

The importance & relevance of animals in research, and their welfare



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Summary

- History of animal research and what has changed
- Three “key principles” for the ethical use of research animals
- Formulating an appropriate regulatory framework and roles for veterinarians

The 'Father' of modern medical research



Claude Galen
AD 129-199

- Physician and philosopher
- Used observation, dissection and vivisection
- Experimented on pigs and goats
- No anaesthesia!

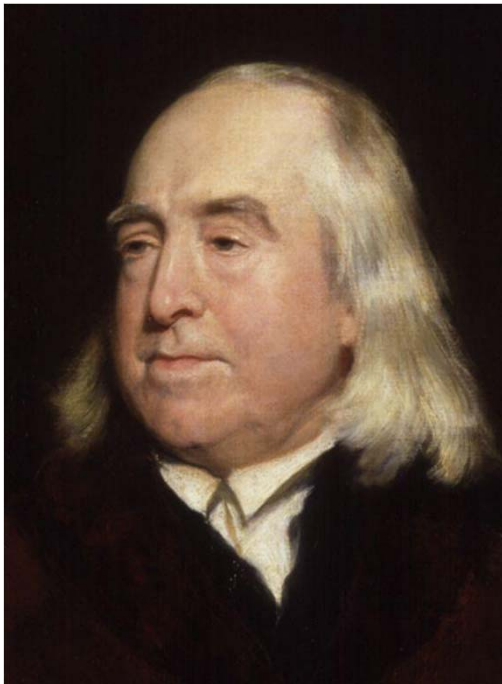
The 'Father' of modern philosophy



René Descartes
1596 - 1650

- Only humans have minds - consciousness
- Animals are as machines (automata) - cannot feel pain
- Vivisection widely practised in Europe till late 18th century
- No anaesthesia!

The moral status of research animals



Jeremy Bentham
1748-1832

- “The question is not can they reason ... but can they suffer?” (1789)
- Utilitarianism – balancing harms & benefits

Laws about Animal Welfare in Research



“Trial of Bill Burns”
Richard Martin MP (Galway)
1754-1834

- “Martin’s Act” 1822
 - Cruel Treatment of Horses & Cattle Act
- Cruelty to Animals Acts 1835, 1849 & 1876
- Animals (Scientific Procedures) Act 1986 – 2012
- "There is no man who kills [even] a sparrow or anything smaller, without its deserving it, but God will question him about it [on the judgment day]"

From “Avoiding Cruelty” to a “Duty of Care”

**SO WHAT HAS CHANGED
BETWEEN 1876 AND 2012?**

Three “Key Principles”

1. Justify animal use

- Perform a harm-benefit analysis

2. Focus on alternatives

- Promote and implement the 3Rs

3. Achieve Balance

- Assure public confidence

The growth of the animal rights movement



Peter Singer 1946 -

- *“Animal Liberation”* published 1975
- Speciesism – humans and animals considered equal
 - “...man has dominion over animals...” - Qur’an & Bible
- **First key principle: Justify animal use**
 - Benefits must balance the harms caused (utilitarianism)

Scale of annual research animal use internationally

- Estimated numbers used in research:
 - USA ~17 - 22 million*
 - Europe ~10 - 12 million (UK 3.5 million)
 - Australia ~ 5 million
 - Rest of the World ~ 20 million
 - **Total ~ 60 million (mainly vertebrates)**

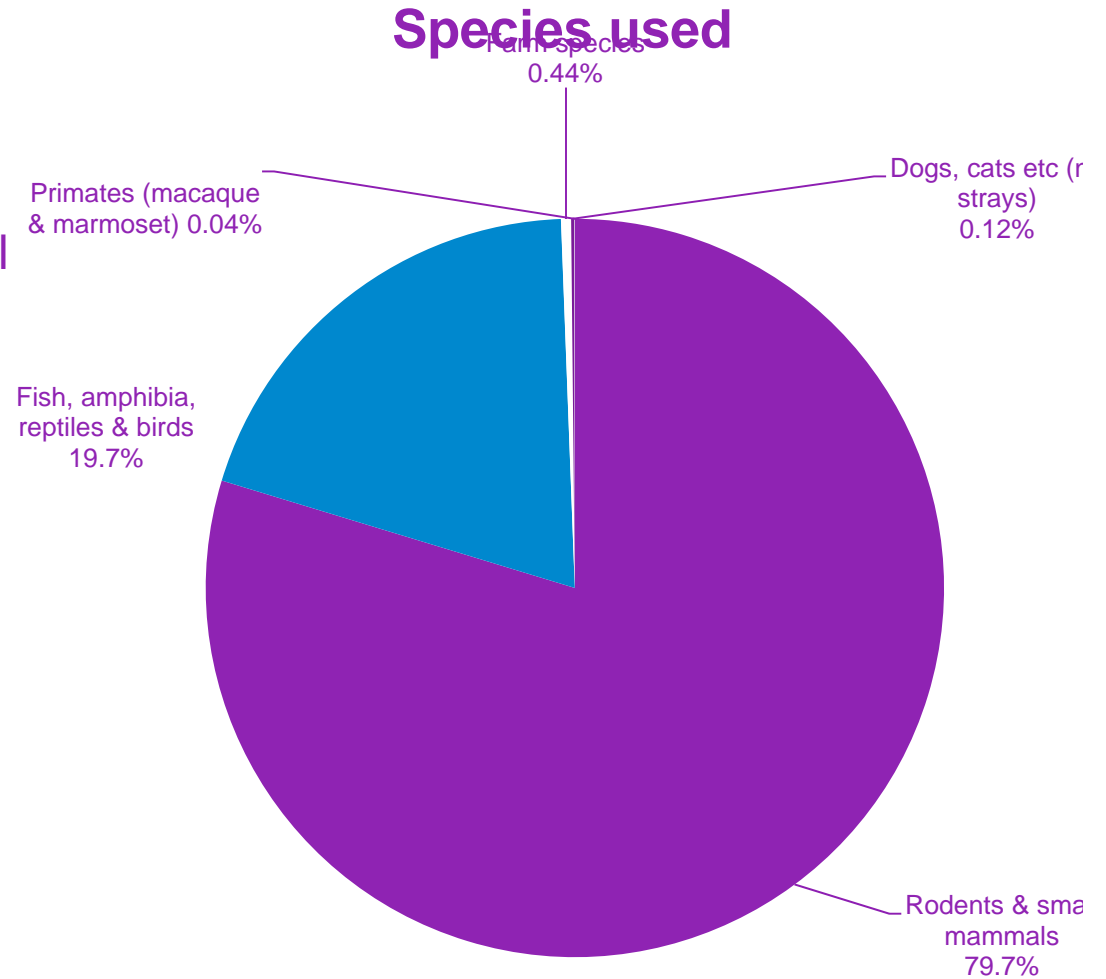
- Estimated numbers slaughtered for meat:
 - **Total ~ 1.75 billion (cattle, sheep, goats & pigs)**

* US official figures exclude rodents, birds, & fish - estimated here to be 90% of use

What animals are being used?

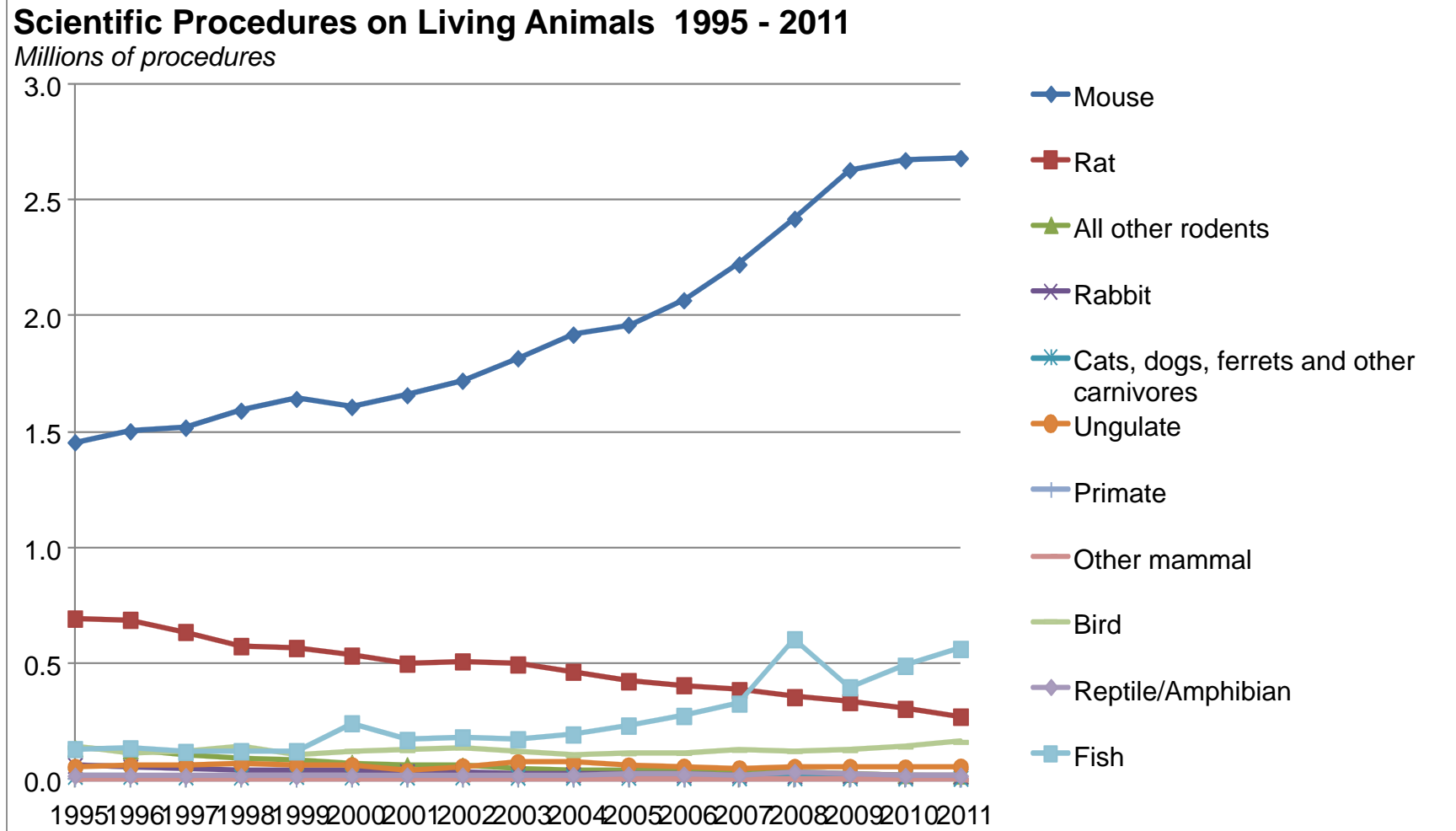
UK Statistics 2011*

- Rats, mice & other rodents, small mammals & rabbits **79.7%**
- Fish, amphibians, reptiles & birds **19.7%**
- Sheep, cows, pigs & other large mammals **0.44%**
- Dogs, cats (no strays), ferrets & small carnivores **0.12%**
- Primates: marmoset & macaque monkeys (no apes) **0.04%**

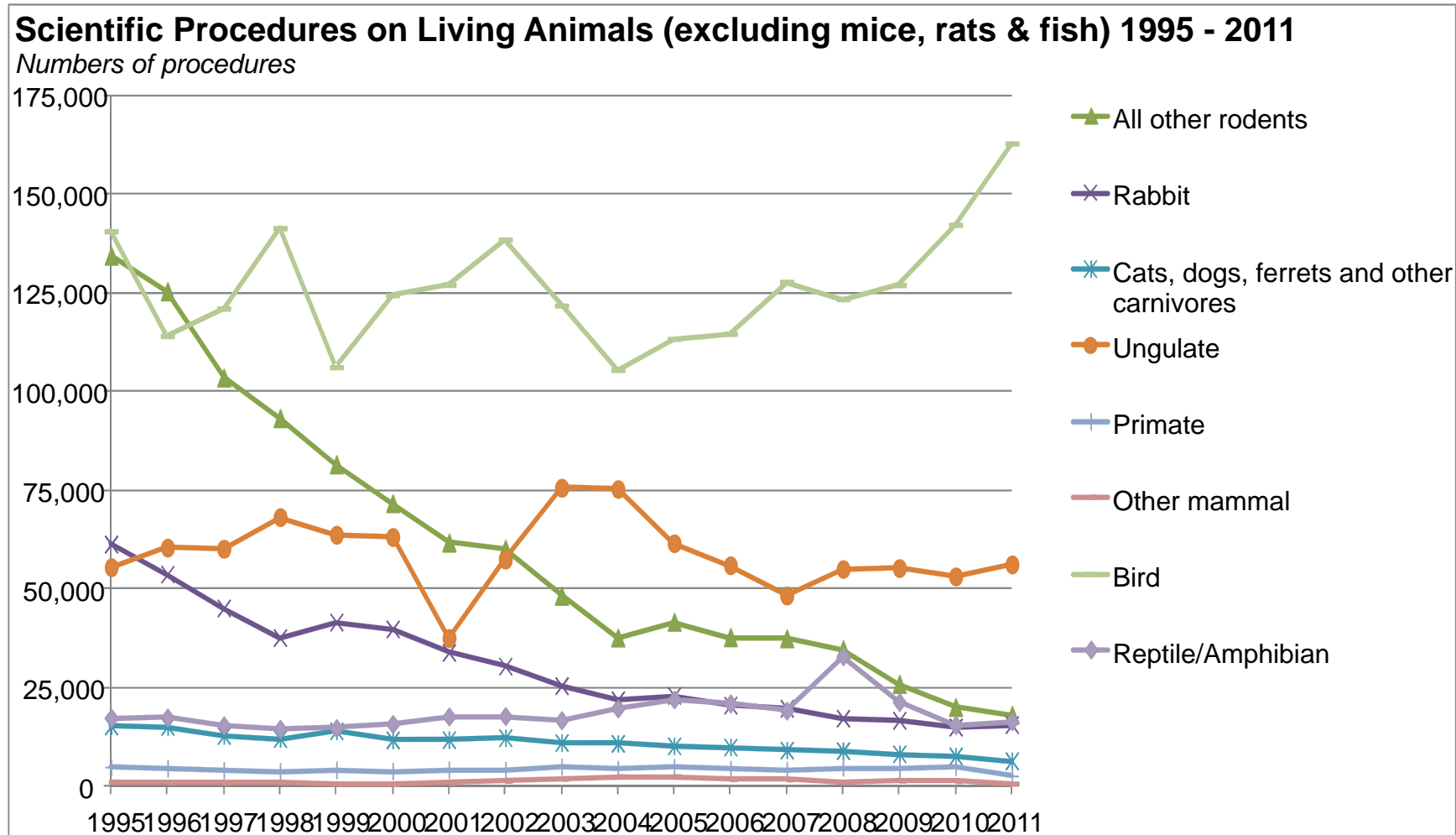


* UK Home Office: 2011 statistics on scientific procedures on living animals, in Great Britain published July 2012.

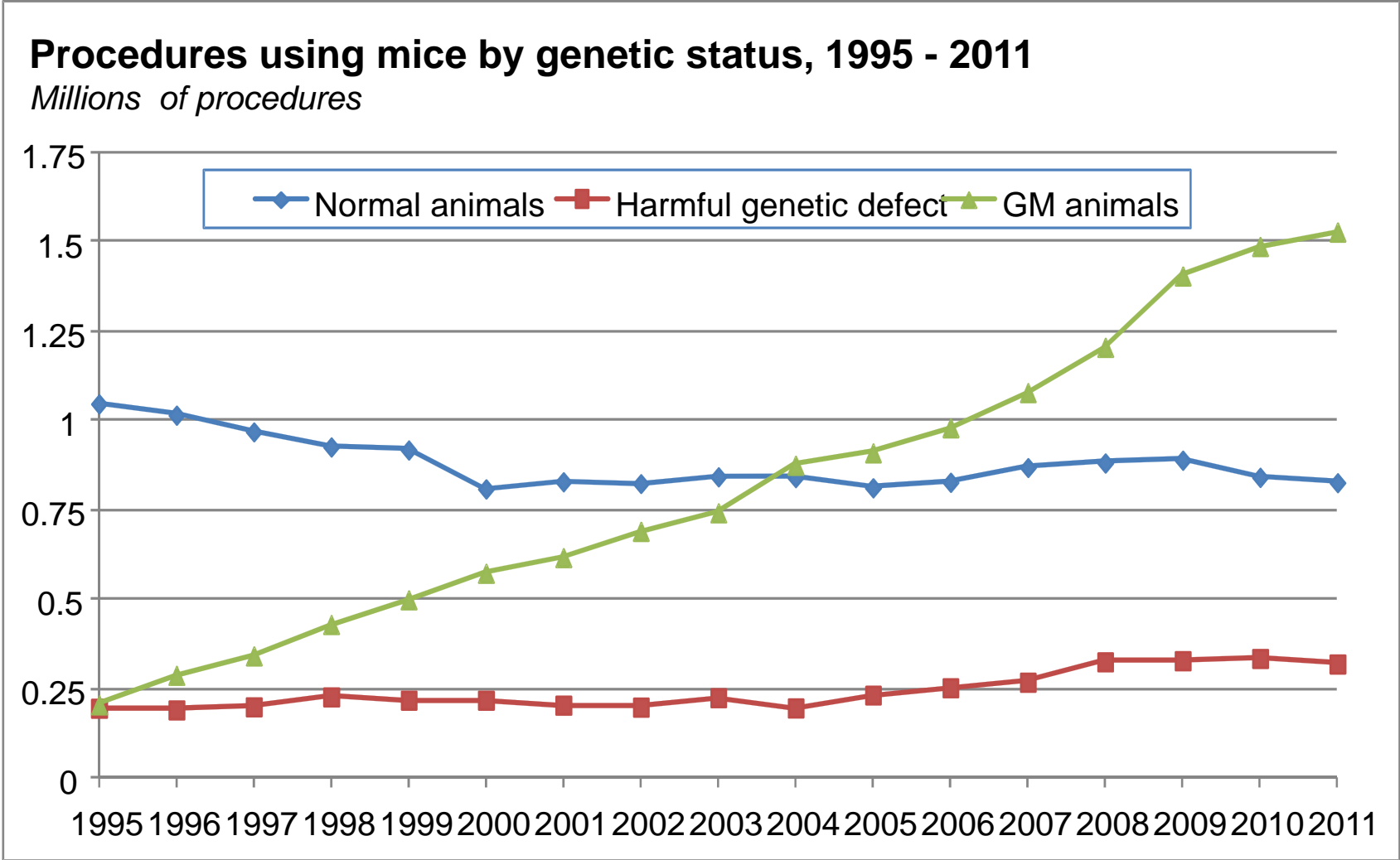
Procedures (all species) - UK 1995-2011



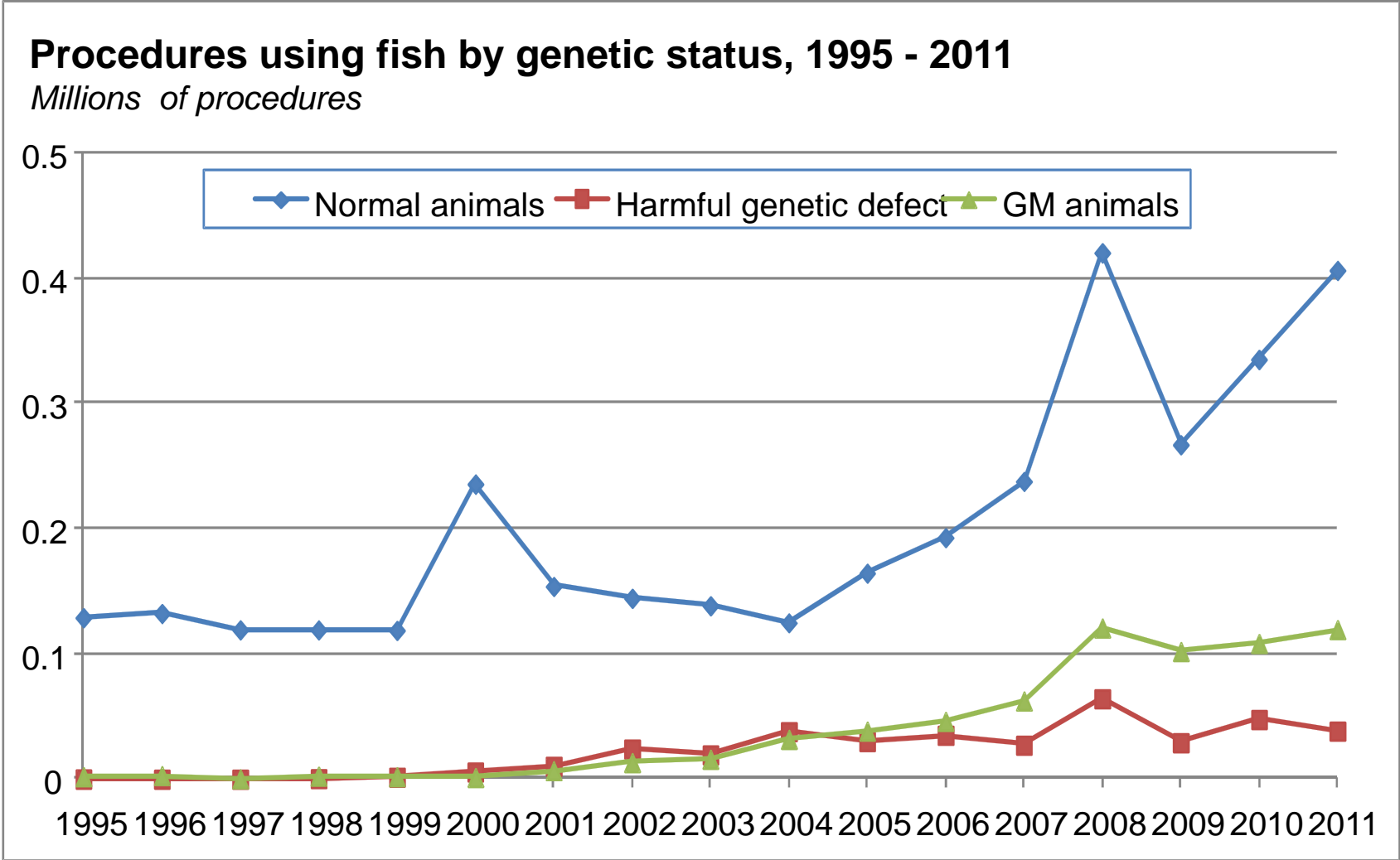
Procedures (exc. mice, rats & fish) - UK 1995 - 2011



Mice by genetic status - UK



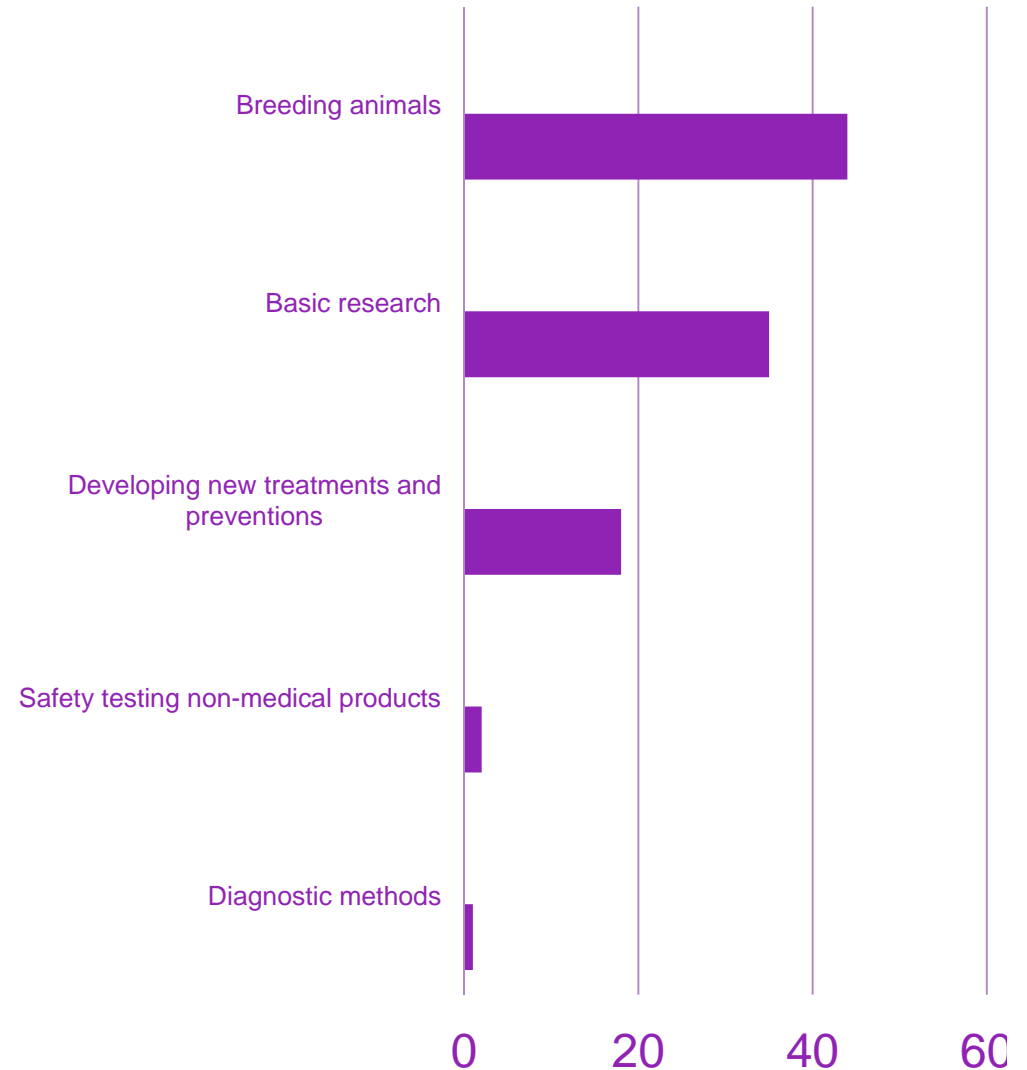
Fish by genetic status - UK



Why are these animals being used?

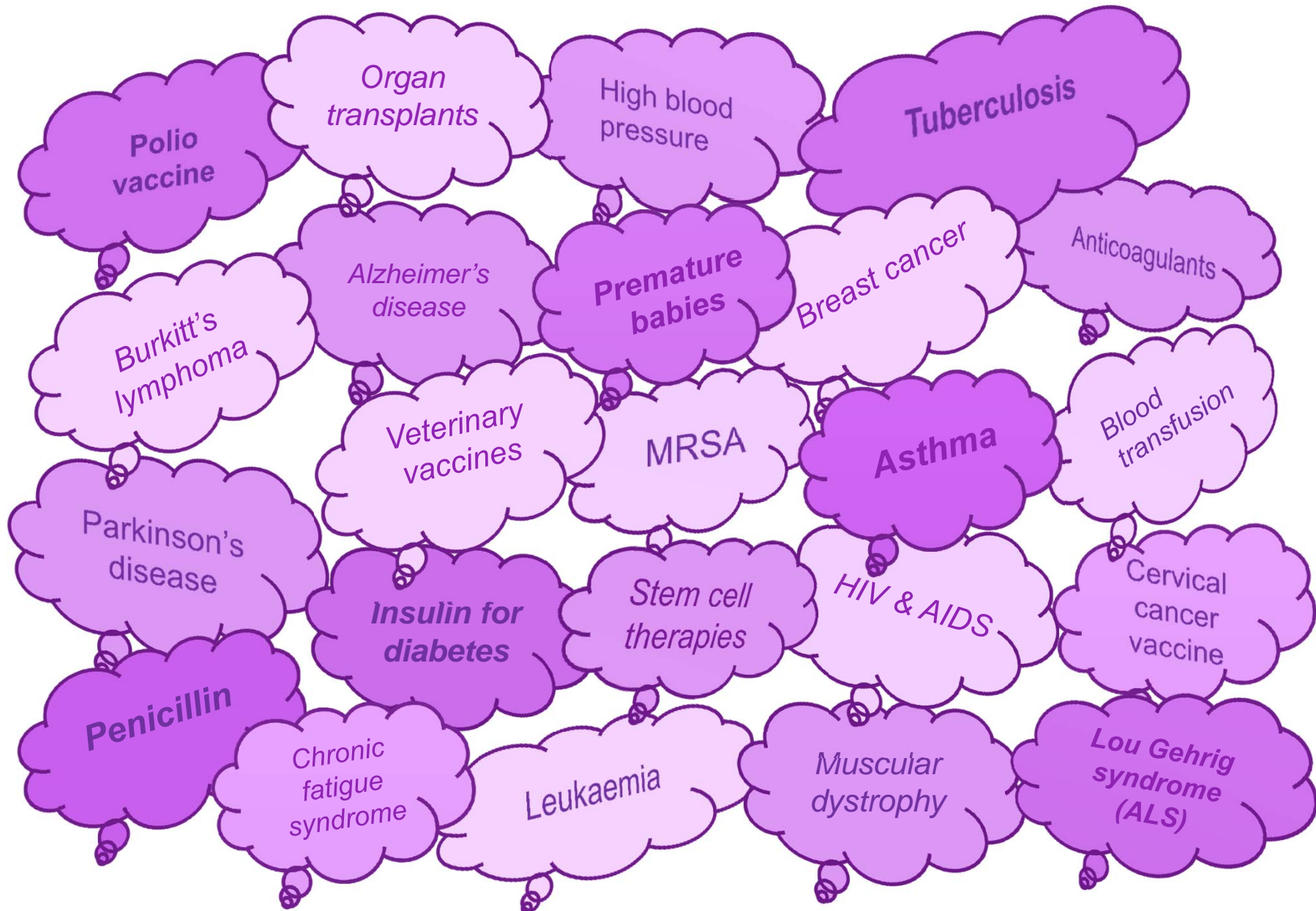
Purposes in UK 2011*

- Breeding (mostly genetically altered animals for research & development of new treatments) **44%**
- Basic biological and medical research **35%**
- Developing new treatments for diseases or ways of preventing disease **18%**
- Safety testing of non-medical products used in the home, agriculture and industry (no cosmetic or toiletries after 1998) **2%**
- Developing new methods of diagnosis **1%**



* UK Home Office: 2011 statistics on scientific procedures on living animals in Great Britain published July 2012.

What are the benefits?



1. Justify animal use:

Perform a harm-benefit analysis

- Important ethical evaluation of projects
- Needs to be done on a case by case basis
- Typically performed either by government 'Competent Authority' (UK & EU) or by in-house committees (USA)
- Significant role for veterinarians, especially in assessing and reducing harms
- Scientific and independent lay opinion may also be sought
- Benefits often difficult to predict, even in applied research
- Post-approval monitoring also important

Focus on alternatives: The 3Rs



William Russell &
Rex Burch

- “Principles of Humane Experimental Technique”
- Published by UFAW in 1959
- Introduced the 3Rs
 - Replacement
 - Reduction &
 - Refinement
- **Second key principle**

2. Focus on alternatives: Promote and implement the 3Rs

➤ **Replacement:**

- Using totally non-animal methods e.g. *in silico*, *human data* (absolute)
- Using cells, tissues, organs of animals *in vitro* (relative)

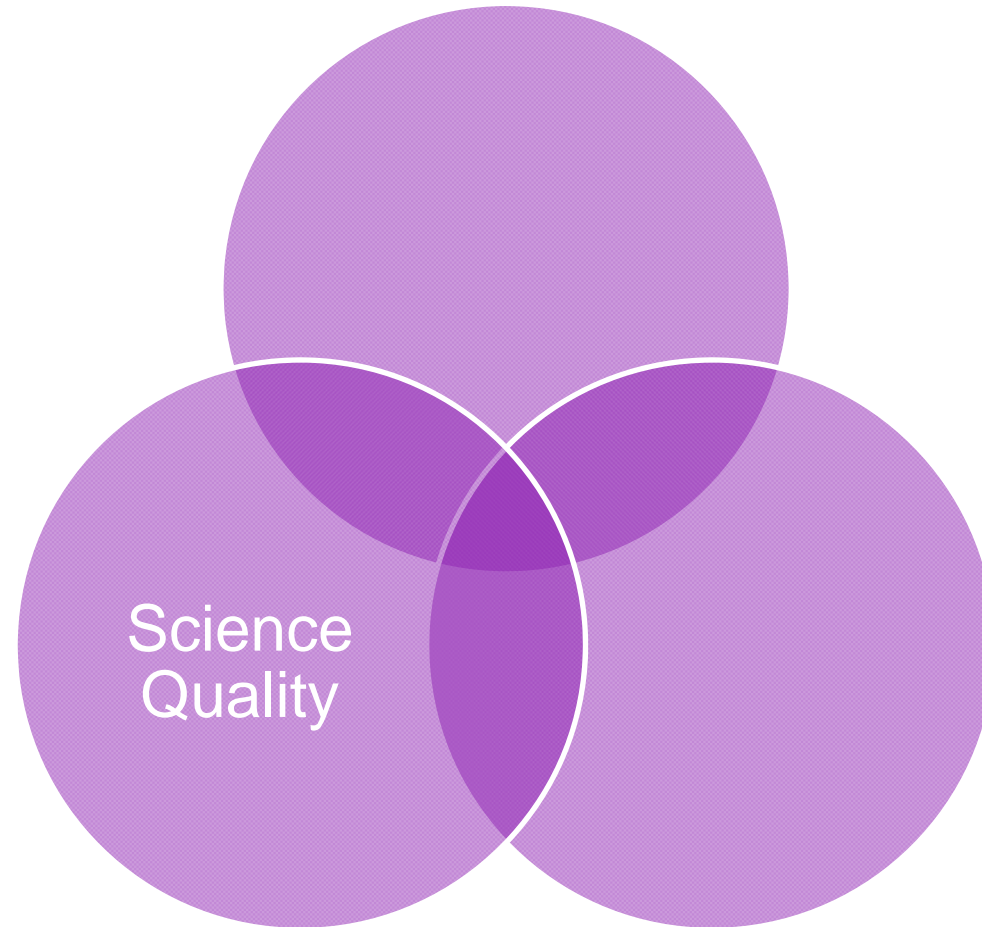
➤ **Reduction:**

- Using fewer animals, often through good experimental design
- Obtain same information from fewer animals or more information from the same number of animals

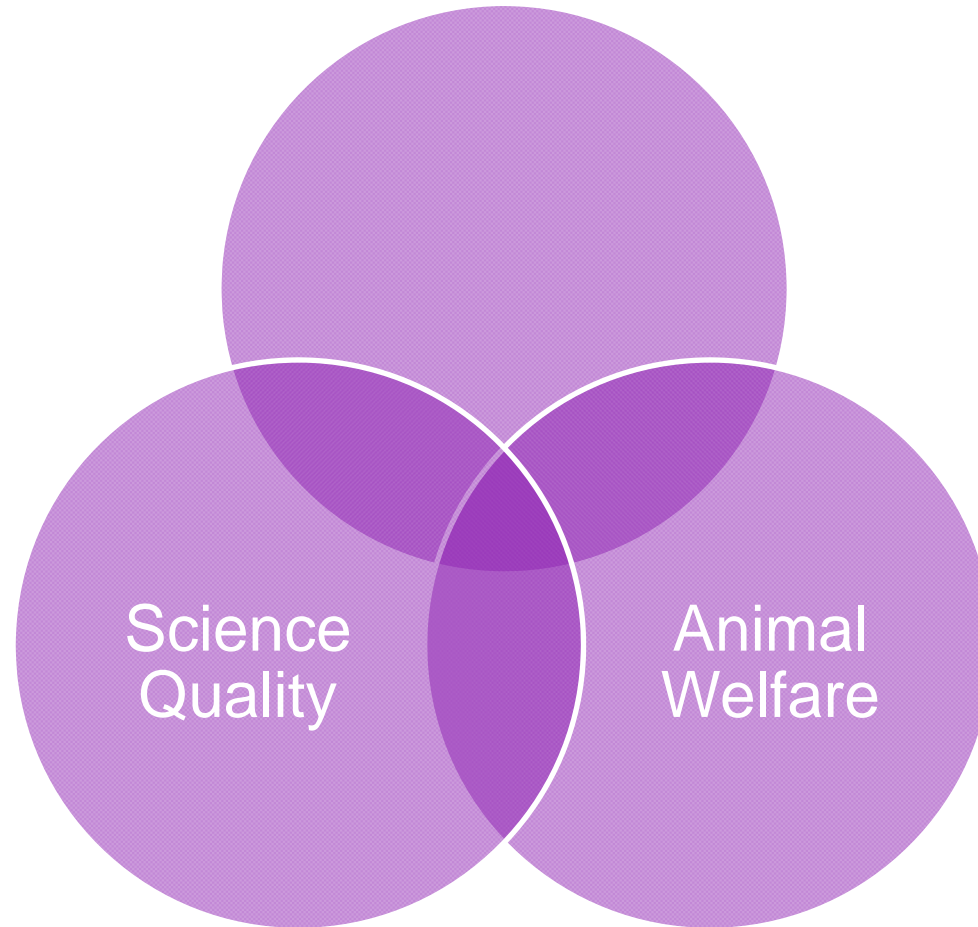
➤ **Refinement:**

- Using methods which minimise pain or distress
 - Using species with less capacity to feel pain
 - Includes improvements in housing and care e.g. enrichment
- Continue to apply the 3Rs throughout the project
- Significant in assessing 'harms' in harm-benefit analysis

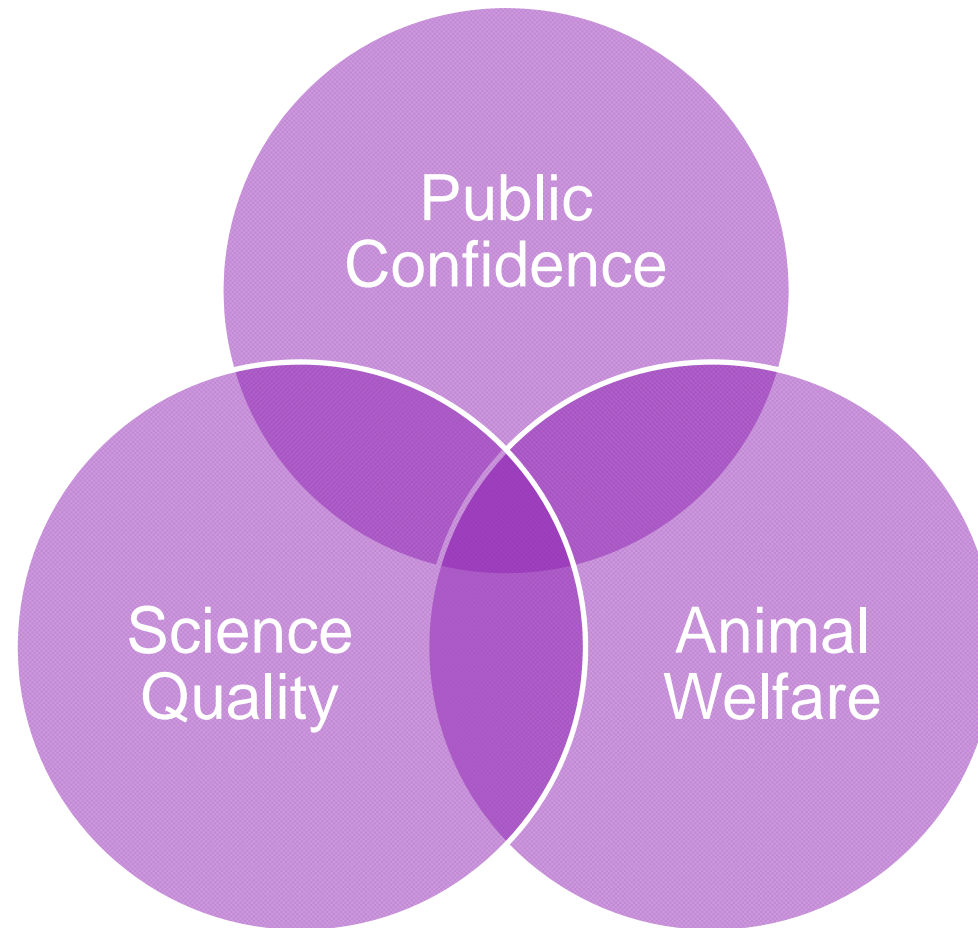
3. Achieve balance: Assure public confidence



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Formulating a regulatory framework – role of OIE

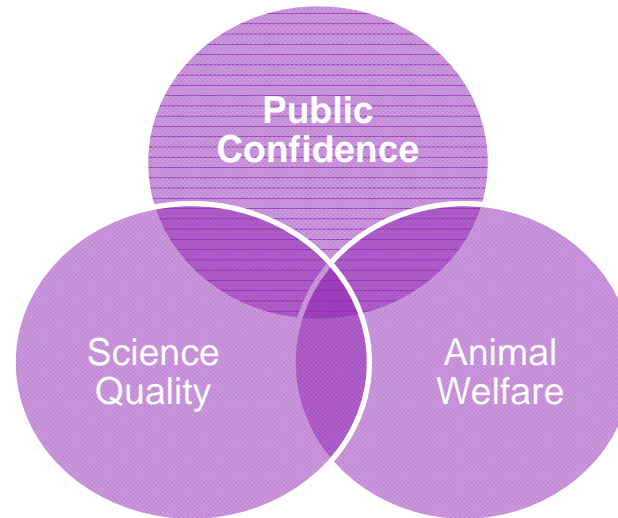
- Where to start?
- **Complex area –**
 - Science & Technology is critical to success of all nations
 - Animal research is essential to that success
 - Reputational risk of poor or non-existent regulation is significant
 - Companies & universities in scientifically developed countries place studies in countries with appropriate welfare regulation
- **Chapter 7.8 in OIE Terrestrial Code – Use of Animals in Research and Education**
 - Formulated by OIE *ad hoc* Group on Laboratory Animal Welfare
 - Provides essential elements for a regulatory framework with great flexibility for cultural, economic, religious and social factors
 - *ad hoc* Group continuing as a virtual group to consider on-going issues
 - e.g. transportation of research animals, especially internationally.

Roles for veterinarians

- **Biosecurity**
 - Avoid infection of animals and humans
- **Care, health and welfare of animals**
 - Clinical health, post mortems, medical records
- **Advice on experimental techniques**
 - Surgery and post operative care
 - Anaesthesia, analgesia and euthanasia
 - Humane end-points
- **Participate in ethical review processes**
 - Especially in relation to refinement
- **Inspection and project assessment & authorisation**
 - Ideally qualified for both these functions
- **Training of scientists and animal care staff**
 - Research and husbandry procedures
 - Environmental enrichment

Conclusions:

- Science & Technology is key to the success of all nations
- Animal research plays an essential role in that success
- Our views of the moral status of research animals, and how we should treat them, has changed over time
- Focus now is on our “duty of care”, not just avoiding “unnecessary suffering”
- Reflected in the OIE “Regulatory Framework”
- Three key principles:
 1. **Justify animal use**
 - Perform a harm-benefit analysis
 2. **Focus on alternatives**
 - Promote and implement the 3Rs
 3. **Achieve Balance**
 - Assure public confidence



<http://www.oie.int/international-standard-setting/terrestrial-code/access-online/>
and select [Chapter 7.8 – Use of Animals in Research and Education](#)

"Whoever is kind to the creatures of God, is kind to himself."

The Prophet Muhammad