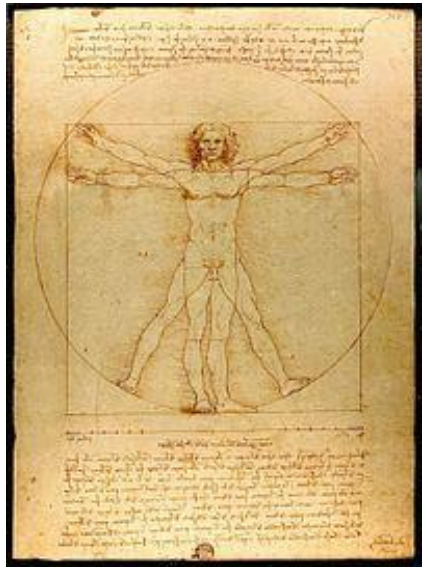
HAV919V

Integrated Physiopathology/Pathophysiologie intégrée

Ethics and animal experimentation



Florence PERRIN

UM, INSERM MMDN

Septembre 2021

florence.perrin@umontpellier.fr

http://www.enseignementsup-recherche.gouv.fr/cid70597/l-utilisation-des-animaux-a-des-fins-scientifiques.html

https://www.inserm.fr/ethique/lethique-a-linserm/

http://www.recherche-animale.org/ (Gircor, association association under the 1901 law)

http://www.understandinganimalresearch.org.uk

https://speakingofresearch.com

Use of animals in science

National regulation for more than 25 years.

Europe. Directive 86/609: harmonization amongst states members. (1986)

Directive 2010/63/UE EU Parliament : protective measures, use of animals only if "***necessary to protect human health, animal health or the environment***".

All scientific projects **MUST** obtain an authorization from the ministry of research **BEFORE** to start.

The project is evaluated by the **ethic comitee.**

Experiments are **only** done by accredited persons. Specific training in ethics, legislation, species-specificities….Several levels of diploma.

All experiments **MUST** be done in animal **facilities that are accredited** by the ministry of research. In each animal facility animal well being committee (3Rs – control of the animal environment).

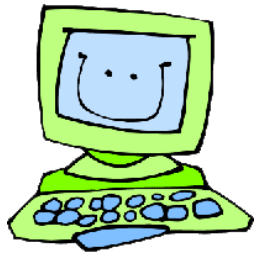
Veterinaries from « Directions départementales de la protection des populations » verify that projects and animal facilities follow the legislation. Unexpected and expected visits.

National charter : ethic of animal experimentation

Based on :

1 - Animals are sensitive beings, susceptible to suffering, that have cognitive and emotional capacities. Animals have physiological and behavioral needs specific to each species

2 - There is not always an alternative method that can avoid the use of animals for research, teaching and the implementation of regulatory tests



Ethic committees for animal experimentation

Article 1: Respect for animals

Human's duty to respect animals as living and sensitive beings, susceptible to pain, suffering and anxiety.

Article 2: Individual responsibility

Any use of animals for experimentation engages the individual responsibility of each person involved.

Article 3: Responsibility of institutions

The institutions are responsible for experiments carried out, within them or on their behalf, on animals.

Article 4: Competences

Responsibility involves ethical, regulatory, scientific, technical and procedural skills trainings **appropriate to the species used at all levels of intervention**.

Article 5: General principles

A reflection on the scientific, ethical and societal merits of the use of animals must precede any experimental approach.

Optimizing the living, housing and care conditions of the animals used must be permanent.

Methods and techniques aimed at eliminating or minimizing damage to animals must be systematically used. The development and promotion of these methods and techniques should be greatly encouraged.

Agreement from the ethic committee precedes all experiments

Article 6 : Criteria

- Absence appropriate alternative methods
- Need of the experiments when confronted to previous study
- Relevance of the methods to answer the question
- Balance between expected results and animal damage
- Adequacy between animal model and scientific objectives
- Species selection (wild species, don’t endanger biodiversity)
- Take into account biological and cognitive characteristics of each species
- Limit the number of animal used to the strict necessity
- Adapt housing, caring and use to respect physiological and behavioral needs of animals

Article 7, 8 et 9 : **Role** and composition of the ethics committee

Place of dialogue and reflection

Gives opinions on experimental projects involving animals, with reference to the principles specified in the Charter

These opinions may be accompanied by recommendations

Each ethics committee participates in the promotion of all the ethical principles

Article 7, 8 et 9 : Role and **composition** of the ethics committee

- 1 person that is in charge of the design of experimental protocol/projects
- 1 person is in charge of proceeding experimental protocols in animals
- 1 person that is qualified in animal care or sacrifice
- 1 veterinary
- 1 person non specialized in questions regarding the use of animal experimentation for science (civil society)

Article 7, 8 et 9 : **Ethic** of the ethics committee

Any ethics committee must be independent, neutral and guarantee the confidentiality of the submitted project

It takes into account the opinions or recommendations of the national ethics committee on animal experimentation

Authorization requests :

Authorization requests can be registered directly online via the application:

APAFiS/demande d'Autorisation

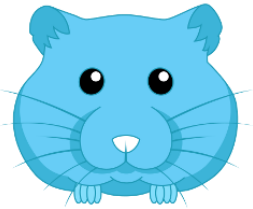
Animal experimentation institutions :
Any facility intended for the accommodation, maintenance or use of animals.

Approvals
Granted by prefectural decree: specifies the animal species housed, the field of activity and the nature of the experimental procedures that can be carried out.

Registers: the person in charge of the establishment must keep registers

Security, control and alarm equipment
Environmental parameters and their variations can influence the welfare of the experimental animal and thus affect research.
Daily check. (temperature, pressure, hygrometry, day / night cycle ...)

Animals for research



Considered as sensitive beings and as biological reactive

Origin: From institutions that have the agreement to breed animals

Transport: regulation for transportation

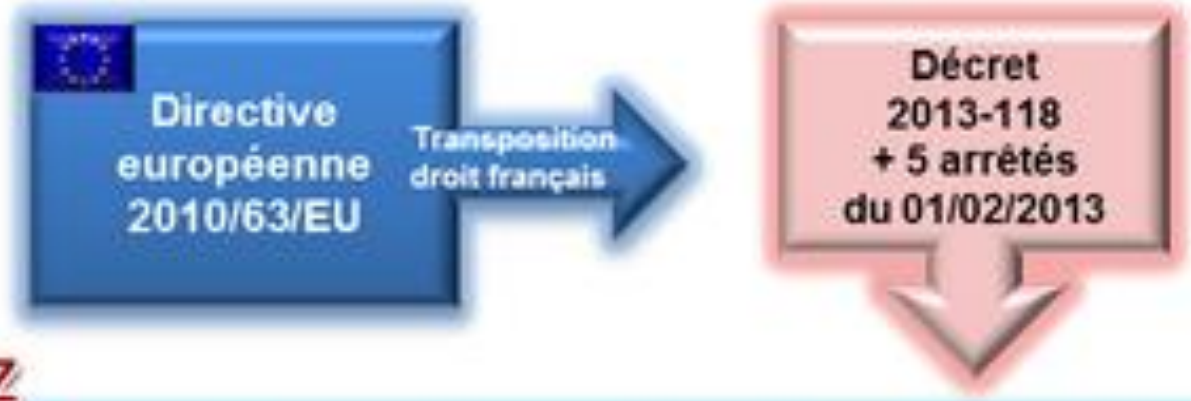
Heath status: Maintaining a known health status meets both regulatory and scientific requirements

Identification: Individual animal tracking. Cattle, sheep, pigs, horses, canines, felines and non-human primates, the regulations require individual identification

The future of the animal

At the end of the protocol, the fate of the animal is decided between different possibilities

Trainings



Instituts thématiques

Inserm

Institut national de la santé et de la recherche médicale

ZOOM

Arrêté relatif à l'acquisition et à la validation des compétences des personnels des établissements utilisateurs, éleveurs et fournisseurs d'animaux utilisés à des fins scientifiques

4 fonctions
-
3 formations
-
A suivre dans l'année qui suit la prise de poste

Fonctions	Formations réglementaires associées *	Correspondance FELASA
Conception ou réalisation des procédures	Concepteur de projets utilisant des animaux (ex niveau I) Niveau requis : bac + 5 ans ou bac+2 et 5 ans d'expérience Durée minimale 57 h	C
Application des procédures	Applicateur des procédures expérimentales aux animaux (ex niveau II) Durée : 45 h	B
Soins aux animaux	Soigneur (ex niveau III) Durée : 34 h	A
Mise à mort des animaux	Concepteur ou applicateur	/

Formation réglementaire complémentaire

1. **Pour la chirurgie expérimentale**: pour les concepteurs de projet et les personnes réalisant les interventions chirurgicales
2. **Pour un groupe d'espèces** (rongeurs, mammifères de rente, petits carnivores, oiseaux, animaux à sang froid, primates, faune sauvage)

Formation continue obligatoire

Pour tous : 3 jours minimum tous les 6 ans. Celle-ci doit avoir trait à l'expérimentation animale ou à la valorisation de la règle des 3R sous forme de formations pratiques, théoriques, participation à des colloques.

Pour justifier la formation et sa durée il est indispensable de détenir une attestation de présence à défaut d'une attestation de formation

* **Formations approuvées** par le ministère de l'agriculture et de la pêche (volume horaire et programme définis par arrêté) dispensées sous formes modulaires avec tronc commun à toutes espèces complété par un groupe d'espèce déterminé

Formations suivies à l'étranger:

reconnaissance possible pour les formations suivies dans un état de l'UE avec nécessité de suivre le module réglementation française et éthique d'une des formations françaises. Prendre contact avec le responsable pédagogique de la formation concernée

Livret individuel de compétence

Les **compétences acquises** sont **consignées** dans un **livret de compétences individuel** comprenant les informations suivantes:

- Compétences acquises
- Mode d'acquisition
- Date et durée de formation
- Date de validation de la formation

Ce livret doit pouvoir être présenté aux autorités de contrôle lors des visites d'agrément ou d'inspection inopinée des établissements.

Suppression des autorisations nominatives d'expérimenter sur animaux vivants

Autorisations des projets

The principles of the 3 Rs : reduce, replace, refine

- **Reduce** the number of animal used

- **Replace** animal models by alternative methods

- **Refine** used methodologies. Improve breeding methods and experimental protocols to reduce pain and stress. End-points: criteria to interrupt an experiment

- The principles of the 4Rs
  - Give **responsibility**
  - Rehabilitation of the use of animals

REDUCE

Limiting to essential experiments

Did we choose the right number? Representative of the population studied?
Biostatistical reflection

Unnecessary repetition of previous experiments

Reflection and writing of a detailed protocol

Ethics committee

REPLACE

Have we considered all the possibilities of achieving a result without laboratory animals?

In Vitro (cells' networks, IPS)

In Silico

REFINE

What can be done to keep the animal well or in as little pain/distress as possible?

Invasive/Non-invasive
Medications
Housing conditions

Criteria for termination

Criteria for termination

Search for signs of pain/distress in animals

Situational cues (weight)

Behavioural cues

Physiological cues

Biochemical cues

UNDERSTANDING ANIMAL RESEARCH

European Union Animal Research Statistics 2018

The European Union has released statistics on the use of animals for scientific purposes in 2018. The report combines statistics from 28 Member States (including the UK) and Norway (EEA).The 2017 report did not include Norway. Since supplying its figures to the EU, the UK has published its statistics for 2020 which are available on the government website.

Number of animals

12,093,096	10,572,305	1,520,791
	87.42%	12.58%
Number of animals used for scientific purposes	Number of animals used in experimental procedures	Number of animals used for creating and breeding genetically altered animals

Most commonly used animals

Mice:	5,505,169
Fish:	2,765,737
Rats:	999,246
Birds:	582,846
Other:	657,946

Severity of experiments
Based on 10,804,854 procedures

Mild:	50.62%
Moderate:	33.86%
Severe:	9.86%
Non-recovery:	5.66%

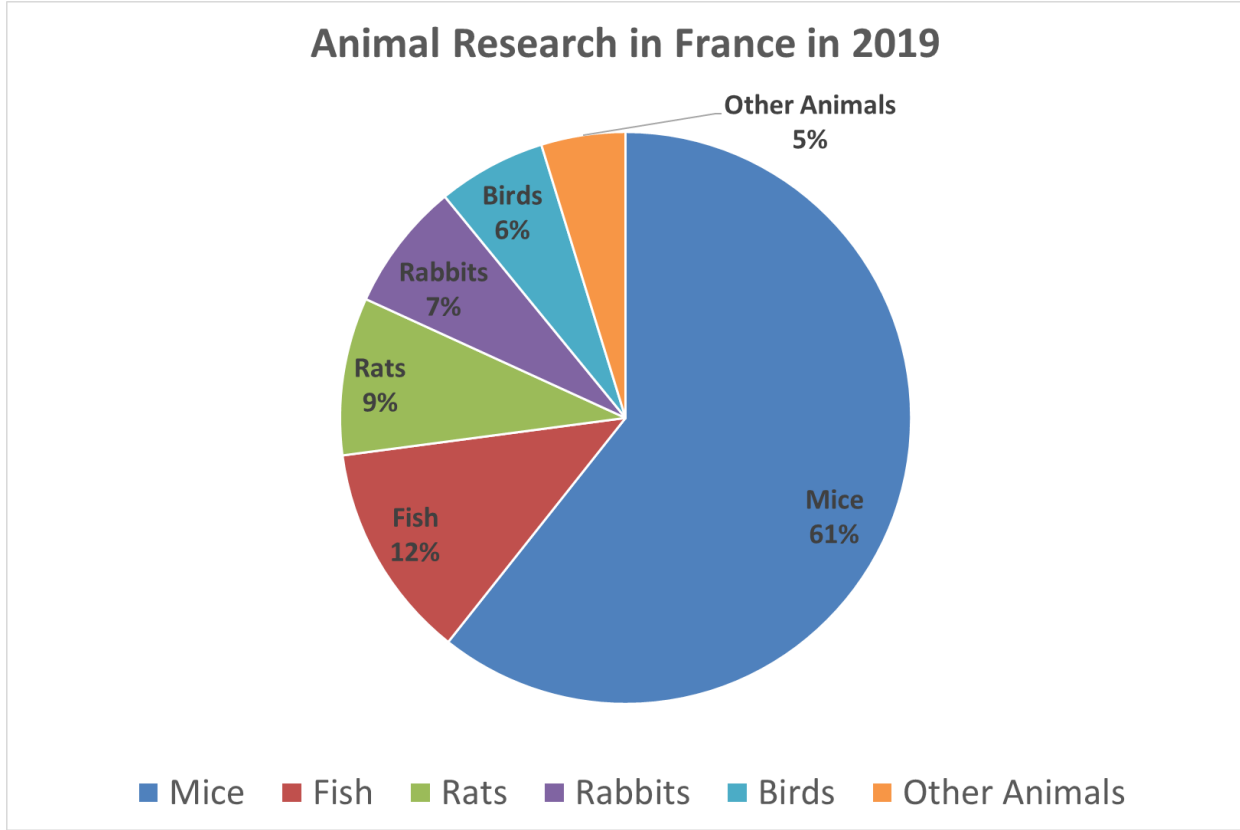
Top ten EU countries
Number of animals used

FRA:	1,752,906
GBR:	1,749,901
NOR:	1,650,547
DEU:	1,629,228
ESP:	713,404
ITA:	547,129
BEL:	487,843
NLD:	382,155
DNK:	245,638
SWE:	236,451

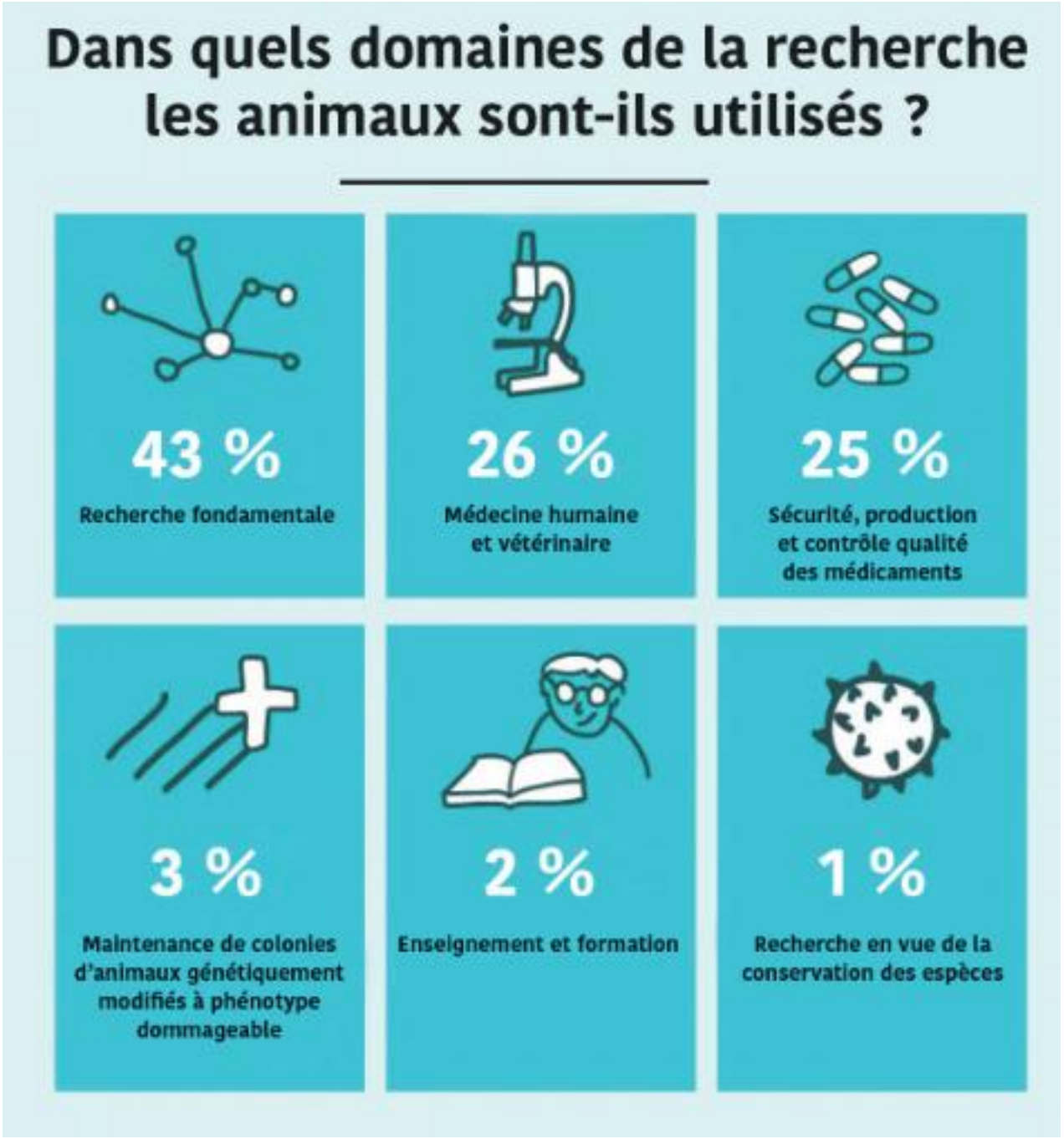
Animals with special protection

Dogs:	17,711
Monkeys:	8,583
Cats:	1,554

In the EU cats, dogs, and primates are species of particular public concern. In the UK these animals, as well as horses, have extra protections and can only be used when no other species is suitable.



2016

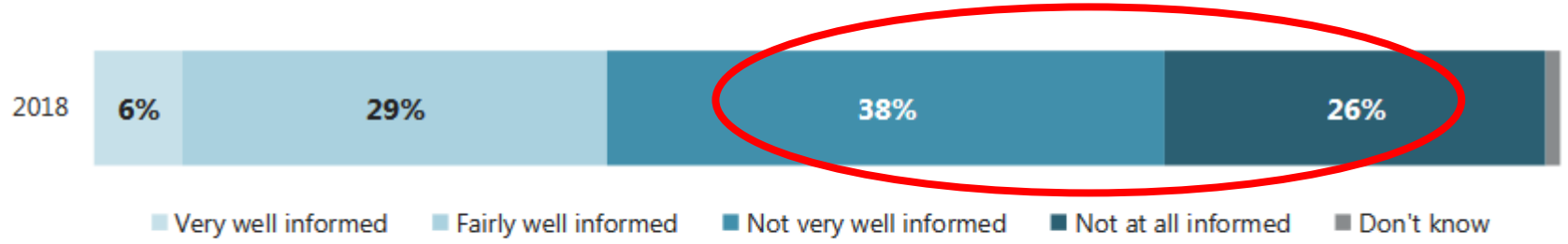

Dans quels domaines de la recherche les animaux sont-ils utilisés ?
43 %
Recherche fondamentale
26 %
Médecine humaine et vétérinaire
25 %
Sécurité, production et contrôle qualité des médicaments
3 %
Maintenance de colonies d'animaux génétiquement modifiés à phénotype dommageable
2 %
Enseignement et formation
1 %
Recherche en vue de la conservation des espèces

October 2018

Public attitudes to animal research in 2018

1 Public awareness of animal research

Figure 1.1: Feeling informed about animal research in the UK, 2014-2018

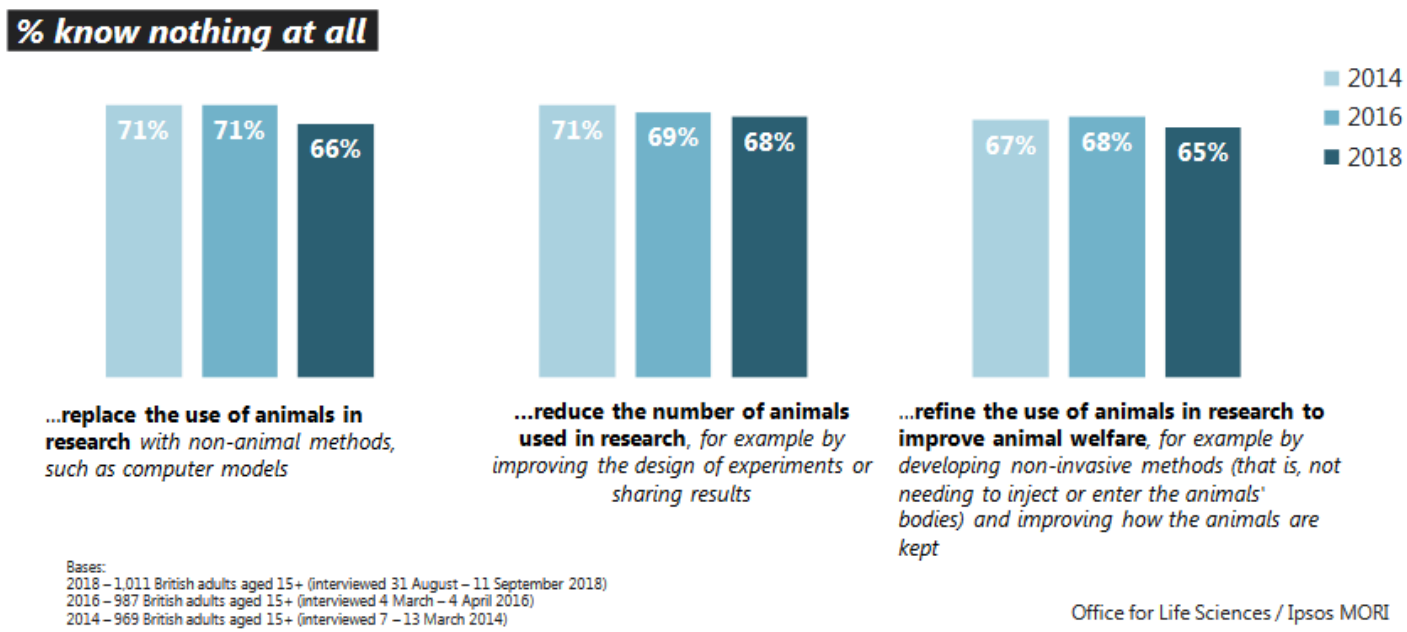


https://www.ipsos.com/ipsos-mori/en-uk/public-attitudes-animal-research-2018

Table 1.1: Awareness of NC3Rs

	Yes *(Aware of NC3Rs)*	**No** *(not aware of NC3Rs)*	**Not sure**
2018	**5%**	**90%**	**5%**
2016	*5%*	*90%*	*6%*
2014	*6%*	*85%*	*8%*

Figure 1.3: Public knowledge of government work in the three Rs



Bases:
2018 – 1,011 British adults aged 15+ (interviewed 31 August – 11 September 2018)
2016 – 987 British adults aged 15+ (interviewed 4 March – 4 April 2016)
2014 – 969 British adults aged 15+ (interviewed 7 – 13 March 2014)

Office for Life Sciences / Ipsos MORI

2 Public acceptability of animal research

Figure 2.1: Public acceptance of animal research for medical purposes 2002 - 2018

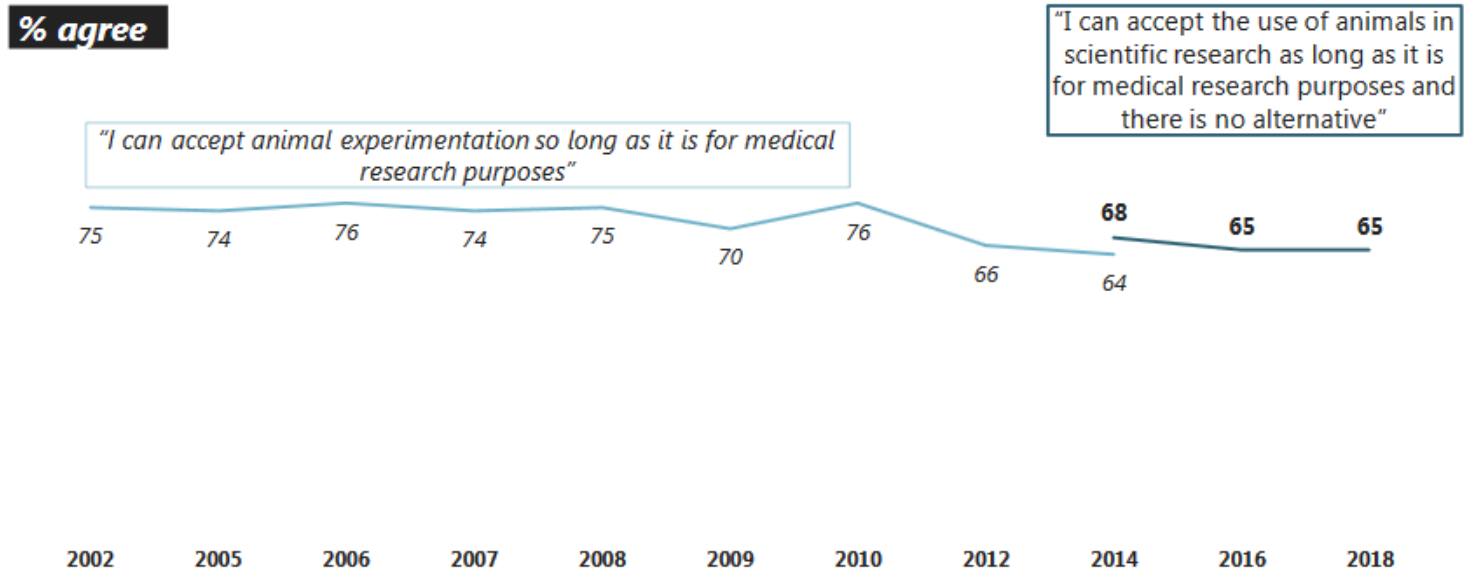


Figure 2.3: Acceptability of the use of animals in all types of research

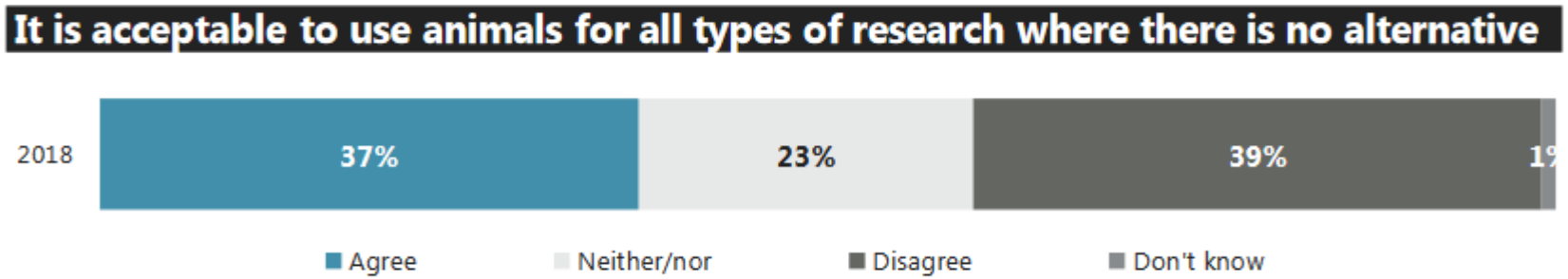
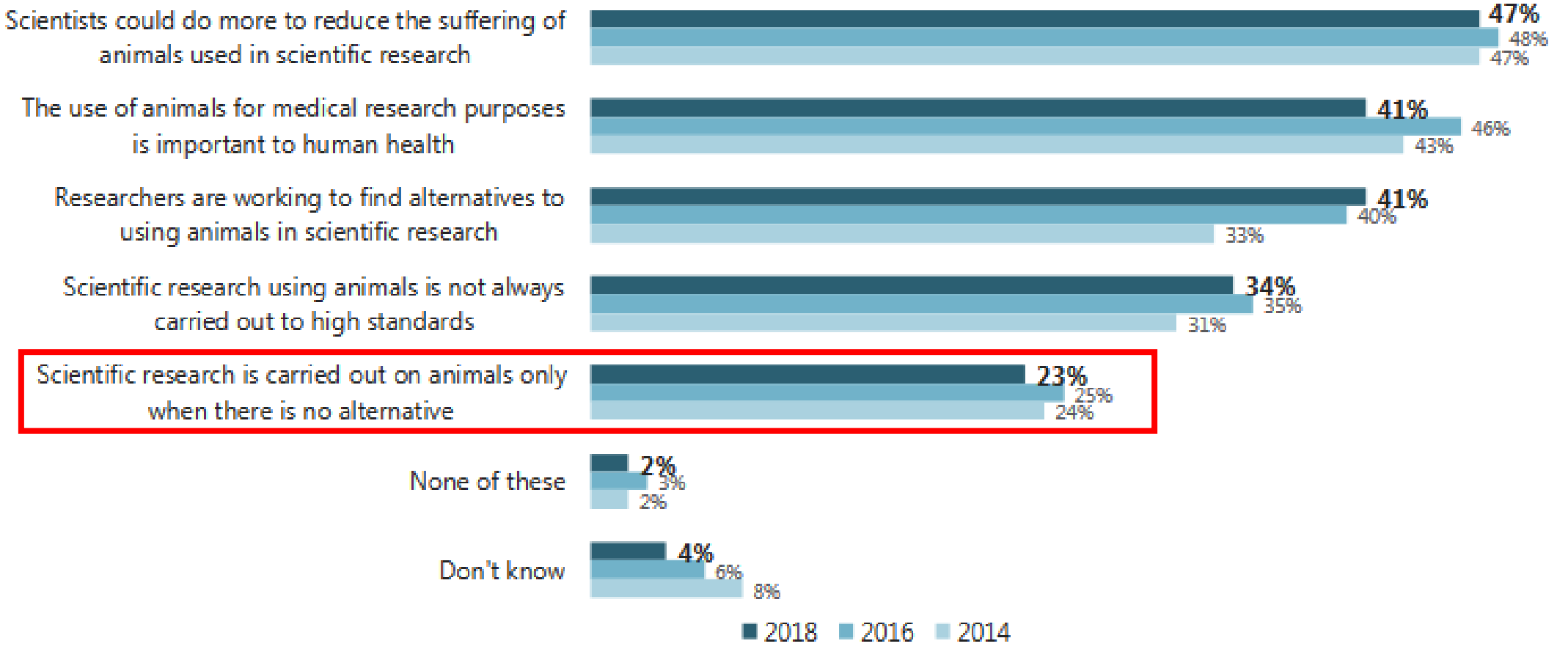


Figure 2.6: And which, if any, of these do you think is true?



Bases:
2018 – 1,011 British adults aged 15+ (interviewed 31 August – 11 September 2018)
2016 – 987 British adults aged 15+ (interviewed 4 March – 4 April 2016)
2014 – 969 British adults aged 15+ (interviewed 7 – 13 March 2014)

Office for Life Sciences / Ipsos MORI

3 Public attitudes towards regulation and behaviour

Table 3.1: "I do not trust the regulatory system around the use of animals in scientific research"

	Agree	Neither agree nor disagree	Disagree	Don't know
2018	**32%**	**37%**	**29%**	**3%**
2016	*34%*	*34%*	*27%*	*4%*
2014	*34%*	*35%*	*26%*	*5%*

Figure 3.1: How strongly do you agree or disagree with the following statements?

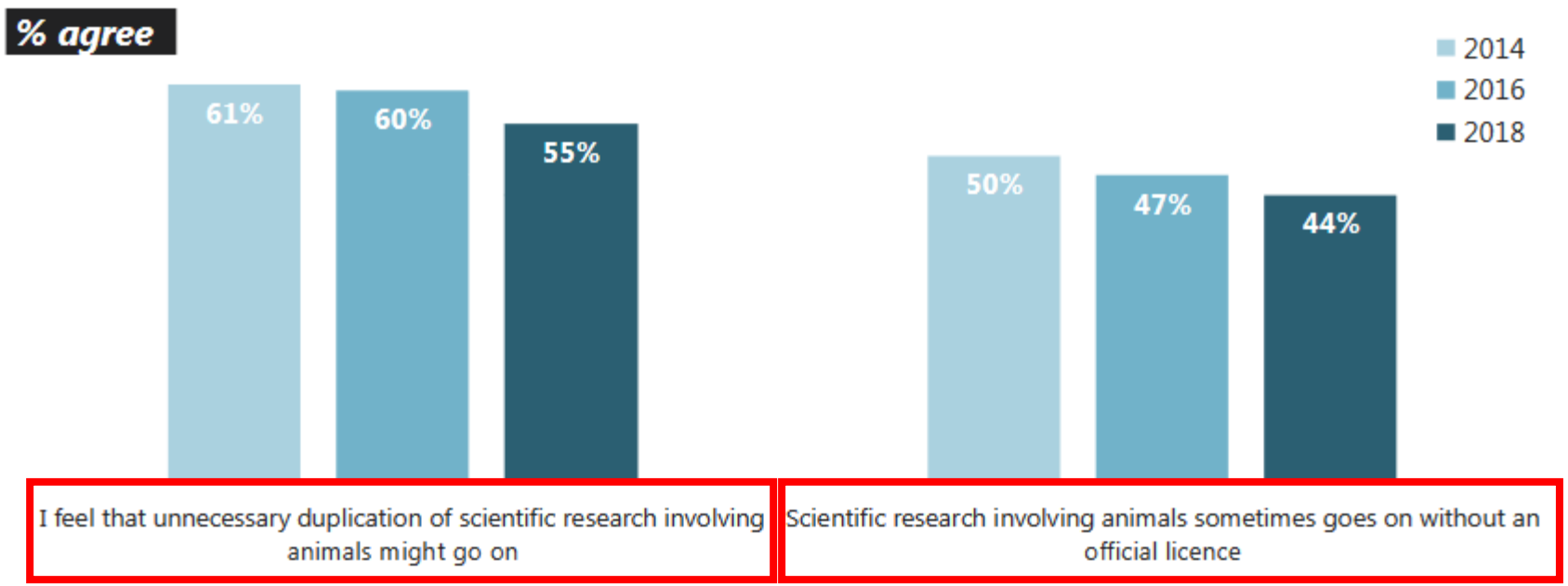


Table 3.2: How strongly do you agree or disagree with the following statements?

	The UK has strict rules on the use of animals in scientific research			I trust the regulators to uncover any misconduct at animal research facilities		
	Agree	Neither agree nor disagree	Disagree	Agree	Neither agree nor disagree	Disagree
2018	**51%**	**31%**	**12%**	**43%**	**27%**	**28%**
2016	*52%*	*28%*	*13%*	*41%*	*25%*	*30%*
2014	*51%*	*28%*	*12%*	*42%*	*24%*	*29%*

Figure 3.2: "The rules in the UK on scientific research involving animals are well-enforced"

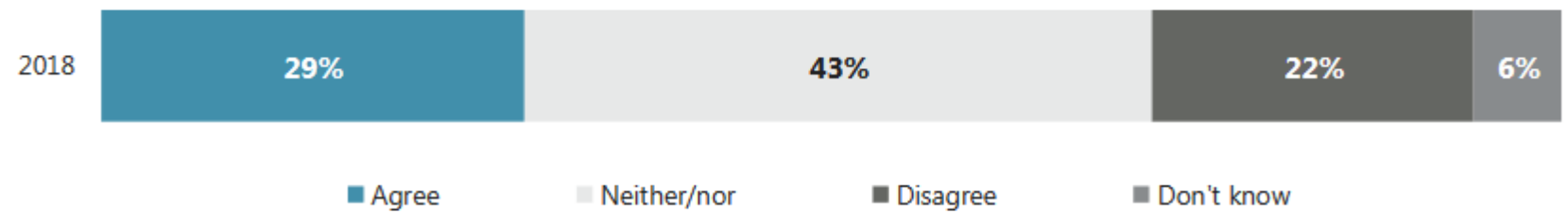
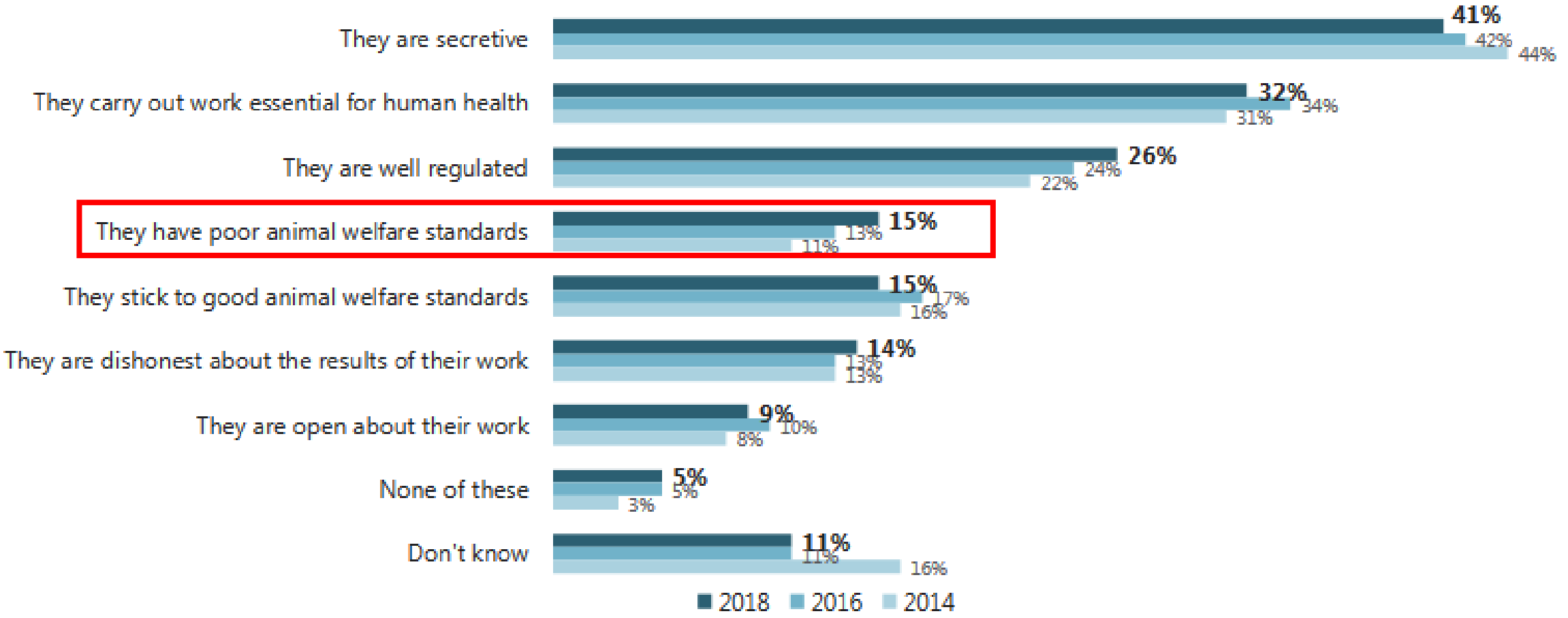


Table 3.3: Acceptability of protest actions

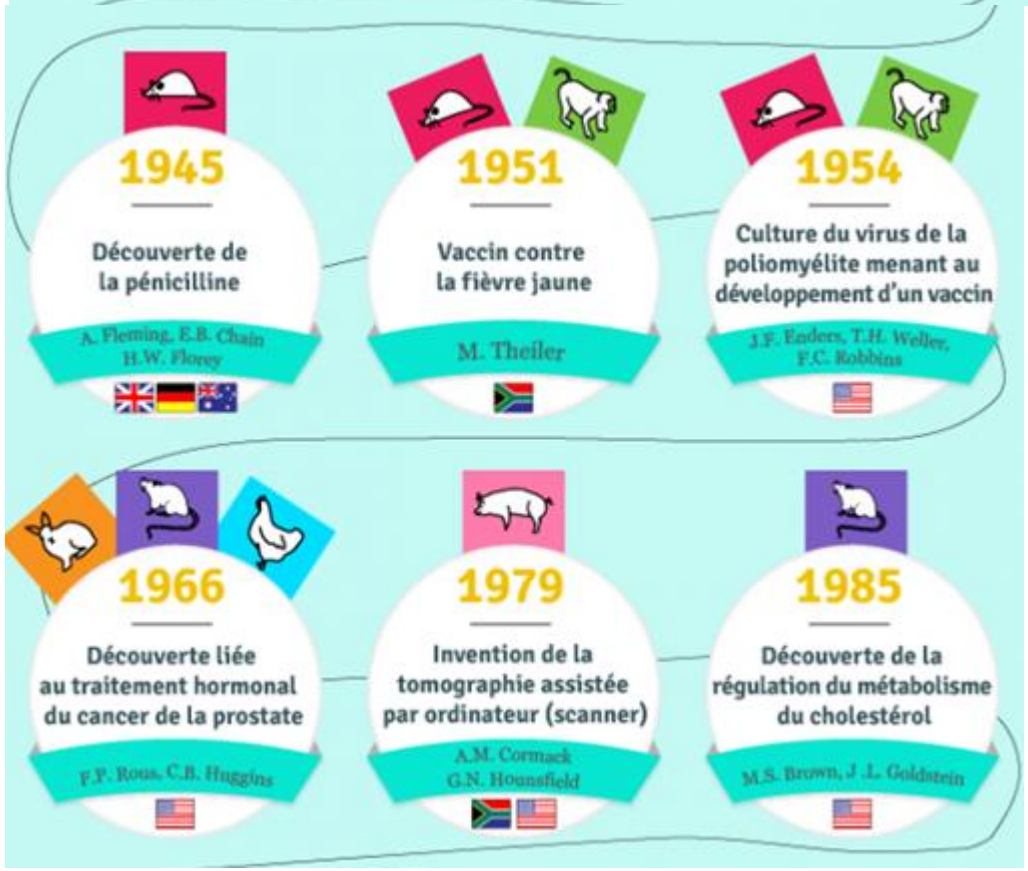
	2014	2016	2018
Hand out leaflets	80%	78%	**81%**
Ask people to put a sticker/poster in their window	65%	70%	**67%**
Occupy research facilities illegally	8%	8%	**9%**
Release animals illegally	7%	9%	**7%**
Destroy or damage property	2%	4%	**2%**
None of these	4%	5%	**5%**
Don't know	4%	3%	**2%**

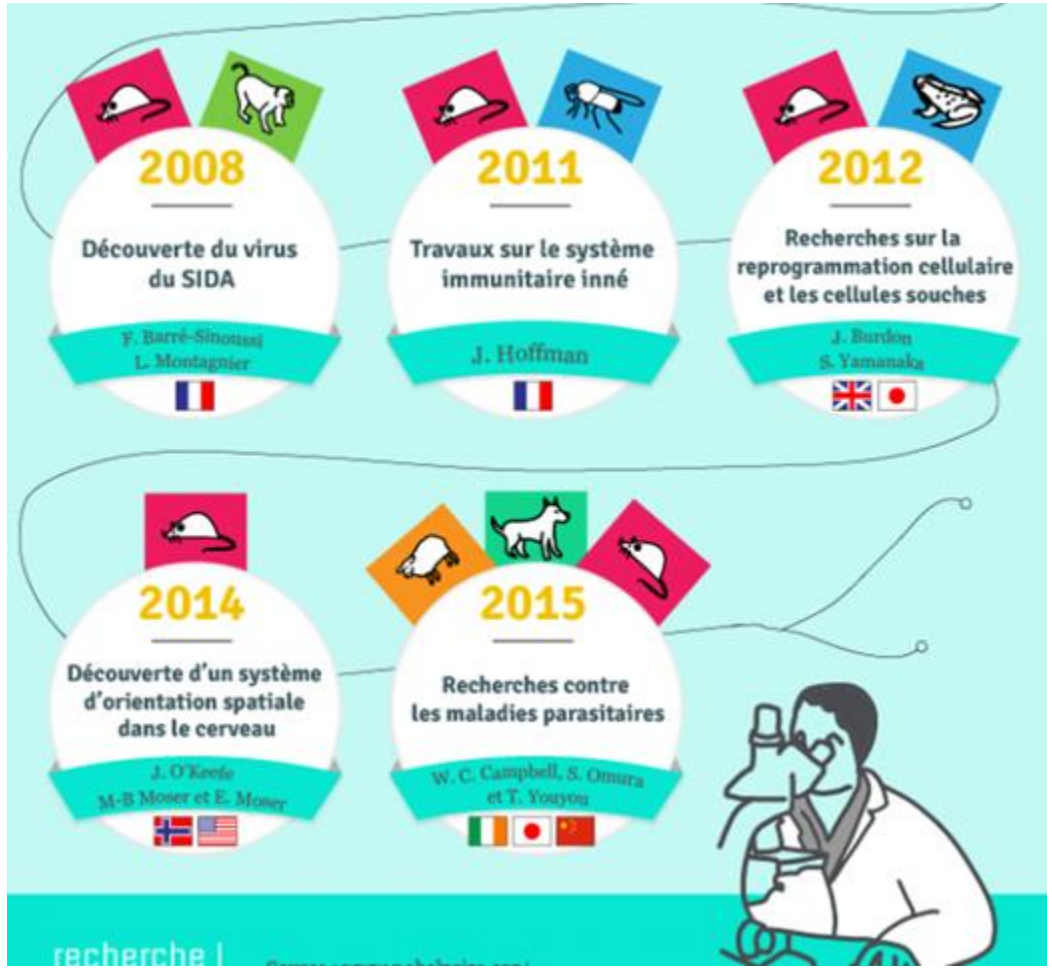
Figure 3.4: Public perceptions of animal research organisations



LES GRANDES DÉCOUVERTES LIÉES À LA RECHERCHE ANIMALE

PRIX NOBEL




2008
Découverte du virus du SIDA
F. Barré-Sinoussi
L. Montagnier
2011
Travaux sur le système immunitaire inné
J. Hoffman
2012
Recherches sur la reprogrammation cellulaire et les cellules souches
J. Burdon
S. Yamanaka
2014
Découverte d'un système d'orientation spatiale dans le cerveau
J. O'Keefe
M-B Moser et E. Moser
2015
Recherches contre les maladies parasitaires
W. C. Campbell, S. Omura et T. Youyou
recherche

11 880 000

Number of animals killed worldwide in 2014 for food

Source: **Food and Agriculture Organization of the United Nations**

2200 animals/seconds, **70 billions** (milliards)/year

France 1.200.000.000 (without fishes) in 2018
(animals for research 1.752.906)

In 2019 in France: 800 millions chickens, 72 millions fishes, 73 millions ducks, 23 millions pigs, 30 millions rabbits, 48 millions turkey, 5 millions sheeps, 2 millions goats, 4 millions cows and calf, 17 000 horses.