Avoiding and reducing 'severe' suffering in laboratory animals

- Promotes the **3Rs**
- Encourages effective processes of ethical review that constructively challenges **whether and how** animals are used in science

Helping to achieve high quality science while reducing impacts on lab animals and improving welfare

Provide support, information and inspiration to help you reduce - or ideally avoid - 'severe' suffering

Within the UK and the European Union, ‘severe’ procedures are those where animals used in science are likely to experience the highest level of harm:

- severe pain, suffering or distress
- long-lasting moderate pain, suffering or distress, or
- severe impairment to their wellbeing or general condition

e.g. Annex VIII of EU Directive 2010/63

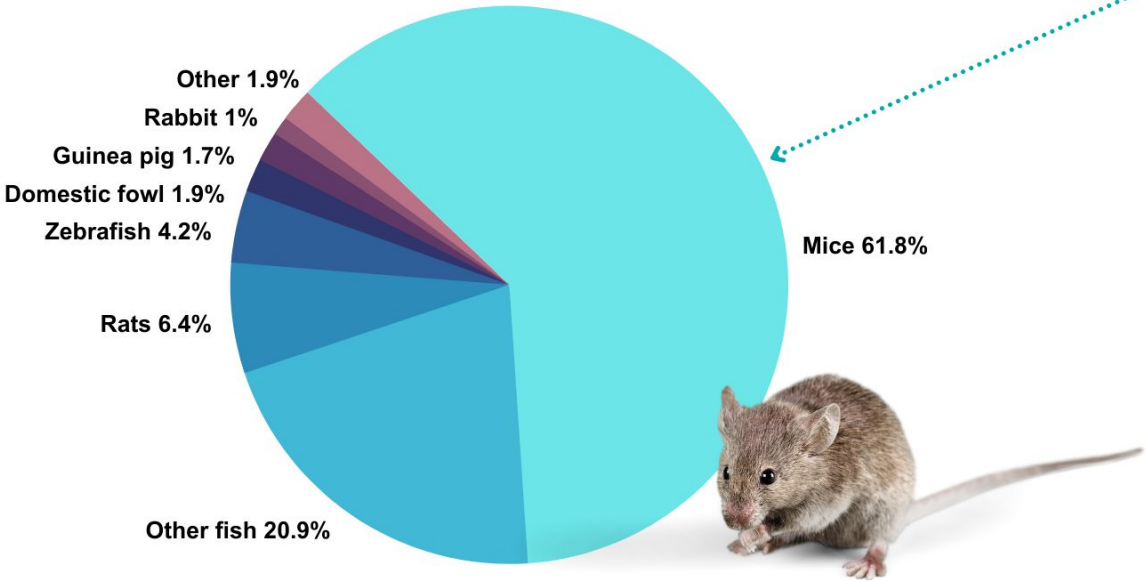
Causes of severe suffering

THREE MAIN REASONS

- Animals may be used in studies of **diseases or conditions** that by their nature can cause severe suffering
- A **combination** or series of less severe factors can combine to lead to an increase in overall suffering
- Where animals **die unexpectedly**, or where the **death** of an animal is used an **‘endpoint’** of the study

Table: Severity of use, EU 2020

	2018	2019	2020
Non-recovery	6% (521,765)	6% (494,368)	**4% (330,392)**
Mild	48% (4,311,312)	50% (4,380,747)	**49% (3,921,024)**
Moderate	35% (3,169,559)	34% (2,955,923)	**37% (3,006,764)**
Severe	11% (976,445)	10% (884,186)	**10% (796,750)**
Total	100% (8,979,018)	100% (8,715,224)	**100% (8,054,930)**

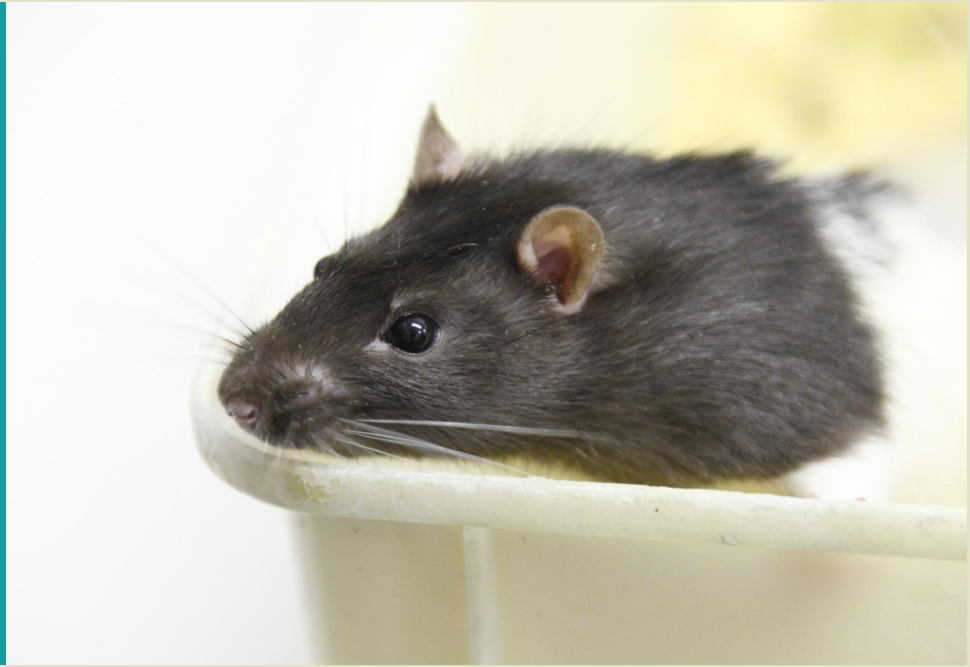


https://ec.europa.eu/environment/chemicals/lab_animals/reports_en.htm

10M

animals across the world experience severe suffering each year

*estimate



All laboratory animal suffering is a concern, but reducing and avoiding ‘severe’ suffering should be a top priority

- ✔ **Ethical** and animal welfare benefits
- ✔ **Legal** requirements to minimise suffering
- ✔ **Societal** concerns about harms to animals
- ✔ **Scientific** benefits - better welfare means better science

Everyone has a part to play

- Scientists
- Animal technologists
- Designated veterinarians
- Staff responsible for ensuring information access, training and competency
- Institutional Animal Care and Use Committees
- Government officials
- National ethics or science committees
- National 3Rs centres
- NGOs

Our initiative

Since 2012, the RSPCA has been **working collaboratively** with the scientific community in the UK, EU and internationally, to initiate and promote a range of activities aimed at identifying and promoting **practical steps** which will help people to **reduce** or, ideally, **avoid** ‘severe’ suffering.

Key objectives

- **Refine models** to bring them to a lower severity limit where possible

  - applies to other levels of suffering too

- Ensure there has been robust discussion and a rationale that justifies the need for severe limits, where they still exist

FOCUS ON SEVERE SUFFERING

61% reduction in experimental procedures causing severe suffering in the **UK** since 2014

focusonseveresuffering.co.uk

EXAMPLES OF POTENTIALLY 'SEVERE' PROCEDURES

Batch potency testing of vaccines (where control animals experience 'severe' disease symptoms) **and other biologics** e.g. botulinum toxin, for regulatory purposes

Studies involving infectious disease models, including the development of vaccines or other treatments, where animals may experience 'severe' disease symptoms

Various tests involved in regulatory toxicology, including ecotoxicology, especially where animals may become moribund or die

Monoclonal antibody production using the mouse ascites method – NB this method has not been used in the UK since 2012 but is still used elsewhere in the world

Some cancer models – involving large tumours, resection, bone metastasis, brain tumours, pancreatic tumours

Some heart disease models – myocardial infarction induction; monocrotaline (MCT)-induced pulmonary arterial hypertension; transverse aortic constriction/banding

Multi-organ failure models

Demyelination of the central nervous system (CNS)

Models of motor neurone disease (MND)

Spinal cord injury models

Neuroscience studies using non-human primates, involving the cumulative effects of numerous surgeries, regular and long periods of restraint, and/or fluid or food control

Tamoxifen as an inducer of gene function

Irradiation with reconstitution of bone marrow

Cerebral malaria in rodents

Pancreatitis models

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Expert Working Groups

- Seizures, convulsions and epilepsy
- Experimental autoimmune encephalomyelitis (EAE)
- Rheumatoid arthritis
- Sepsis
- Spinal cord injury
- Bone marrow ablation and reconstitution

- Avoiding mortality

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Events

- **Brussels**, Belgium - 2016
- **Berlin**, Germany - 2017
- **Stevenage**, UK - 2019
- **Athens**, Greece - 2019
- **Manchester**, UK - 2022
- **Stockholm**, Sweden - 2022
- Leiden, Netherlands - 2023

100s of participants: regulators, scientists, veterinarians, animal technologists and care staff, members of Animal Welfare Bodies (similar to IACUCs or AECs) and National Committees etc.

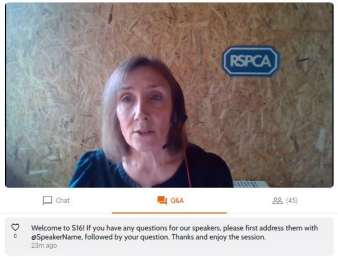
focusonseveresuffering.co.uk/events

Nuno Henrique Franco @Nuno_H_Franco · Dec 10, 2021

So happy to have Penny Hawkins @RSPCA_LabAnimal delivering a talk at the SPCAL Scientific Day on the challenging goal of ending severe suffering, in #animalresearch.

Potentially severe procedures

- Batch potency testing of vaccines and other biologics
- Infectious disease models with severe symptoms, e.g. some vaccine development
- Studies of diseases that cause severe suffering in humans, e.g. rheumatoid arthritis, sepsis, spinal cord injury
- Some regulatory toxicology tests, e.g. acute toxicology, ecotoxicity



efpia

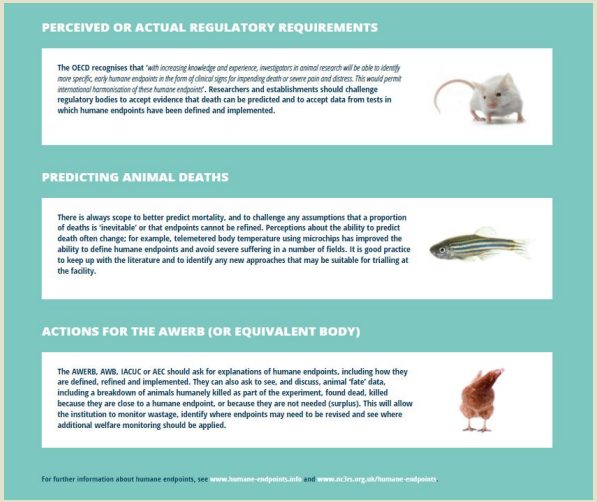
RSPCA

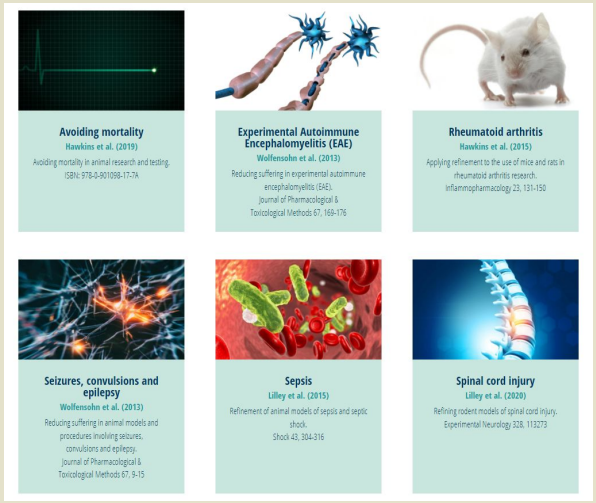
How the pharmaceutical industry is tackling 'severe' suffering in animals used in science

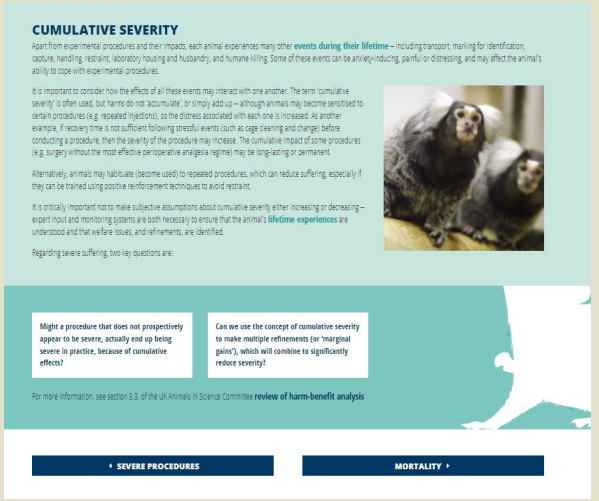
An online event co-organised by EFPIA and the RSPCA

Wednesday 26 January 2022: 14:30 - 16.00 CET

Website







RSPCA · lasa Laboratory Animal Science Association · LAVA Laboratory Animals Veterinary Association, A division of the British Veterinary Association · iat

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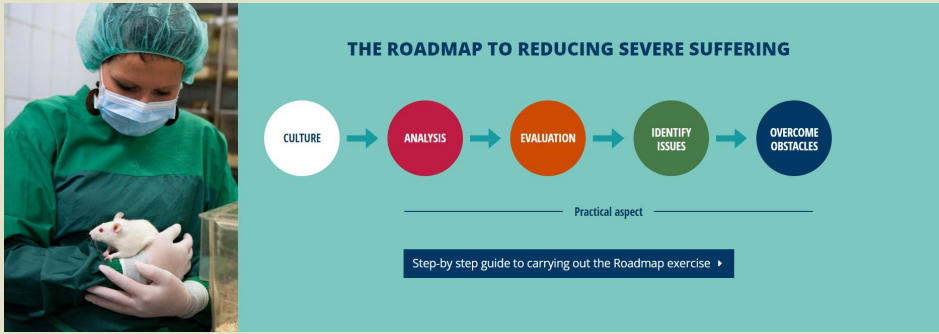
A commitment to address severe suffering

- Agreement as a priority area for attention and action
- Institutional strategy and responsibilities
- Setting of clear objectives



Consider as part of the ‘Culture of Care’

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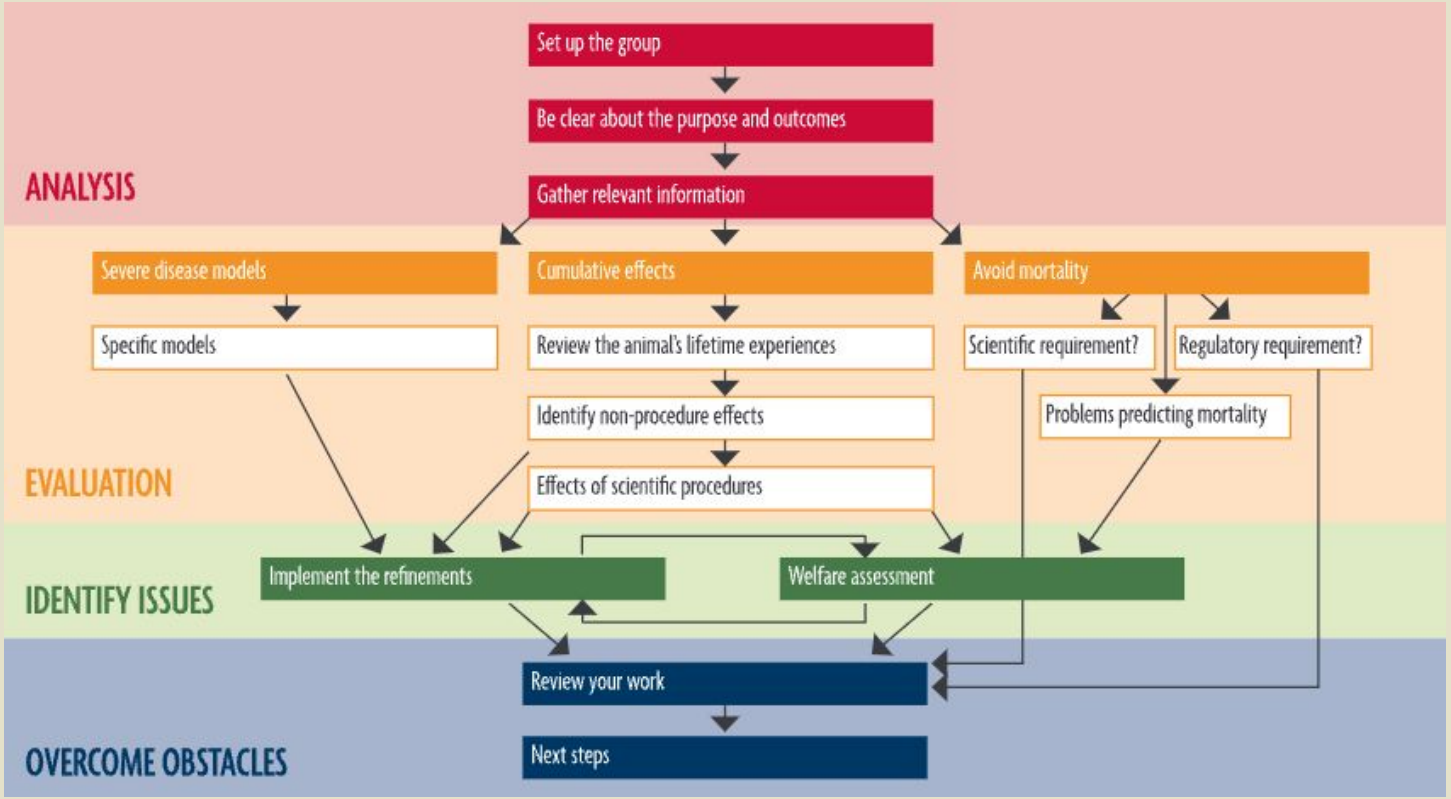

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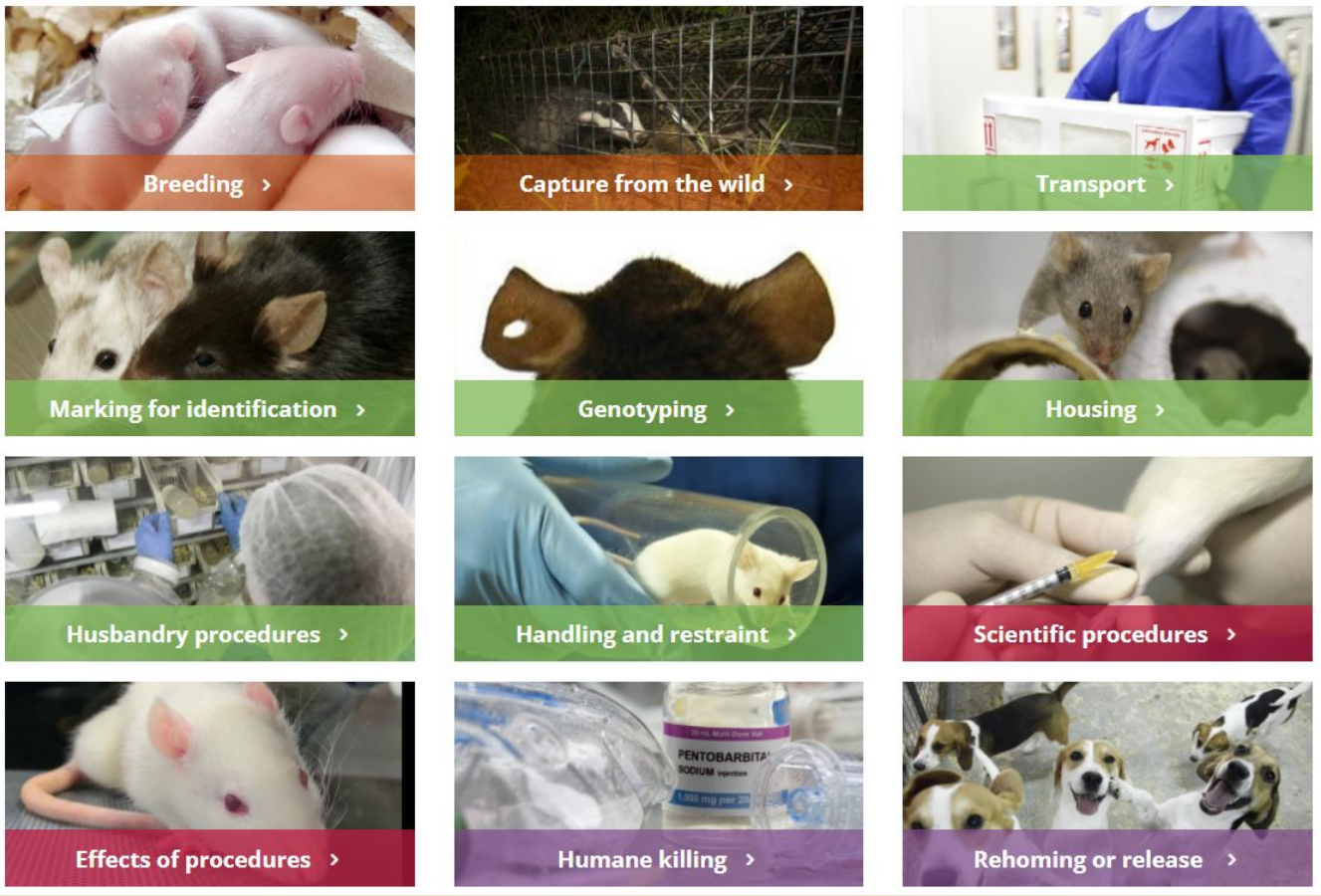

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Factor	Experience of the animal	Welfare issues	Ways of mitigating these
Sourcing	Mice are bred in-house. Supply and demand are carefully matched and animals provided with litter, nest boxes and nesting material. Cages are cleaned weekly.	Distress due to separation of dam and pups at weaning.	Ensure removal from dam is appropriately timed and keep litters together wherever possible. Review frequency of cage change (e.g. fortnightly?) to ensure cage is sufficiently clean but with minimal disturbance.
Transport	Once, between rooms within the same building before procedures begin.	Stress and anxiety due to movement.	Move in home cages, minimise distance, think about timing, ensure sufficient time to recover before any other interventions or procedures.
Marking for identification	Animals are identified using microchips, which involves capture and restraint for insertion.	Distress due to restraint, short term pain of chip insertion.	Trial less aversive capture techniques (see below). Research pros and cons of sedating or anaesthetising mice. Ensure adequate checks in case of longer term discomfort.

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 and indicators of these	Methodology and interventions	Humane endpoints
Administration of rheumatoid arthritis inducer	Capture and restraint – distress. Aggression, vocalisation, unwilling to be caught. Administration i.d. or s.c. – pain. Flinching, vocalisation, aggression. Pain or ulceration around injection site. Attention to site, reduction in nest quality, body weight/food intake reduction,	Competent, empathetic capture (e.g. not by tail) and handling, habituate to handling and restraint. Use gaseous anaesthesia for i.d.; inject into rump, not tail base (if tail base is painful, restraint by the tail will hurt). Minimise volumes and doses, use multiple sites if large volumes. Ensure injectate formulated to minimise adverse effects Inject into rump (less risk of ulceration); never inject into the foot; if attention paid to site apply topical anaesthesia and review	Humane endpoints with respect to administration of inducer in general: - Ulceration that is painful, shows no signs of healing or becomes infected. - If an ulcer reaches >5 mm, the vet or senior animal technologist should be informed and consulted about treatment. Animal should be humanely killed if no signs of healing within 3 days.

Examples of questions to consider

- Why is severe suffering needed? Is there a robust scientific justification?
- Could the protocol be run with a moderate severity limit?
- Is the ‘model’ translatable? How significant are the proposed benefits of the work?
- Is there a regulatory requirement for the experimental design and ‘endpoint’? Can this be challenged?
- Are welfare assessment and monitoring protocols optimised?
- What more could be done to mitigate impacts on animals?

Applying the roadmap at Novo Nordisk

Prospectively

- Identify as many sources of harm as possible
  - Related to the (disease) model
  - Related to procedures
  - Related to housing, husbandry and care
- Agree on Humane Endpoints
  - General
  - Model specific
- Agree on procedures for welfare assessment

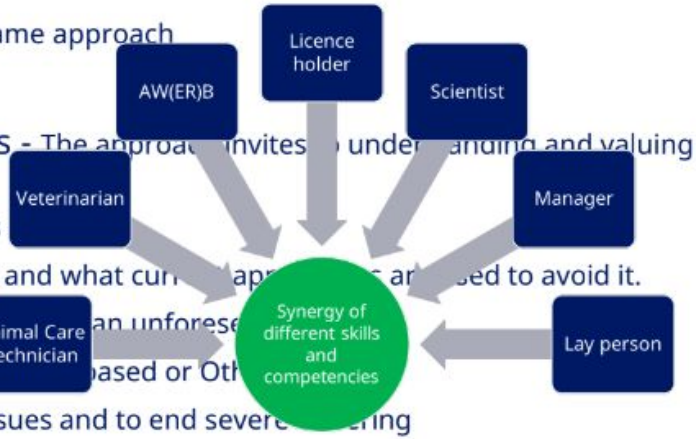
Retrospectively

- Assess actual severity
  - Identify when and why severe harm was experienced by the animal
  - Identify if avoidable harm unintentionally occurred
  - Evaluate the effectiveness of the implemented Humane Endpoints
  - Evaluate the effectiveness of how animal welfare was assessed
- Agree on revisions
- Agree on how learnings are captured and communicated to all relevant people

From presentation by Thomas Bertelsen (tsbt@novonordisk.com) at ‘Refining severe disease models and procedures’ international meeting - August 2022

Why the roadmap works

- The RSPCA approach facilitates a **cooperative response** from licence holders and scientists, because:
  - Objective, data driven, systematic and no blame-game approach
- Dialogue with licence holders and scientists - The approach invites to understanding and valuing the roles of different people within an establishment
  - Data check: Is the scoring as 'severe' for all animals
  - Evaluation: Looking at why severe suffering occurs and what current approaches are used to avoid it.
  - Is the harm prospective or does severe suffering an unforeseen
  - Define obstacles: Are the obstacles, - Scientific, R based or Oth
  - Overcome obstacles: Set out a plan to overcome issues and to end severe ering
  - Action plan
  - Evaluate



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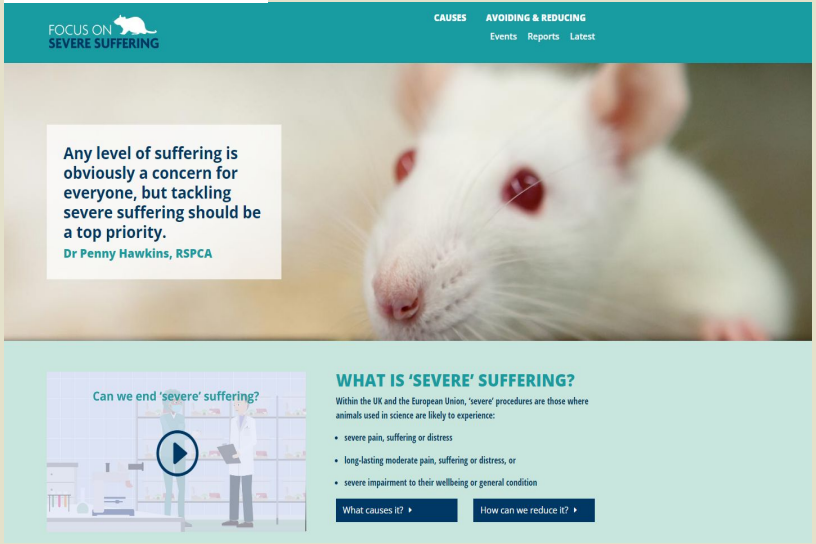

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https://vimeo.com/626040615/68bbe9be0d

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