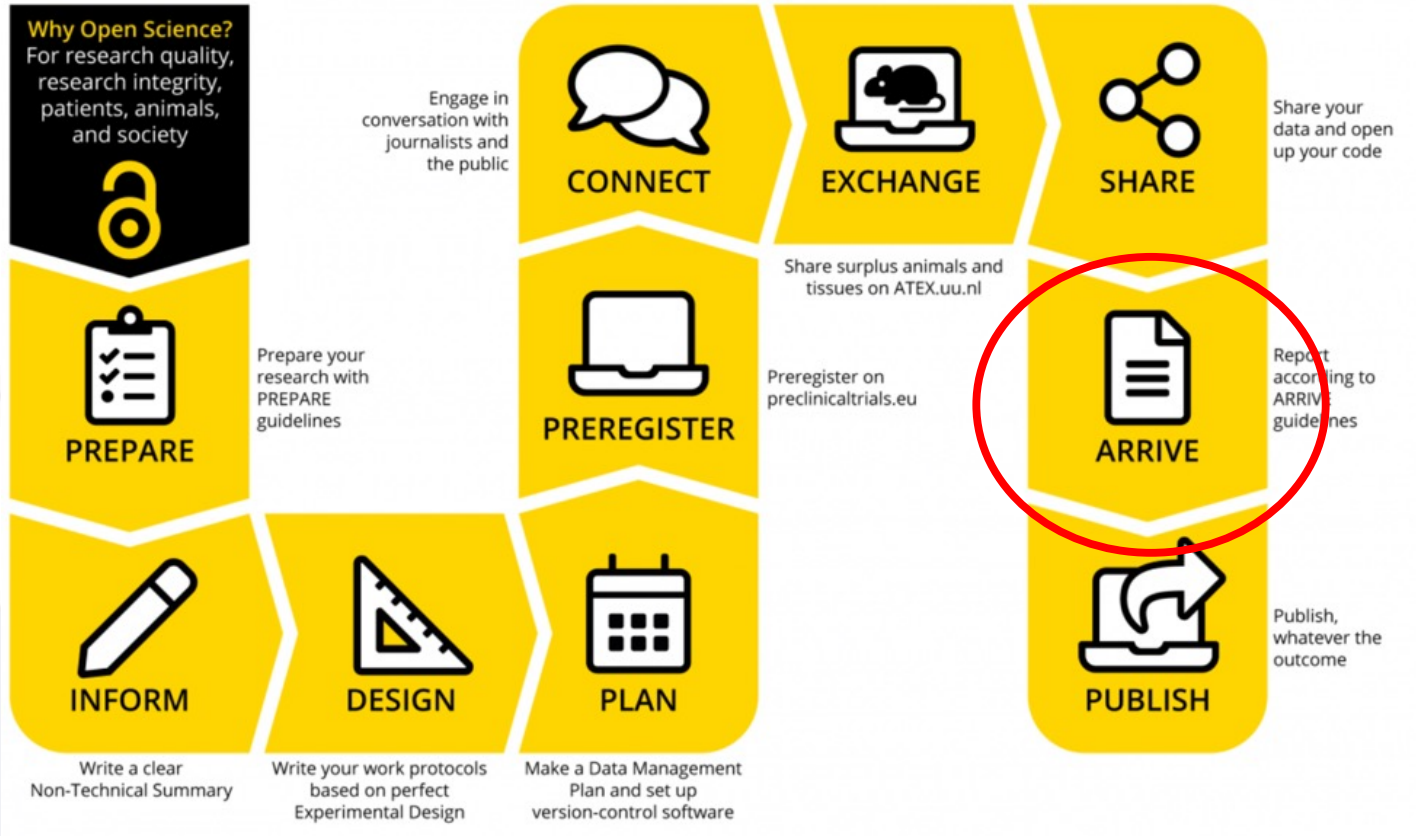

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norecopa.no/PREPARE *and*
ivd-utrecht.nl/en/news/better-animal-research-through-open-science-1

arriveguidelines.org

The ARRIVE guidelines 2.0

This section of the website provides detailed explanations about each item of the guidelines. Use the left-hand side menu to navigate to each item.

To facilitate a step-wise approach to improving reporting, the guidelines are organised into two prioritised sets:

ARRIVE Essential 10

These ten items are the basic minimum that must be included in any manuscript describing animal research. Without this information readers and reviewers cannot assess the reliability of the findings.

Recommended Set

These items complement the Essential 10 set and add important context to the study described. Reporting the items in both sets represents best practice.

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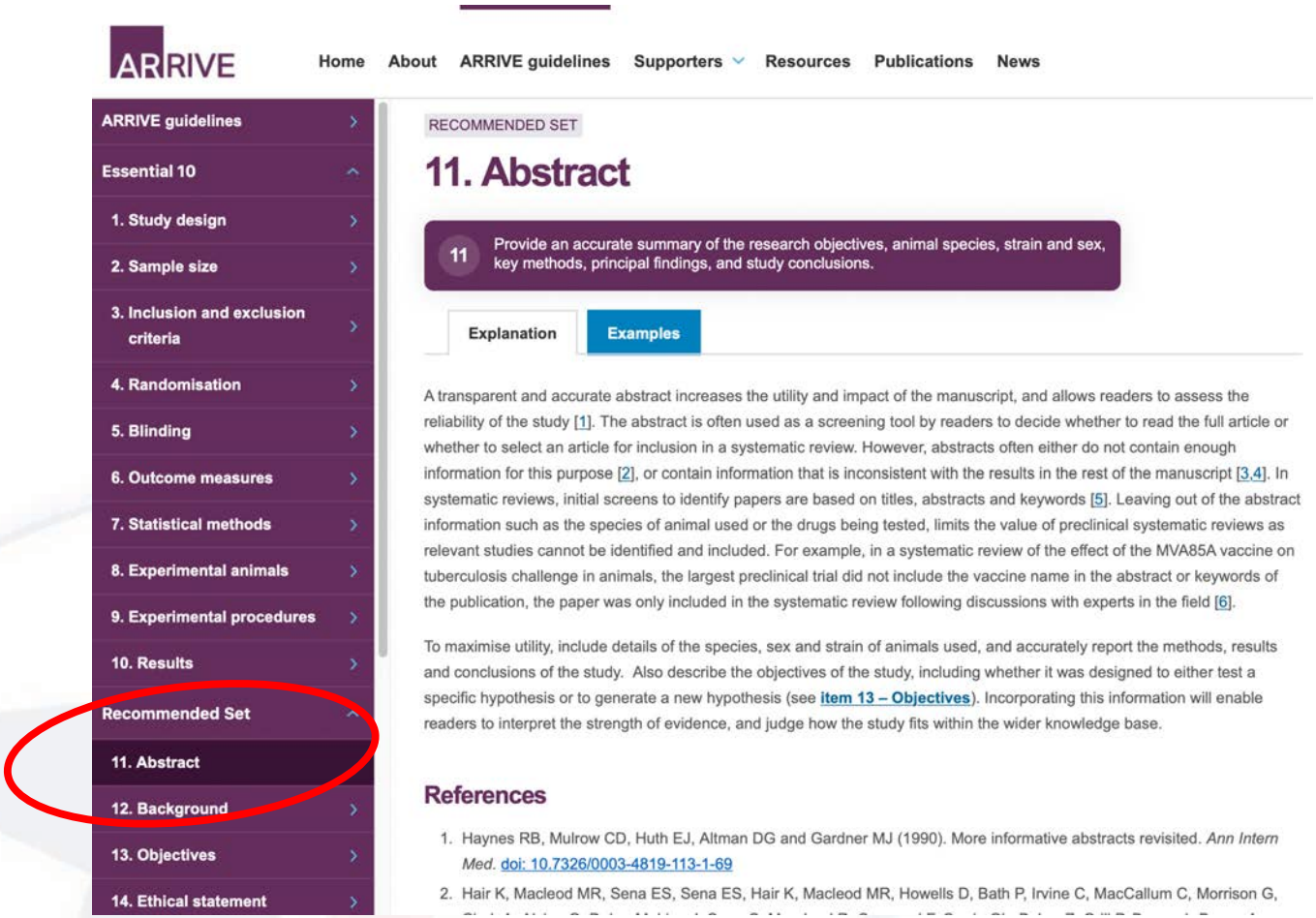
arriveguidelines.org



norecopa.no / PREPARE / 10-Experimental animals

There are three broad areas which need to be considered when planning animal studies:

1. The suitability of the species or strain as a model of the target organism
2. The ethical issues surrounding their use: 'choosing the right animal for the right reason'. The large increase in use of genetically altered lines has created increasing concern about the suitability of these animals as models of human conditions.
3. Characterisation of the animals. Items to be considered, in collaboration with the supplier, include:
   - Species, strain, line and phenotype (with an explanation of any genetic modifications)
   - Age, developmental stage, sex and weight
   - Stage of oestrous cycle and any previous breeding history
   - Any necessary pre-treatment (e.g. castration for this
   - Name and address of the supplier/breeder, method of capture and transport
   - Health status (e.g. germ-free, gnotobiotic, SI
   - Re-use of animals, which should be justified legislation
   - Any plans for release or re-homing, which m

More resources

- Examples and references from the NC3Rs
- Information on inbred strains of mice and rats
- Strategies to minimise genetic drift and maximise experimental reproducibility in mouse research
- Mouse Locator, UK
- The Collaborative Cross panel of inbred mouse strains
- Nude mice - more than what meets the eye
- The Rat Guide
- Rat Behavior and Biology

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"We ARRIVED, because we were PREPARED"

- ✓ *Better Science*
- ✓ *Improved animal welfare*
- ✓ *Advancement of the 3Rs*
- ✓ *Safer working environment*

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More than 3Rs

***The 3 Rs* to minimise the harm:**

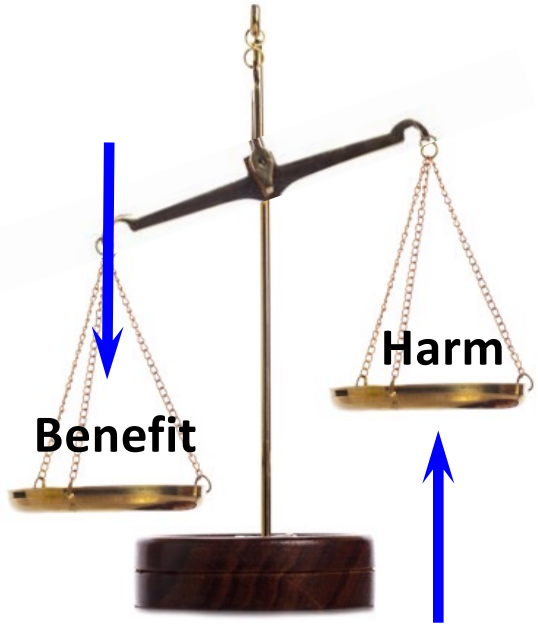
- *Replace the unnecessary experiments*
- *Reduce the number of animals used*
- *Refine the conditions for the animals*

***The 3 Ss* - your commonsense and your heart**

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

***The 3 Vs* to increase the validity of the experiment:**

- *Construct Validity (can the model answer the question?*
- *Internal Validity (has the experiment been correctly designed?)*
- *External Validity (are the results translatable to the target group?)*



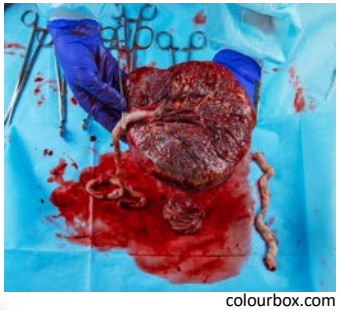
norecopa.no/3R
norecopa.no/3S
norecopa.no/3V

NAMs og NATs

NAMs: New Approach Methodologies (not *Non-Animal Methods!*)

Avoidance (methods which don't directly replace animal experiments)

e.g. "Read-Across"
studies on the human placenta


colourbox.com

	Chemical 1	Chemical 2	Chemical 3	Chemical 4
Structure	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx
Property 1	● ⇨ ○		● ⇨ ○	
Property 2	● ⇨ ○		○ ⇦ ●	
Property 3	○ ⇦ ●		● ⇨ ○	
Activity 1	● ⇨ ○		● ⇨ ○	
Activity 2	● ⇨ ○		○ ⇦ ●	
Activity 3	○ ⇦ ●		● ⇨ ○	

● Existing data point ○ Missing data point

NATs: Non-Animal Technologies

Alternatives to animal experiments

e.g. organoids (mini-organs)
organs-on-chips
experiments on fruit flies

NB. Those who work with NAMs may not even be aware that they use a method that can reduce animal use.
It is therefore important to build bridges between the lab animal community and the NAMs/NATs-communities !

https://www.oecd.org/chemicalsafety/risk-assessment/groupingofchemicalschemicalcategoriesandread-across.htm

https://nc3rs.org.uk/sites/default/files/documents/NonAnimalTechCO082_RYE_4_nrfinal2.pdf

We need more dialogue between the experts in their different fields

English-language newsletters

norecopa.no/news/newsletters 1,300 international subscribers

7-8 times a year

- Norecopa's Annual Meeting and 3R Prize
- Updates about Norecopa
- Nordic Zebrafish Network and course
- News of PREPARE
- News of other 3R Centres and activities
- Harmonisation of education and training
- New forum for behavioural research
- New textbook on anaesthesia
- Fish research
- Glimpses from research
- Food for thought
- For Norwegian readers
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- Scottish Accreditation Board
- Stiansen Foundation
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- US Department of Agriculture

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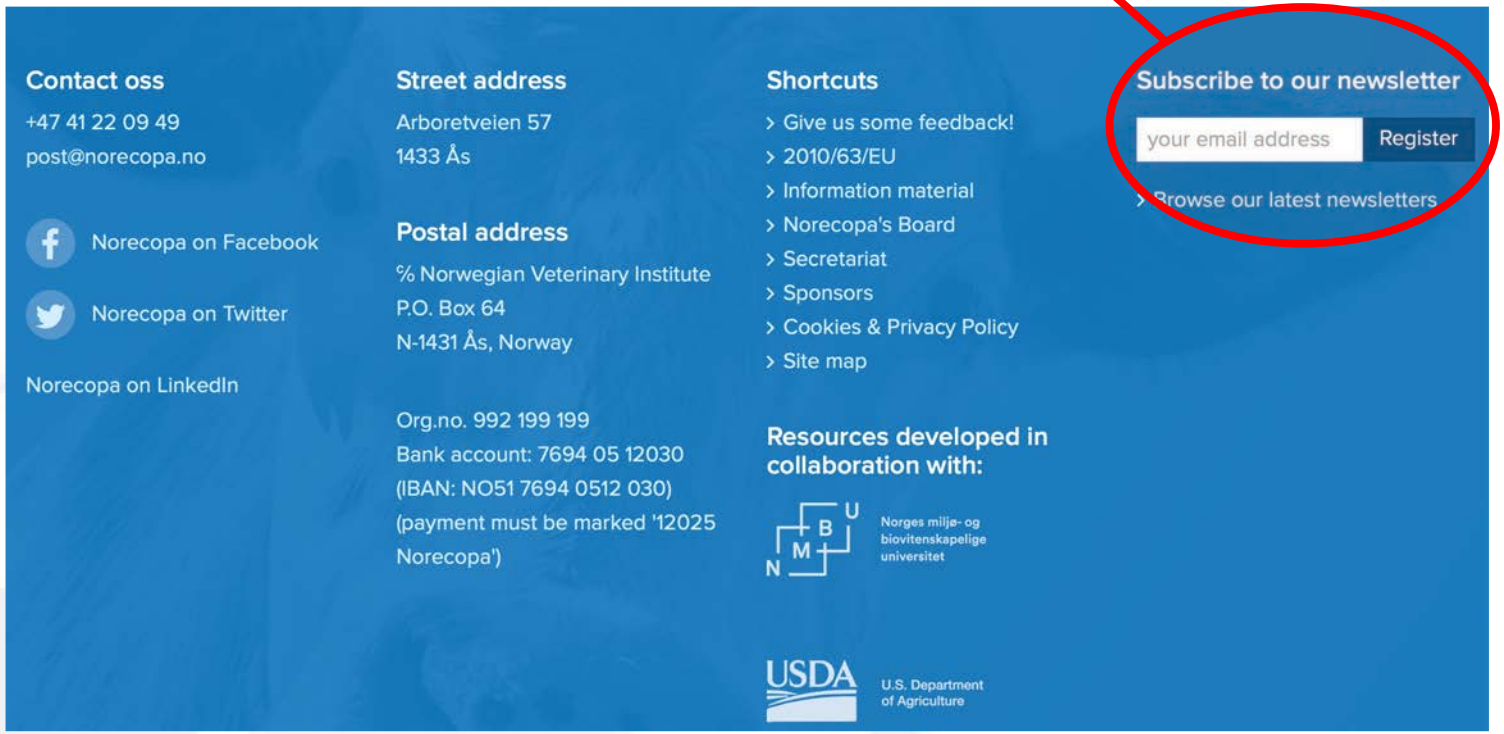
English-language newsletters



Thank you for listening!

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