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PART 1/2

COMMISSION STAFF WORKING DOCUMENT

Summary Report on the statistics on the use of animals for scientific purposes in the Member States of the European Union and Norway in 2020

Report of statistical information on the use of animals in procedures

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Report of statistical information on the use of animals in procedures

I. Executive Summary

This report presents statistical data on the use of animals for scientific purposes in the Member States of the European Union (EU) and Norway during 2020 under Directive 2010/63/EU[1] ("the Directive") on the protection of animals used for scientific purposes. References to "EU" and "Union" data from here on in this report, are therefore to be understood to cover 27 EU Member States and Norway, unless otherwise specified.

The presentation of data follows that of the previous reports distinguishing animals used directly in research, testing, routine production and for educational (including training) purposes ("research and testing" from here on), from those used for the creation and maintenance of genetically altered animals in support of the Union research needs.

For the year 2020, this current report no longer incorporates data from the United Kingdom. To allow for the comparisons with previous years using the same reporting countries, data presented for 2018 and 2019 excludes the data from the United Kingdom.

It is important to note that due to an error, the Polish data were duplicated for 2019, and as a result the 2019 EU data had to be revised. The duplicate records have been removed resulting in a -1.4% reduction compared to the previously reported 2019 EU totals. The Public ALURES Statistical EU database has also been updated with the corrected data[2]. The references in this report to 2019 data are made based on the corrected data.

[1] Directive 2010/63/EU OJ L276, 20.10.2010, p.33-79

[2] The Public ALURES Statistical EU database 2019 data was corrected on the date of publication of this report.

I.1. Numbers and origins of animals

In 2020, the total number of animals used for the first time **in research and testing** covering the 28 countries (EU-27 and Norway) is just below 8 million. This is 7,5% lower than in 2019.

	2018	2019	2020
Total	8,822,404	8,579,439	**7,938,064**

Table 1: Total numbers of animals used for the first time for research, testing, routine production and education purposes in the Union between 2018 and 2020

16 Member States reported a decrease in the numbers of animals used in 2020. Of these, 11 attributed the decrease at least partially to national measures as a result of COVID-19 pandemic (e.g., reduced activities due to lockdowns; cancelled or postponed projects). At the same time, there was an increase in the number of animals in 11 Member States and Norway. Four of these have specifically mentioned research activities related to COVID-19.

The number of animals used for the first time for **the creation and maintenance of genetically altered (GA) animal lines** to meet the research needs in the Union is around 680,000. There was an overall increase of 4%, driven mainly by the creation of new genetically altered animal lines (+25%) while the maintenance of existing GA lines showing a decrease of 14%. However, the accurate reporting of animals under the maintenance of existing GA lines is particularly challenging, which may partly explain the continued fluctuation of numbers.

	2018	2019	2020
GA creation	378,876	311,958	388,729
GA maintenance	531,068	347,460	297,899
Total GA creation and maintenance	**909,944**	**659,418**	**686,628**

Table 2: Total numbers of animals used for the creation and maintenance of genetically altered animal lines

With the exclusion of the data from the United Kingdom and the increasing number of fish uses reported by Norway, the proportion of mice used for the first time in research and testing is now under

half of all species used (49%), however, still remaining as the most used species. Fish is the second most used species with 28%.

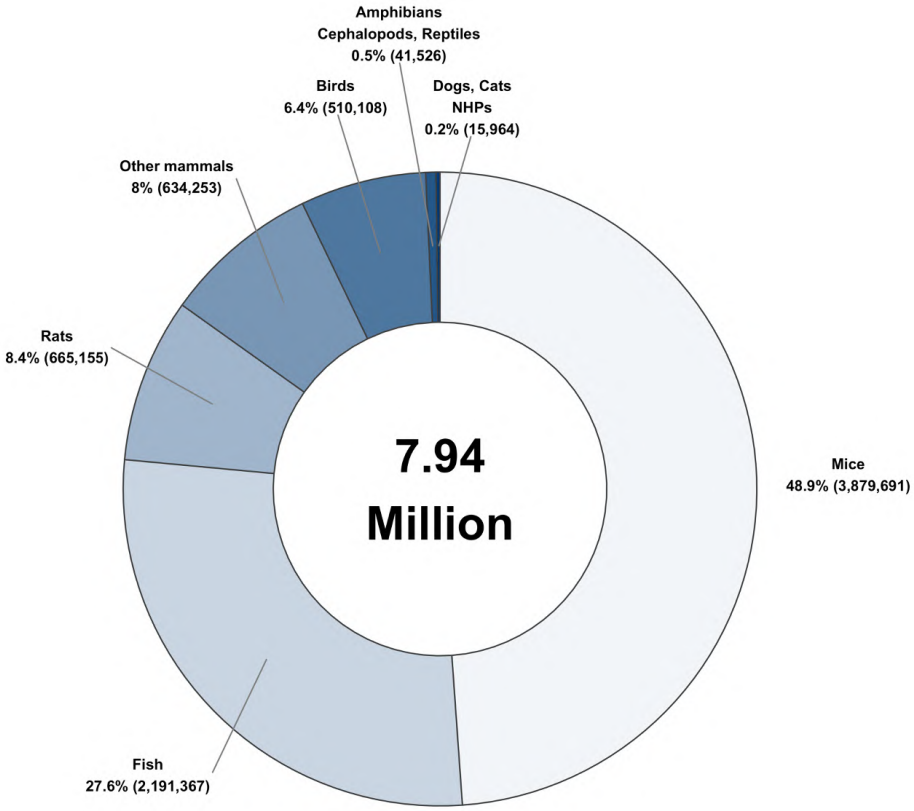


Figure 1: Numbers of animals used for the first time by main classes of species in 2020

In 2020, the numbers of mammals used for the first time decreased by 600.000. The first-time uses of dogs and non-human primates continued the downward trend, decreasing further
-16% and -10% respectively. There was also a significant decrease in the use of cephalopods (-90%) although the numbers being small (1.633 first-time uses).

Of the other more significant changes, it is worth mentioning the increase of 2.500 horses, donkeys and cross-breeds (+176%). There was also an increase in the first use of hamsters (+66%) and cats (+15%).

Information about the origin of animals is important. Animals bred outside the Union do not benefit from the accommodation and care standards provided by the Directive. Moreover, an increase in transport times may negatively impact their welfare.

In 2020, the proportion of animals born outside of the Union continue to represent only 1% of all animals used for the first time (excluding non-human primates). The proportion of animals born in the

Union but not at a registered breeder increased representing 14%. It is important to note that this category includes animals from, for example, farms, and studies carried out using wild animals, especially wild fish.

The Directive provides additional protection for non-human primates due to their genetic proximity to human beings, their highly developed social skills and capacity to experience pain, suffering and distress. In order to end the capturing of animals from the wild including for the purposes of breeding, the Directive requires moving towards using non-human primates that have been bred, ultimately, in self-sustaining colonies, from parents who themselves have been bred in captivity.

In 2020, the origin of non-human primates coming from Africa increased from 36% to 48%, decreased from 45% to 33% for Asia and remained stable for EU-registered breeders with 13% of all non-human primates used for the first time. The proportion of non-human primates being either second or higher generation purpose-bred, or coming from self-sustaining colonies was 82%, a slight decrease from 2019. It is important to note that the reporting of the colony type (whether a self-sustaining colony or not) will in future reports be separated from the reporting of the generation, providing more accurate data.

I.2. Uses of animals in research and testing

In 2020, 8.05 million uses (first and any subsequent reuse) of animals for scientific purposes were reported. The total number of uses decreased by 8%. As in previous years, the main purpose was research (72%) of which 41% of all uses were carried out for basic research and just under 31% for translational and applied research purposes. A further 17% of animal uses were for regulatory use to satisfy regulatory requirements, followed by routine production (5%).

In absolute numbers, the most important changes, compared to 2019, were the number of uses having decreased for basic research (-10%), routine production (-7%) and regulatory purposes (-5%) as well as preservation of species (-53%), and higher education or training for the acquisition, maintenance or improvement of vocational skills (-32%). However, protection of the natural environment in the interest of the health or welfare of human beings or animals (+10%) increased significantly, concerning mostly “other fish”.

Thanks to the continued monitoring of the use of appropriate reporting categories, and corrective measures where issues were identified with the use of “Other basic research”, there was a significant decrease (-44%) of the use of this category, and instead more appropriate categories had been used. The Commission continues to monitor excessive use of this category. Where necessary, the Commission addresses it bilaterally with Member States and Norway where such use seems to be a result of a failure of the users to report under more appropriate pre-specified categories.

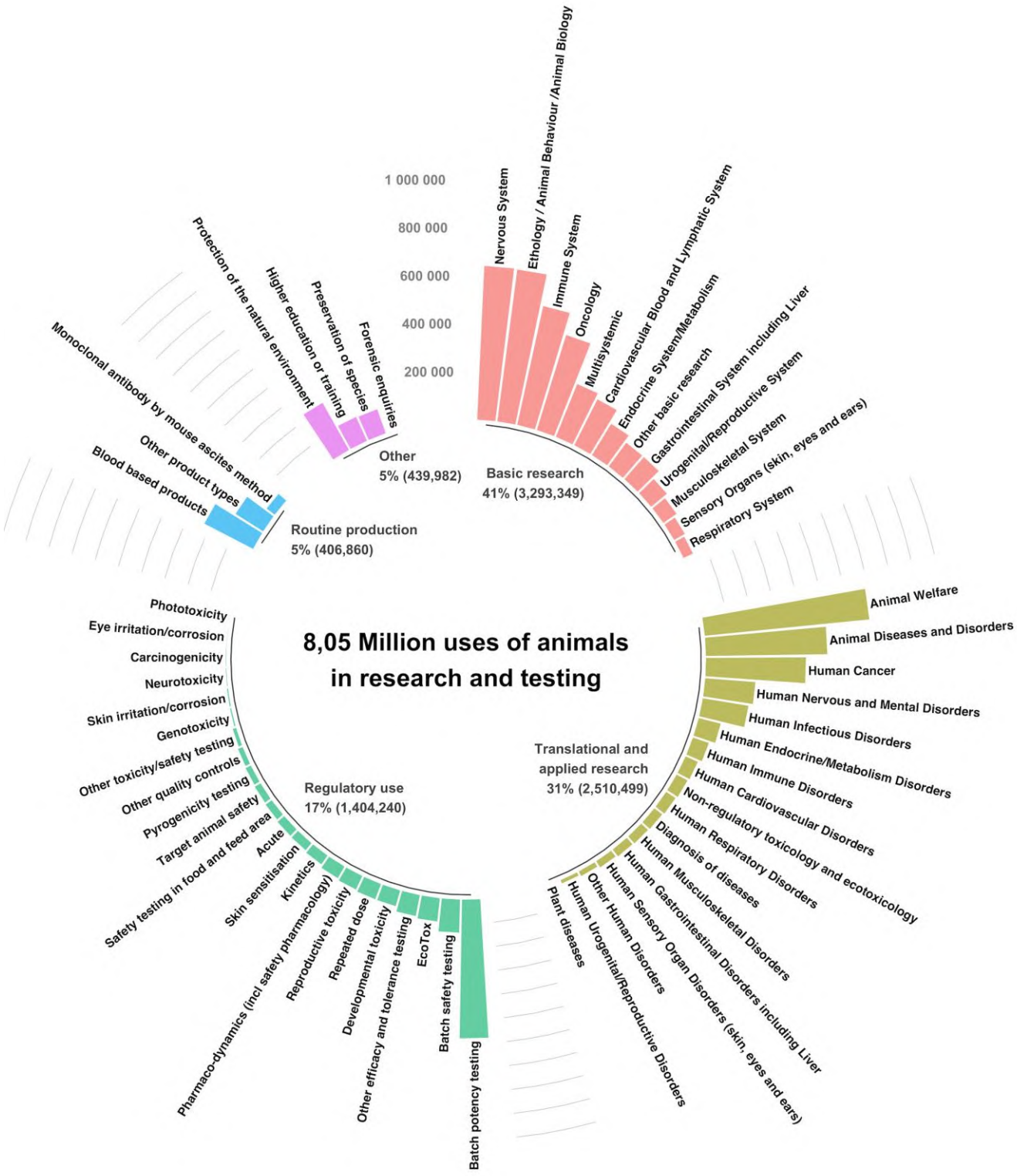


Figure 2: All uses of animals for research and testing in 2020

The actual severities reported for each use of an animal decreased between 2019 and 2020 in the 'severe' category (-2%). 4% of uses were reported as 'non-recovery'.

	2018	2019	2020
Non-recovery	6% (521,765)	6% (494,368)	**4% (330,392)**
Mild [up to and including]	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% (8,979,081)**	**100% (8,715,224)**	**100% (8,054,930)**

Table 3: Severity of uses

The graphical presentation below shows the purpose areas with most severe uses. In 2020, most of these were conducted for regulatory purposes while routine production was mostly mild. In proportion, uses in translational and applied research tended to be more severe than those reported in basic research. When analysing all the sub-categories of purposes, batch potency testing continues to result in the highest number of severe uses (about 134,000 uses) followed by animal diseases and disorders (about 112,000 uses). Looking at the proportion of severe uses within a sub-category: other lethal methods (93%) was the highest, followed by acute toxicity (42%), production of monoclonal antibodies (34%) and diagnostics of diseases (31%).

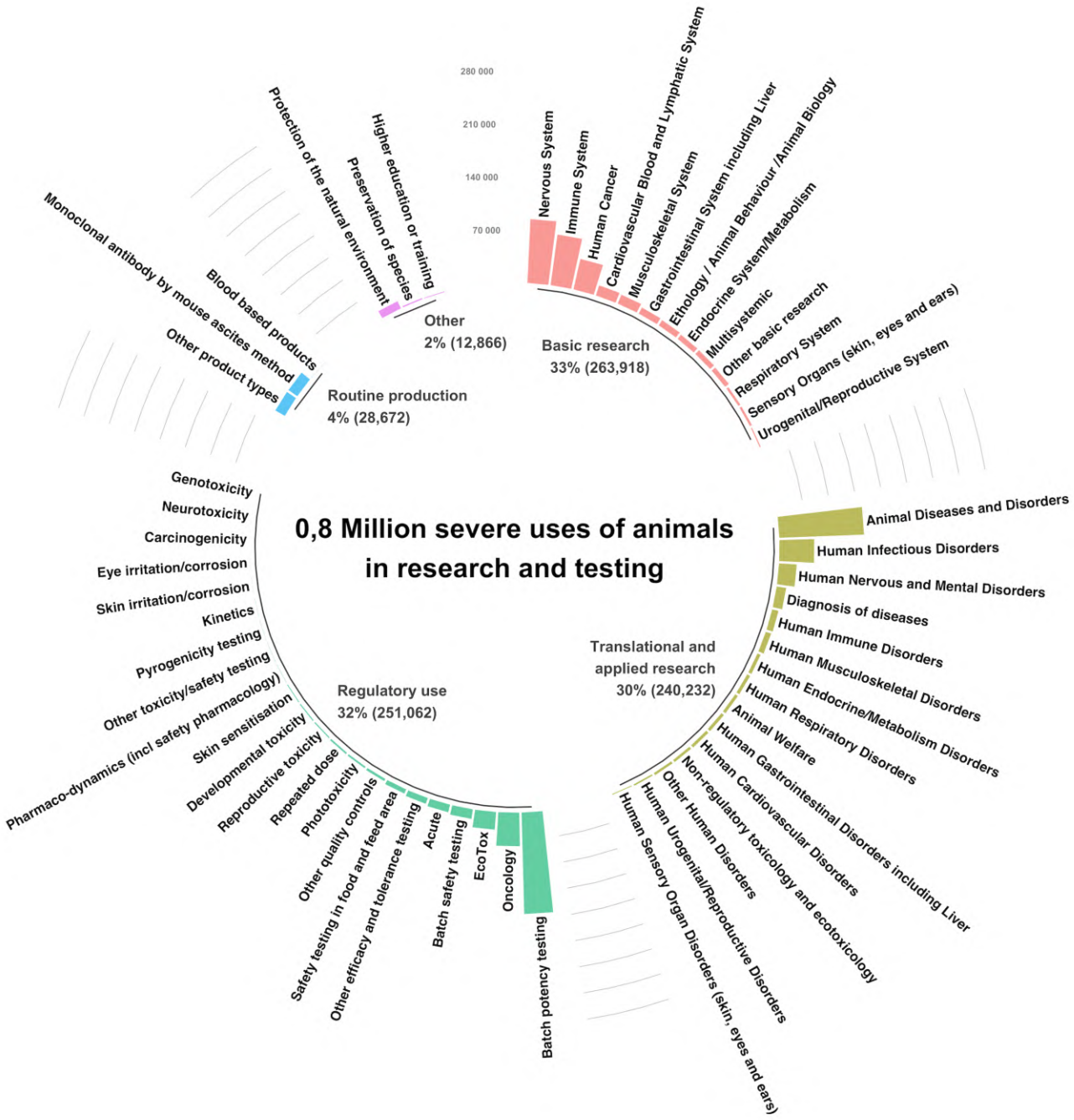


Figure 3: Severe uses of animals for research and testing in 2020

In 2020, the majority of uses to satisfy regulatory requirements of specific sector legislation occurred in relation to placing on the market of medicinal products for humans (54%), veterinary medicinal products (22.8%) and industrial chemicals (8.7%) (Figure 4).

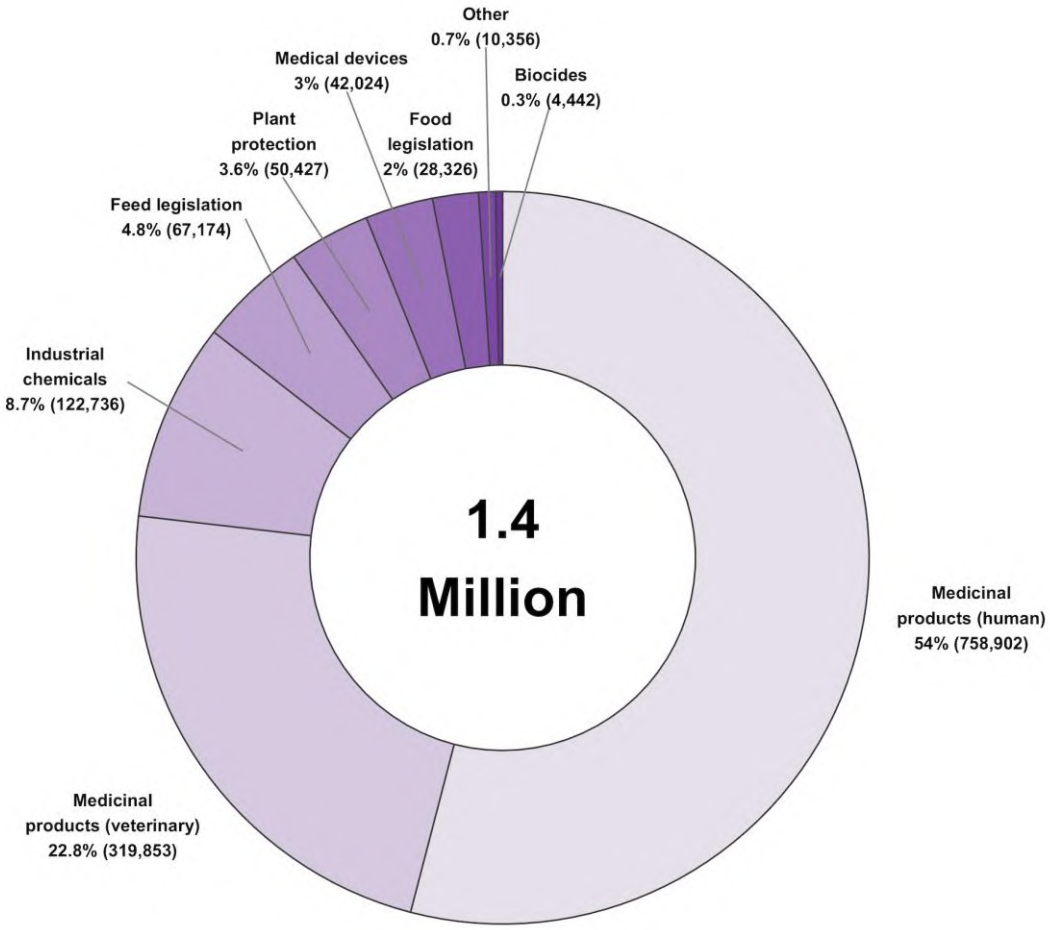


Figure 4: Regulatory uses by type of legislation in 2020

The majority of regulatory uses continues to be performed to comply with regulatory requirements originating from the Union legislation (95%).

In terms of severity level resulting from uses to satisfy regulatory requirements, 15% of these uses were reported as severe, 21% as moderate, 64% mild (and up to mild) and less than 1% as non-recovery.

In line with the principle of the Three Rs[3], the total number of animals used in procedures can be reduced by performing more than one procedure on an animal, however, under strict conditions taking into account the lifetime experience of the individual animal. The reuses remained stable around 1.5% of all uses. Proportionally, large mammals are reused more often, such as horses, donkeys and cross-

[3] Replacement, reduction and refinement as the guiding principle for more ethical use of animals in testing and scientific research.

breeds, sheep, and some species of non-human primate. However, also the reuse of reptiles is high (38%). Animals used for the purposes of education training have the highest proportions of reuses (12%).

The proportion of genetically altered animals used in research and testing remained stable between 2019 and 2020 at 22%. Of the 1.8 million uses that were carried out on animals that were genetically altered, 17% had a harmful phenotypic alteration. Zebra fish and mice continue to be the most commonly genetically altered species with 52% and 41% of these genetically altered respectively.

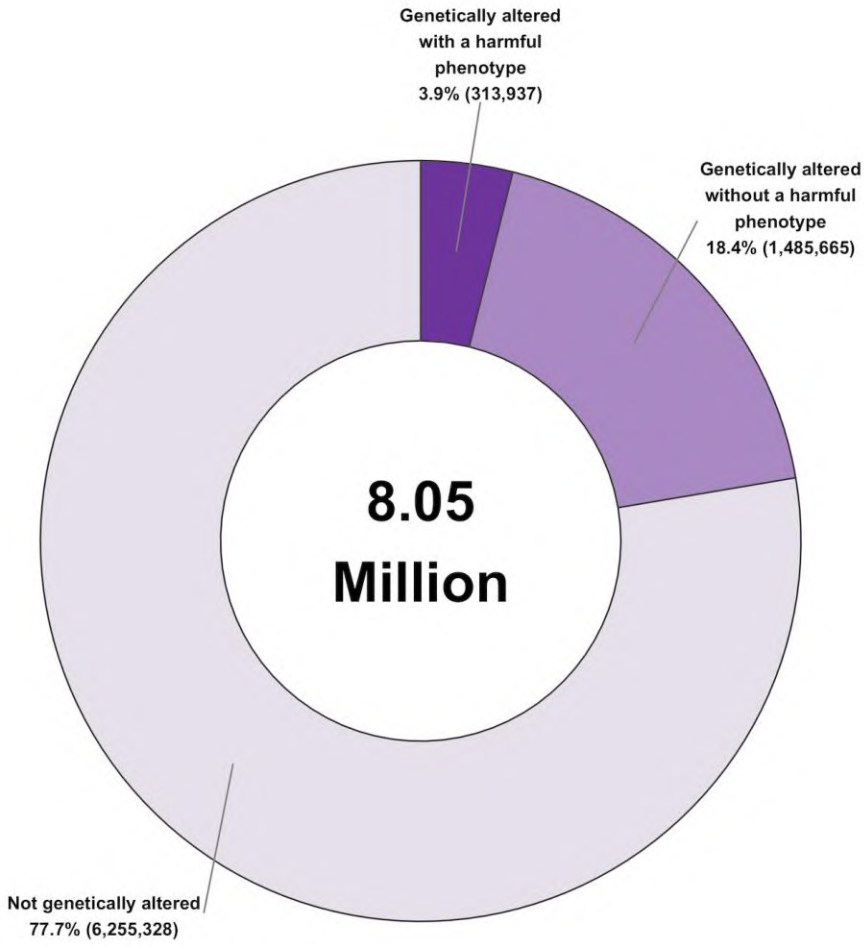


Figure 5: Genetic status of animals used in research and testing in 2020

Genetically altered animals are used almost exclusively for research purposes with basic research accounting for 74% of uses of genetically altered animals.

I.3. Creation and maintenance of genetically altered animal lines for research purposes

In 2020, the number of animal uses for the creation of new genetically altered animal lines increased by 26% to 393,746. The main species used for this purpose were, as before, mice and zebra fish, 75% and 23% respectively. Other species include rats, other species of fish, xenopus, hamster (Syrian), other amphibians and domestic fowl. In 2018 and 2019, marmosets had been used for the creation of new genetically altered animal lines with the field of research interest identified as urogenital/reproductive systems and multisystemic studies. In 2020, no marmosets were used for this purpose. It is interesting to note that at least in 2020 no uses of genetically altered marmosets in research and testing were reported.

In 2020, the category 'basic research' covered 86% of all uses for the creation of new genetically altered animal lines. The purposes for which these were created remained the same: nervous system (20%), multisystemic research (18%), oncology (11%) and immune system (10%). The most important sub-category under translational and applied research for which new genetically altered animal lines were created was other human disorders (11%), mainly to be able to study rare genetic disorders.

In comparison to 2019, animals used for the first time for the 'maintenance of colonies of genetically altered animals of established lines' decreased by 14%. However, the likely reason for the continued fluctuation of the numbers in this category is the complexity of the reporting requirements. As announced in our previous report, a guidance document on genetically altered animals under the Directive[4] has been developed. It was endorsed by Member States National Contact Points responsible for the implementation of the Directive at their meeting in November 2021. This has been made available in all Union languages in 2022 and is expected to improve harmonisation and accuracy of reporting of genetically altered animals.

I.4. Conclusions

For the first time since 1991, the data from the UK is no longer reported. To facilitate the presentation of comparative data on animal use trends, the data from 2018 and 2019 were recalculated by removing the data from the UK.

The total numbers of animals used for the first time in research and testing decreased more significantly than in previous years, from 8,5 million to just under 8 million between 2019 and 2020 which represents a decrease of 7.5%. However, this is partially attributed to reduced activities as a result of national measures related to COVID-19 pandemic.

A clear decrease was noted in first uses of mammals. Also, some positive trends were seen with the reduction of testing in order to satisfy regulatory requirements. In contrary, the main increases were seen in the uses of animals for protection of the natural environment in the interest of the health or welfare of human beings or animals, and these were mainly linked to the use of fish and amphibians. When taking into account all animals used for research and testing for the first time, and those used for

[4] https://op.europa.eu/en/publication-detail/-/publication/7ff424e1-eb8f-11ec-a534-01aa75ed71a1/language-en/format-PDF/source-282386407

the first time for the creation and maintenance of genetically altered animals, there was an overall increase of 4% between 2019 and 2020, driven mainly by the increase of the uses for the creation of new genetically altered animal lines.

Concerning the uses of animals in areas where alternative methods are available, the uses for the rabbit pyrogenicity decreased again in 2020 by 21%. Further efforts should continue to be made to speed up the transition to non-animal alternatives. The use of the mouse ascites method for the production of antibodies continues to be of concern, as it increased again by further 12%. Its use is almost entirely reported by one Member State and efforts are currently under way by the authorities to review on-going projects where mouse ascites use may be involved. Such use can only be authorised if the project applicant provides robust scientific evidence why the use of alternative methods is not possible. The revised data categories for 2021 data and onwards will allow for a better monitoring of animal use for the production of antibodies.

2021 was an important year for transparency in animal use in research and testing in the Union. During the summer, the European Commission launched two open access databases, available for all interested stakeholders, to facilitate identification of areas where replacement and refinement efforts are most urgently needed. The first database, ALURES Statistics[5], allows statistical data mining at Union level. The second database, ALURES NTS[6], contains Member State publications of non-technical project summaries of authorised projects that provide further understanding of why and how animals are still needed in research and testing. These can also be of interest to those planning animal use, to identify ways in which the Three Rs have been applied in already authorised projects.

One of the main aims of the ALURES databases is to facilitate initiatives by stakeholders, including public and private research organisations, and funding bodies, to strategically progress towards the ultimate goal of full replacement by focusing the development of alternatives on areas that will have the greatest impact.

In the next report, some of the reporting categories will change from 2021 data onwards which will further improve accuracy and precision. The new reporting requirements can be found in Commission Implementing Decision 2020/569/EU[7] and these aim to address, for example, excessive use of "other" categories by providing new categories for those most commonly reported under "other" species or "other" purposes.

[5] https://ec.europa.eu/environment/chemicals/lab_animals/alures_en.htm

[6] https://ec.europa.eu/environment/chemicals/lab_animals/alures_nts_en.htm

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2020.129.01.0016.01.ENG&toc=OJ:L:2020:129:TOC

BACKGROUND

The objective of the Commission Staff Working Document is to present statistical information on the use of animals in procedures in the European Union and Norway under Directive 2010/63/EU[8] of 22 September 2010 on the protection of animals used for scientific purposes. The obligation to collect statistical data is covered by Article 54(2) of the Directive. The data format for the 2020 data was laid out in now repealed Commission Implementing Decision 2012/707/EU[9].

Regulation (EU) 2019/1010[10] ("the Regulation") amended Article 54(2) of the Directive taking effect in in June 2019. This report is based on data provided by Member States in accordance with the previous wording of Article 54(2) requiring the collection on an annual basis of statistical information on the use of animals in procedures, including information on the actual severity of the procedures and on the origin and species of non-human primates used in procedures. The amended Article 54(2) requires Member States to submit the statistical data by electronic transfer in a non-summarised format to the Commission.

As a result of the amendment to the Directive, also Commission Implementing Decision 2012/707/EU was required to be changed to accommodate the new obligations. A new Commission Implementing Decision 2020/569/EU[11] was adopted on 16 April 2020. However, the revised statistical reporting format will take effect from the 2021 data and thus is not yet applicable to the 2020 data in this current report..

Even if the Regulation removed the obligation of the Commission to submit a formal statistical report to the European Parliament and the Council, an annual summary report will continue to be published by the Commission. Since improved transparency is one of the key objectives of the Directive, the Commission considers it appropriate, as well as necessary in support of the other objectives of the Directive, that the Member State level data are also made available on a yearly basis until 2023 when these will become accessible through ALURES statistical EU database.

This current statistical report contains the results of the data collected by all 27 Member States and Norway in 2020. References to "EU" and "Union" data from here on in this report, are therefore to be understood to cover 27 EU Member States and Norway, unless otherwise specified.

It is important to note that due to an error the Polish data were duplicated for 2019, and as a result the 2019 EU data had to be revised. The duplicate records have been removed resulting in a -1.4% reduction compared to the previously reported 2019 EU totals. The Public ALURES Statistical EU

8 Directive 2010/63/EU OJ L276, 20.10.2010, p.33-79

9 OJ L 320, 17.11.2012, p. 33–50

10 OJ L 170, 25.6.2019, p. 115–127

11 OJ L 129, 24.4.2020, p. 16–50

database has also been updated with the corrected data[12]. The references in this report to 2019 data are made on the basis of the corrected data.

II. DATA SUBMITTED AND GENERAL ASSESSMENT

III.1. Data Submitted

The data were collected according to the Commission Implementing Decision 2012/707/EU of 14 November 2012 establishing a format for the submission of the information pursuant to Directive 2010/63/EU of the European Parliament and the Council on the protection of animals used for scientific purposes.

III.2. General Considerations

This report aims at providing a comprehensive overview on the use of animals in procedures in the European Union and Norway in 2020. The purposes of the use of animals have been analysed, and some of these purposes have been broken down into more precise sub-categories.

In this report, data are presented either in the form of figures or summary tables providing information on a specific aspect of the Directive. Overall numbers are given for the year 2020. On some occasions where the trend analysis provides information on the evolution of the Directive's objectives, numbers from previous years (2018-2020) are recalculated by excluding data from the UK. Key findings are presented in the form of tables and graphics. However, in some cases, further information in the text may have been drawn both from annexed tables and Member State narratives (see Part C of this Staff Working Document). Member State narratives have been helpful in providing information such as for the content of 'other' categories (for example, "Other rodents", "Other basic research").

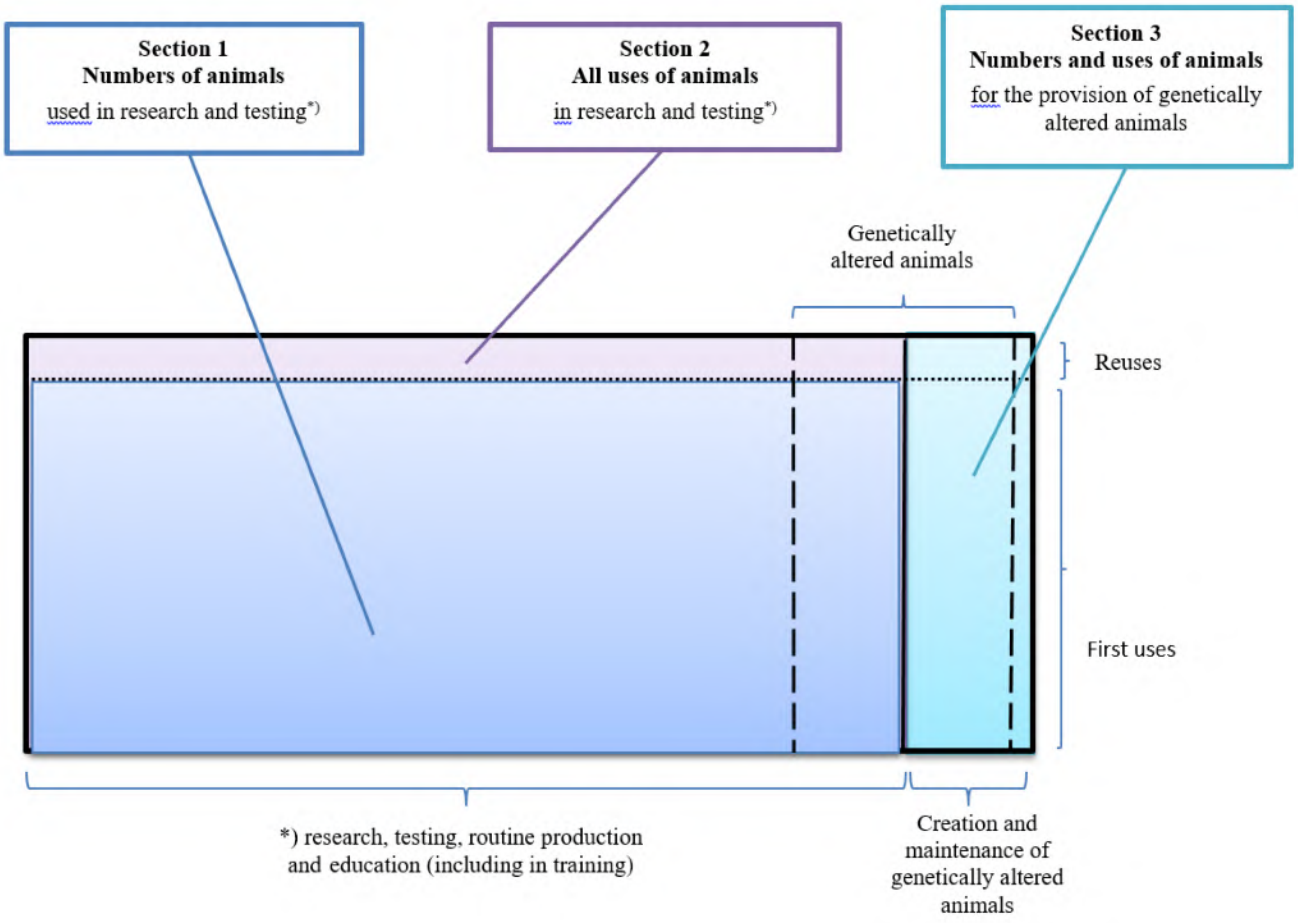
The Commission and Member States continue to work together to address issues and questions arising from reporting obligations to ensure uniform understanding of the revised reporting requirements, such as the reporting of actual severity, animals used for the maintenance of genetically altered animal lines and accurate reporting under different purpose categories. In November 2021, Member State National Contact Points responsible for the implementation of the Directive endorsed an important guidance document on genetically altered animals[4] developed by experts from Member States and key stakeholders. The guidance document contains a dedicated section on statistical reporting requirements. The Commission has made it available in all Union languages to ensure the guidance is accessible to all those bound by the reporting obligations.

[12] The Public ALURES Statistical EU database 2019 data was corrected on the date of publication of this report.

III.3. Report structure

The objective of this report is to present all these data structured in a manner that allows for an improved understanding of when and how animals are still used in science today. It is hoped that, in line with the Directive aims, this way of reporting will better facilitate the identification of animal use areas on which efforts for the development and validation of alternative approaches can be focused.

Therefore, Part A of the report is composed of three sections as illustrated in the picture below:



Numbers of animals used for research, testing, routine production and educational purposes[13] in the EU – Section 1 (IV.1)

[13] In this context 'Research' means basic, applied and translational research, animals used for the purposes of protection of the natural environment in the interests of the health or welfare of human beings or animals, preservation of the species and forensic enquiries; 'testing' refers to regulatory use of animals and 'education'

The first section focuses on the *numbers of animals* used, for the first time, for the purposes of research, testing, routine production and education (the term 'education' in the context of this report also includes animals used for the purposes of training). These animals can be both conventional animals or those that have been genetically altered. This part reports on their numbers and origins. It excludes animals that have been used for the creation of a new genetically altered animal line, or maintenance of an existing genetically altered animal line. These are covered in part three below.

Details of all uses of animals for research, testing, routine production and educational purposes in the EU – Section 2 (IV.2)

The second section focuses on the way in which animals are used in these scientific procedures, *covering all uses, both the first and any subsequent reuse.* This serves to draw an overall picture of all uses of animals for the purposes of research, testing, routine production and education in the Union. This part takes into account the nature of the procedures, their legislative context, reuse of animals, the genetic status of the animals, and the severities experienced by the animals.

Numbers and uses of animals for the creation and maintenance of genetically altered animals in the EU – Section 3 (IV.3)

The third section focuses on the provision of *genetically altered animals* needed to support scientific research in the Union. It reports, on one hand, animals used in procedures for *the creation* of new genetically altered animal lines and, on the other, *the maintenance* of colonies of existing genetically altered animals. As in part one of this report, it provides the actual numbers of animals, used for the first time, as well as more detailed information taking into account all uses (first, and any subsequent reuse) for the purposes of creation and maintenance of genetically altered animal lines. It also provides further information on the type of research for which new genetically altered animal lines are being created. These animals have not been used in other scientific procedures, in other words the data are separate from those covered in parts one and two of this report.

Part B of this report contains Union-level data that have been used as the basis for conclusions in Part A of the report. Part C of this report provides data from the Member States together with their respective narratives.

Information outside of the scope of the statistical report

What remains outside of the scope of annual statistical reporting – even if covered by the scope and provisions of the Directive, are:

- Foetal forms of mammals;
- Animals killed solely for organs and tissues, and sentinels, unless the killing is performed under a project authorisation using a method not included in Annex IV of Directive 2010/63/EU;

includes animals used for training purposes. Glossary in IV.4. provides further information on some of the categories of scientific use purposes.

- Animals bred and killed without being used, apart from genetically altered animals with intended and exhibited harmful phenotypes, and those having been genotyped with an invasive method before being killed.

Additional information on animals bred and killed without being used will be reported in the five-year report on the implementation of the Directive in line with Article 54(1) of the Directive.

III.4. Glossary of terms

Generations and origins of non-human primates

- F0 - an animal born in the wild
- F1 - first generation captive bred animal
- F2 or greater - second or higher generation captive-bred animal
- SSC - animal sourced from a self-sustaining colony where no further animals are obtained from the wild

Genetically altered animals

For the purposes of statistical reporting, "genetically altered animals" refer to either of the following:

- genetically modified (such as transgenic, knock-out and other forms of genetic alteration) and induced mutant animals (irrespective of the type of mutation);
- animals with spontaneous deleterious mutations maintained for research for that specific genotype.

Genetically altered animals are reported either

a) When used for the creation of a new animal line;
b) When used for the maintenance of an established line with an intended ***and*** exhibited harmful phenotype; This category also includes genetically altered animals during maintenance of an established line, irrespective of whether the line is of intended non-harmful or harmful phenotype, that have been subject to invasive genotyping (genetic characterisation/tissue sampling);
c) When used in other (scientific) procedures (i.e. not for the creation or the maintenance of a line).

The reporting of genetically altered animals is summarised in the above table.

<u>Creation</u>

All animals *carrying a genetic alteration* are reported during the creation of a new line. Also, those used for superovulation, vasectomy and embryo implantation are reported (these may or may not be genetically altered).

Genetically normal animals (*wild-type offspring*) produced as a result of the creation of a new genetically altered line are not reported, unless these have been subjected to a procedure, for example an invasive method for the sole purposes of genotyping.

Establishment and maintenance of breeding colonies

A new strain or line of genetically altered animals is considered to be "established" when transmission of the genetic alteration is stable, which will be a minimum of two generations, and a welfare assessment has been completed. This marks the transition from "creation" to "breeding".

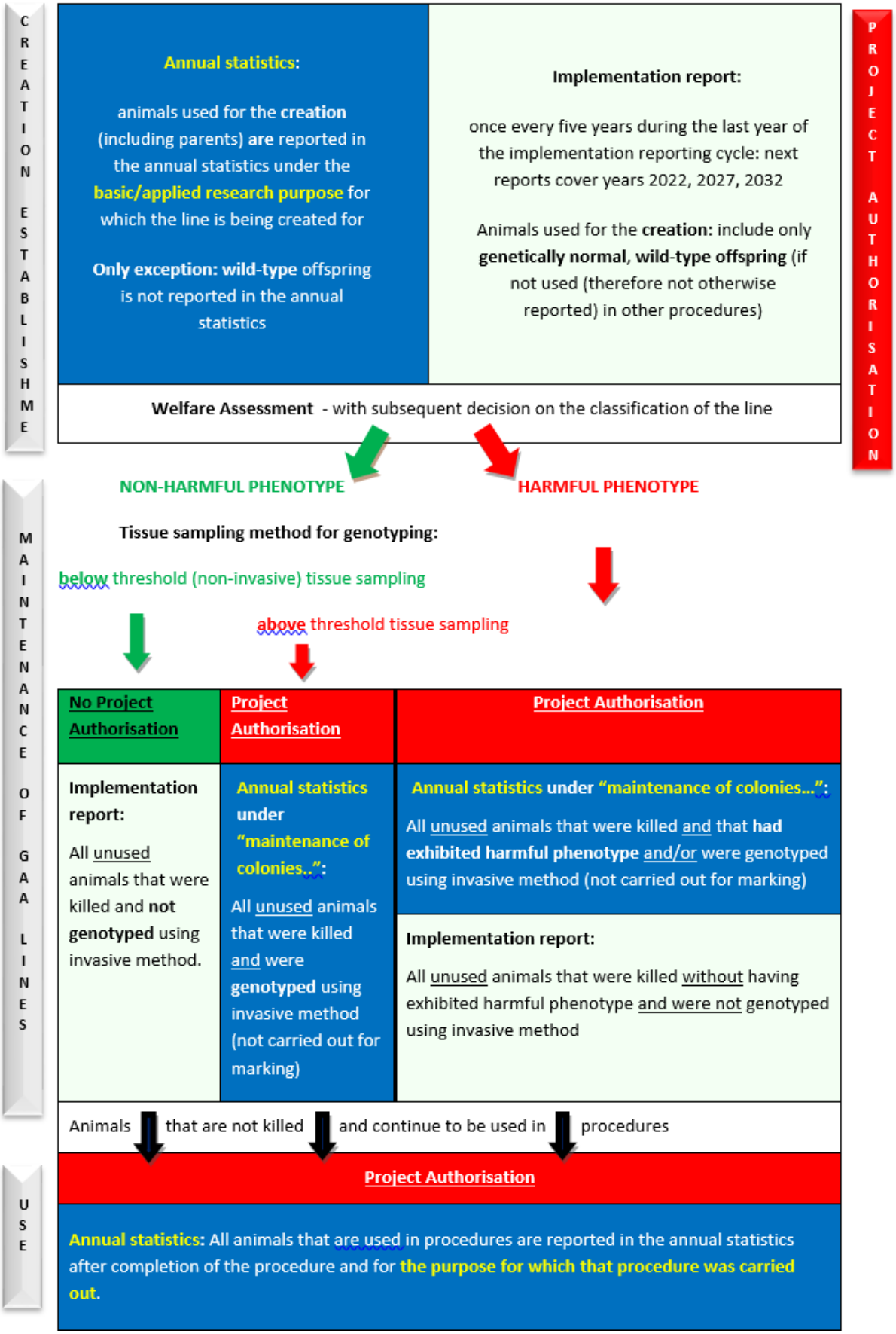
The welfare assessment determines if the newly established line is expected to have an *intended harmful phenotype (characteristic/trait)* i.e. an effect of genetic alteration that impacts negatively on an animal's health or welfare, such as muscle weakness, diabetes, tumour development.

If the welfare assessment concludes that the line is *not* expected to have a harmful phenotype, its breeding falls outside the scope of a procedure and is not reported in the annual statistics.

If the welfare assessment concludes that the line *is* expected to have a harmful phenotype, its breeding falls within the scope of a procedure. If this is the case, and if the animal is not used in other procedures and it has exhibited, before being killed, pain, suffering, distress of lasting harm as a result of the harmful phenotype, it is reported under the category *Maintenance of colonies of established genetically altered animals, not used in other procedures.*

Use in procedures (other than creation or maintenance of a genetically altered line)
All genetically altered animals which are used in procedures (not for the creation or maintenance of a genetically altered line) are reported under their respective purposes they were used for. These animals may or may not exhibit a harmful phenotype.

Diagram for the reporting of the creation, maintenance and use of genetically altered animals


CREATION ESTABLISHME
PROJECT AUTHORISATION
Annual statistics:
animals used for the creation (including parents) are reported in the annual statistics under the basic/applied research purpose for which the line is being created for
Only exception: wild-type offspring is not reported in the annual statistics
Implementation report:
once every five years during the last year of the implementation reporting cycle: next reports cover years 2022, 2027, 2032
Animals used for the creation: include only genetically normal, wild-type offspring (if not used (therefore not otherwise reported) in other procedures)
Welfare Assessment - with subsequent decision on the classification of the line
NON-HARMFUL PHENOTYPE
HARMFUL PHENOTYPE
MAINTENANCE OF GAA LINES
Tissue sampling method for genotyping:
below threshold (non-invasive) tissue sampling
above threshold tissue sampling
No Project Authorisation
Project Authorisation
Project Authorisation
Implementation report:
All unused animals that were killed and not genotyped using invasive method.
Annual statistics under "maintenance of colonies..":
All unused animals that were killed and were genotyped using invasive method (not carried out for marking)
Annual statistics under "maintenance of colonies...":
All unused animals that were killed and that had exhibited harmful phenotype and/or were genotyped using invasive method (not carried out for marking)
Implementation report:
All unused animals that were killed without having exhibited harmful phenotype and were not genotyped using invasive method
Animals that are not killed and continue to be used in procedures
USE
Project Authorisation
Annual statistics: All animals that are used in procedures are reported in the annual statistics after completion of the procedure and for the purpose for which that procedure was carried out.

Procedure

"Procedure" means any use, invasive or non-invasive, of an animal for experimental or other scientific purposes, with known or unknown outcome, or educational purposes, which may cause the animal a level of pain, suffering, distress or lasting harm equivalent to, or higher than, that caused by the introduction of a needle in accordance with good veterinary practice.
This includes any course of action intended, or liable, to result in the birth or hatching of an animal or the creation and maintenance of a genetically modified animal line in any such condition but excludes the killing of animals solely for the use of their organs or tissues.

Purposes - Main categories of purposes of uses for research, testing, routine production and education (including training)

Basic research

Basic research includes studies of a fundamental nature including physiology. Studies that are designed to add knowledge about normal and abnormal structure, functioning and behaviour of living organisms and environment, this includes fundamental studies in toxicology. Investigation and analysis focused on a better or fuller understanding of a subject, phenomenon, or a basic law of nature instead of on a specific practical application of the results.

Translational and applied research

Translational and applied research includes animals used for purposes as described in Article 5(b) and (c) of the Directive, that is to say,

"(b) translational or applied research with any of the following aims:

> *(i) the avoidance, prevention, diagnosis or treatment of disease, ill-health or other abnormality or their effects in human beings, animals or plants;*
>
> *(ii) the assessment, detection, regulation or modification of physiological conditions in human beings, animals or plants; or*
>
> *(iii) the welfare of animals and the improvement of the production conditions for animals reared for agricultural purposes;*

(c) for any of the aims in point (b) in the development, manufacture or testing of the quality, effectiveness and safety of drugs, foodstuffs and feed-stuffs and other substances or products;"
This category also includes discovery toxicology and investigations to *prepare* for the regulatory submission and method development. This does not include studies *required* for regulatory submissions.

Regulatory use

Regulatory uses cover the use of animals in procedures with a view to satisfying regulatory requirements, that is to say, for producing, placing and maintaining products/substances on the market, including safety and risk assessment for food and feed. It also includes tests carried out in respect of products/substances for which a regulatory submission was foreseen but ultimately not made, for instance because these were deemed unsuitable for the market by the developer and thus fail to reach the end of the development process.

Routine production

Routine production includes animals used in the manufacturing process of products such as antibodies and blood products including polyclonal antisera by established methods.

Protection of the natural environment in the interests of the health or welfare of human beings or animals

This category includes studies aimed at investigating and understanding phenomena such as environmental pollution, loss of biodiversity, and epidemiology studies in wild animals. This excludes any regulatory use of animals for ecotoxicology purposes.

Preservation of species

Studies aimed at conserving species, often those at risk of extinction, for example to investigate improved breeding strategies or preservation of habitats.

Higher education or training

This category covers the use of animals for the purposes of education for delivering theoretical knowledge within a higher education programme and also for the acquisition, maintenance or improvement of vocational skills.

Forensic enquiries

Studies to assist the investigation of forensic enquiries.

Severities experienced by the animals

The impact on animal welfare is reported by assigning an animal's experience to a 'severity' category – "mild", "moderate" or "severe". There is a further category termed "non-recovery" which relates to where animals are placed under general anesthesia before they are used and are killed afterwards before regaining consciousness.

The reported severity reflects the highest degree of pain, suffering, distress or lasting harm observed to be actually experienced by the animal during the course of its use. Further guidance on severity assessment can be found at http://ec.europa.eu/environment/chemicals/lab_animals/pdf/Endorsed_Severity_Assessment.pdf.

i. **Non-recovery -** Animals which have undergone a procedure that has been performed entirely under general anaesthesia from which the animal has not recovered consciousness shall be reported as Non-recovery.

ii. **Mild (up to and including)** - Animals which have undergone a procedure as a result of which the animals have experienced short-term mild pain, suffering or distress, as well as when there has been no significant impairment of the well-being or general condition of the animals shall be reported as Mild.

This category also includes any animals used in an authorised project, but which have ultimately *not* been observed to have experienced a level of pain, suffering, distress or lasting harm above the minimum threshold (equivalent to that caused by the introduction of a needle in accordance with good veterinary practice) for example untreated control animals ("up to mild"). However, animals required for the maintenance of colonies of genetically altered animals of established lines *with an intended harmful phenotype and which have not exhibited* pain, suffering, distress or lasting harm as a consequence of the harmful genotype are not reported in annual statistics.

iii. **Moderate** - Animals which have undergone a procedure as a result of which the animals have experienced short-term moderate pain, suffering or distress, or long-lasting mild pain, suffering or distress as well as procedures that have caused moderate impairment of the well-being or general condition of the animals shall be reported as Moderate.

iv. **Severe** - Animals which have undergone a procedure as a result of which the animals have experienced severe pain, suffering or distress, or long-lasting moderate pain, suffering or distress as well as procedures, that have caused severe impairment of the well-being or general condition of the animals shall be reported as Severe.

In the exceptional circumstances where, under the safeguard clause, the Severe classification is exceeded these animals and their use will be reported under Severe. Should this occur, further explanation on the circumstances of this use is provided in the respective Member State narrative.

Species of animals

The Directive applies to live non-human vertebrate animals, including independently feeding larval forms and fetal forms of mammals as from the last third of their normal development, and live cephalopods.
Larval forms and cephalopods are reported in the statistics when they become capable of independent feeding. Due to the small size of many larval forms of fish and cephalopod species, the count for these animals may be done on the basis of estimation.

The Three Rs

Replacement, reduction and refinement of the use of animals for scientific purposes.

Use and reuse

The "use" of an animal within a project extends from the time the procedure (or first procedure/technique in a series) is applied to it, to the time when the observations, or the collection of data (or other products) for a particular scientific purpose (usually a single experiment or test), are completed.
"Reuse" is a term to indicate any subsequent use of an animal, which has already completed a procedure (or series of procedures/techniques) for a particular scientific purpose. Article 16 of the Directive on reuse defines it as a use when a different animal on which no procedure has previously been carried out could also be used. Article 16 also defines the conditions under which an animal may be reused.

PART A: COMPILATION AND OVERVIEW OF THE EU DATA BETWEEN 2015 AND 2020

IV.1 Numbers of animals used for research, testing, routine production and educational purposes in the EU

This part focuses on the numbers of animals used *for the first time* in procedures for the purposes of research, testing, routine production and education. Therefore, it excludes all reuses of animals that are considered in the second part which reports on all uses of animals. It also excludes animals that are used either for the creation of new genetic altered lines or the maintenance of colonies of established genetically altered animal lines. However, animals used for research, testing, routine production and educational purposes can be conventional or genetically altered.

In addition to the numbers of animals, this part also provides information on the species in relation to their origin, and for non-human primates, information on progress to purpose-bred animals, by recording generation.

IV.1.1. Numbers of animals used for the first time

In 2020, the number of animals used for the first time in the Union is 7.34 million, including the data from Norway and without the United Kingdom.

	2018	2019	2020
Total	8,822,404	8,579,439	**7,938,064**

Table 4: Total numbers of animals used for the first time for research, testing, routine production and education purposes in EU-27 and Norway between 2018 and 2020

Table 4 above shows a decrease (-7.5%) of the total number of animals used for the first time between 2019 and 2020.

In 2020, the main species used for the first time for research, testing, routine production and educational purposes were mice, fish, rats and birds that together represented 91% of the total number of animals. Species of particular public concern (dogs, cats and non-human primates) represented 0.2% of the total number of animals. No great apes are used for scientific purposes in the European Union (Figure 6).

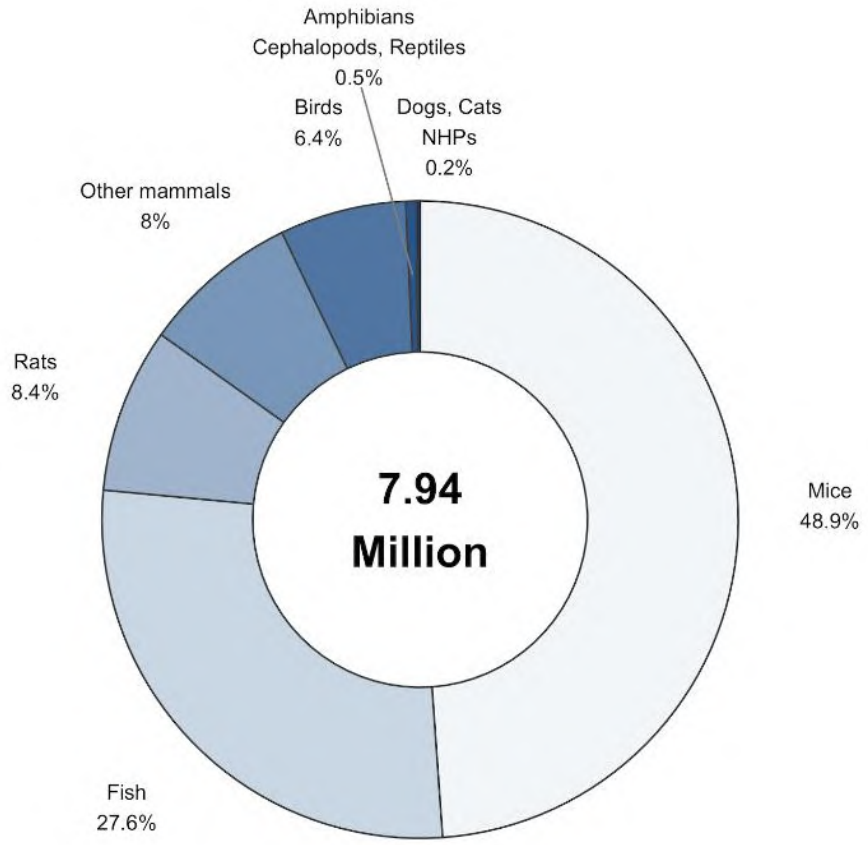


Figure 6: Numbers of animals used for the first time by main classes of species in 2020

The proportional distribution of species used for the first time evolved slightly compared to 2019 with an increase of the proportion of fish (+3%), other mammals (+1%) and rats (+1%) and a decrease of mice (-4%) while other categories remained stable in proportion (table 5).

	2018	2019	2020
Mice	4,410,737	4,318,913	**3,879,691**
Rats	829,906	792,744	**665,155**
Other mammals	644,370	639,348	**650,217**
Fish	2,470,851	2,267,777	**2,191,367**
Birds	436,316	498,218	**510,108**
Amphibians, Cephalopods, Reptiles	30,224	62,439	**41,526**
Total	**8,822,404**	**8,579,439**	**7,938,064**

Table 5: Numbers of animals used for the first time by main classes of species

For fish, the Directive distinguishes zebra fish (13% of fish in 2020) from other fish species. The main "other" fish species (1,91 million in 2020 - Table 7) was salmon with about 1 million first uses.

For birds, the Directive distinguishes domestic fowl (83% of birds in 2020) from other birds. The main species reported as "Other birds" (86,371 in 2020 – Table 7) were turkey and the Great Tit (*Parus major*).

In this context, it is important to note that from 2021 data onward, further species of fish and turkey have been added as separate categories to provide more detailed data and reduce the use of "other" categories.[14]

For amphibians, the Directive distinguishes rana (5% of amphibians in 2020) and xenopus (47% of amphibians in 2020) from other amphibians. The main species reported as "Other amphibians" (18,293) were axolotl (*Ambystoma mexicanum*), newt (*Pleurodeles waltl*) and agile frog (*Rana dalmatina*).

First uses of mammals in 2020 are reported in more detail in table 6 below. First uses of mammals decreased (-10%) compared to 2019.

	2018	2019	2020
Mice	4,410,737	4,318,913	**3,879,691**
Rats	829,906	792,744	**665,155**
Guinea-Pigs	123,486	111,652	**111,172**
Hamsters (Syrian)	9,397	10,427	**17,355**
Hamsters (Chinese)	20	17	**149**
Mongolian gerbil	4,269	3,672	**2,978**
Other rodents	19,534	28,273	**28,186**
Rabbits	332,097	342,644	**343,521**
Cats	1,517	2,140	**2,464**
Dogs	14,802	10,388	**8,716**
Other carnivores	5,308	5,780	**8,117**
Farm animals	122,746	114,777	**118,002**
Non-human primates	6,111	5,319	**4,784**
Other mammals	5,083	4,259	**4,773**
Total	**5,885,013**	**5,751,005**	**5,195,063**

Table 6: Numbers of animals used for the first time in the Mammal category

Farm animals include horses, donkeys and cross-breeds, pigs, goats, sheep and cattle. "Other carnivores" (8,117 in 2020) reported were mainly mink while "Other rodents" (28,186) included bank and common voles; and "Other mammals" (4,773) mainly bats.

[14] Commission Implementing Decision 2020/569/EU, Annex III

In 2020, the numbers of Horses, donkeys and cross-breeds used for the first time increased significantly (+176%), as well as hamsters (Syrian) (+66%) and "Other carnivores" (+59%), cattle (+16%) and cats (+15%). Uses of other species decreased: cephalopods (-90%), rana (-72%), other birds (-20%), Mongolian gerbils (-19%), rats (-16%), dogs (-16%), zebra fish (-16%), ferrets (-14%) and mice (-10%).

The number of non-human primates reported during the period decreased (-10%). Species used were prosimians, marmosets and tamarins, cynomolgus monkey, rhesus monkey, vervets (*chlorocebus spp*), and baboons. In line with the general ban on the use of great apes, introduced by the Directive, no such use was reported during the period 2015-2020.

	2018	2019	2020
Mice	4,410,737	4,318,913	**3,879,691**
Rats	829,906	792,744	**665,155**
Guinea-Pigs	123,486	111,652	**111,172**
Hamsters (Syrian)	9,397	10,427	**17,355**
Hamsters (Chinese)	20	17	**149**
Mongolian gerbil	4,269	3,672	**2,978**
Other rodents	19,534	28,273	**28,186**
Rabbits	332,097	342,644	**343,521**
Cats	1,517	2,140	**2,464**
Dogs	14,802	10,388	**8,716**
Ferrets	1,041	1,455	**1,250**
Other carnivores	4,267	4,325	**6,867**
Horses, donkeys and cross-breeds	1,626	1,388	**3,831**
Pigs	79,699	77,424	**73,509**
Goats	1,443	1,124	**998**
Sheep	17,398	15,782	**17,489**
Cattle	22,580	19,059	**22,175**
Prosimians	170	194	**54**
Marmoset and tamarins	289	142	**196**
Squirrel monkey	25	0	**0**
Other species of New World Monkeys (Ceboidea)	0	0	**0**
Cynomolgus monkey	5,349	4,741	**4,220**
Rhesus monkey	210	182	**227**
Vervets (Chlorocebus spp.)	16	25	**34**
Baboons	30	33	**53**
Other species of Old World Monkeys (Cercopithecoidea)	22	2	**0**
Other mammals	5,083	4,259	**4,773**
Domestic fowl	341,763	390,340	**423,737**
Other birds	94,553	107,878	**86,371**
Reptiles	1,544	1,972	**2,072**
Rana	3,563	6,169	**1,722**
Xenopus	14,074	17,386	**17,806**

Other amphibians	6,775	19,944	**18,293**
Zebra fish	259,468	318,426	**277,328**
Other fish	2,211,383	1,949,351	**1,914,039**
Cephalopods	4,268	16,968	**1,633**
Total	**8,822,404**	**8,579,439**	**7,938,064**

Table 7: Numbers of animals used for the first time by species

IV.1.2. Origin of animals used for the first time

The origin (place of birth) of animals is divided into two categories depending on whether the species belongs to the category of non-human primates or not. For non-human primates, more detailed information is collected on their origin (continent of origin) and in addition their generation is reported (see Part IV.1.2.2.2).

IV.1.2.1. Place of birth of animals (other than non-human primates)

In 2020, 84.1% of the animals used for scientific purposes for the first time were born in the Union at registered breeders[15] and 1.6% were born outside of the Union (either in the rest of Europe or outside of Europe). Categories of animals born in the Union but not at a registered breeder includes animals from, for example, farms, and studies carried out using wild animals, especially wild fish (Figure 7).

[15] This includes animals born at registered breeders in Norway authorised under the conditions of Directive 2010/63/EU.

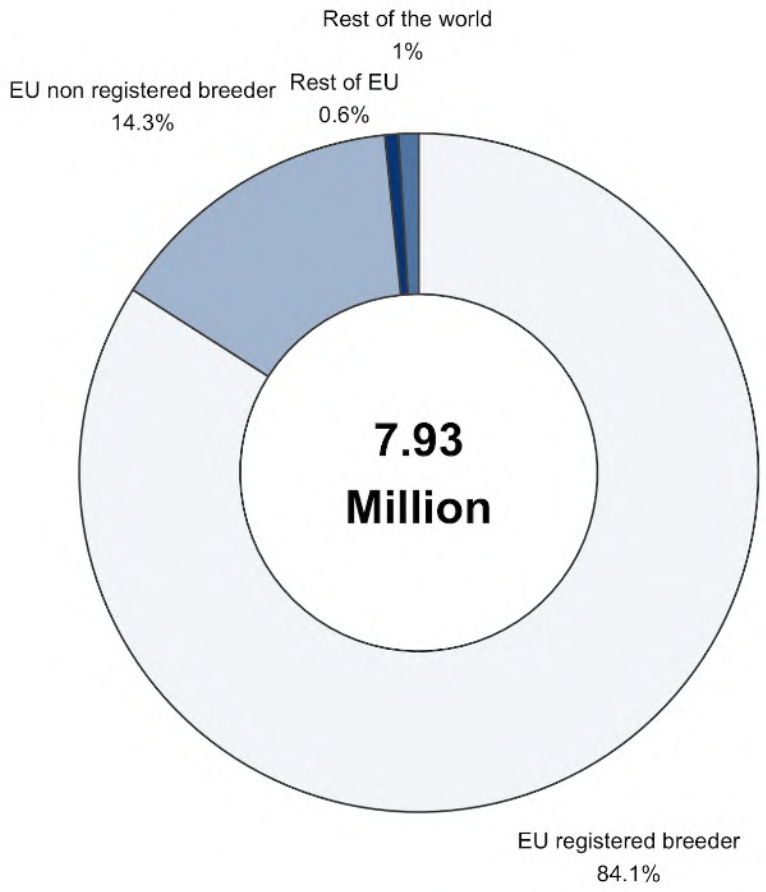


Figure 7: Place of birth of animals other than non-human primates in 2020

In 2020, the place of birth of animals other than non-human primates remained stable. Compared to data including United Kingdom reporting, there is no significant change either.

	2018	2019	2020
Animals born in the EU at a registered breeder	88% (7,742,669)	85% (7,283,376)	**84% (6,668,758)**
Animals born in the EU but not at a registered breeder	9% (785,668)	14% (1,161,131)	**14% (1,137,778)**
Animals born in rest of Europe	2% (208,244)	1% (67,351)	**1% (50,783)**
Animals born in rest of world	1% (79,712)	1% (62,262)	**1% (75,961)**
Total	**100% (8,816,293)**	**100% (8,574,120)**	**100% (7,933,280)**

Table 8: Place of birth of animals other than non-human primates

Annex I of the Directive contains a list of animals that may only be used where those animals have been bred for use in procedures (see Article 10). Figure 8 shows all the animal species listed in Annex I, except non-human primates.

In 2020, amongst the species listed in Annex I, rodents, rabbits and zebra fish were, for the vast majority, born at EU-registered breeders (Figure 8). Cats (49%), dogs (37%) and to a lesser extent frogs (29%) had a higher proportion of animals born in the Union but at a non-registered breeder (Part B – Table 2). The most common reason for using dogs and cats that came from non-registered breeders in the Union were procedures in pet dogs and cats, which had blood samples taken for studies of genetic disorders, or pet animals, which were involved in patient studies for better treatment methods.

22% of dogs, 11% of hamsters (Syrian), 9% of cats, and 6% of frogs were imported from the rest of the world (Part B – Table 2).

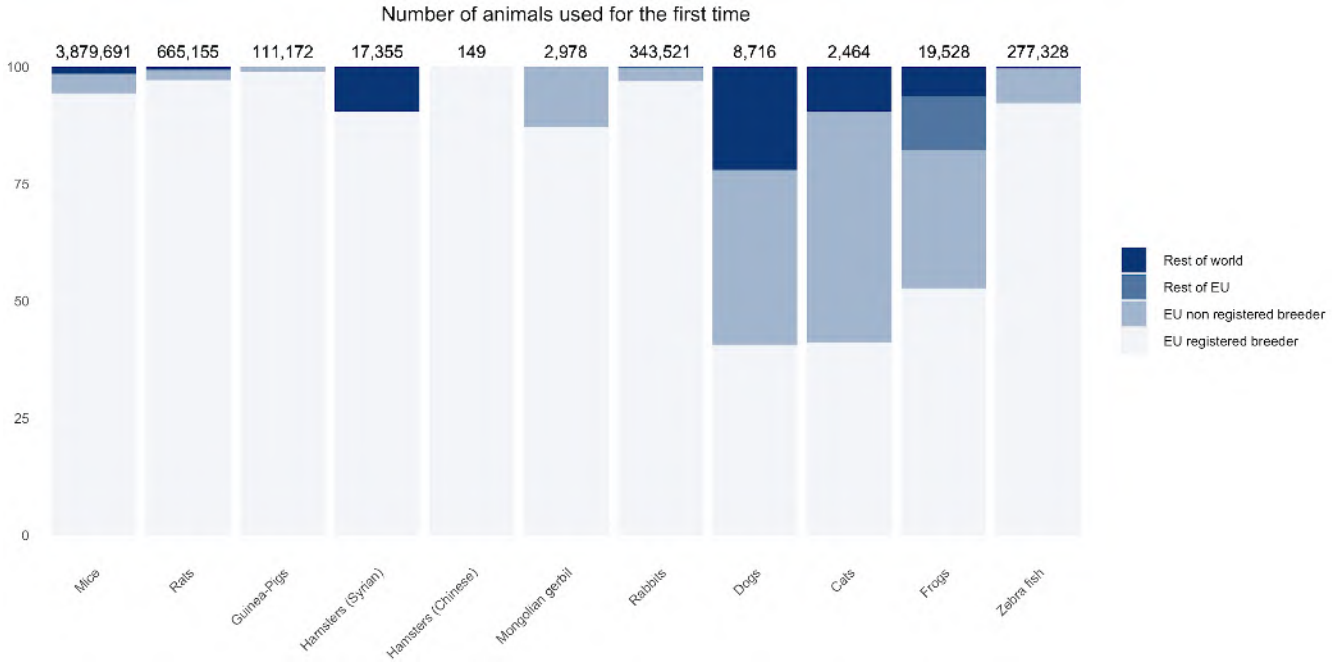


Figure 8: Place of birth of animals other than non-human primates listed in Annex I in 2020

IV.1.2.2. Origin of non-human primates

The Directive provides additional protection for non-human primates due to their genetic proximity to human beings, their highly developed social skills and capacity to experience pain, suffering and distress. Furthermore, the Directive recognises that the capture of non-human primates from the wild is highly stressful for the animals concerned and carries an elevated risk of injury and suffering during capture and transport. In order to end the capture of animals from the wild including for the purposes of breeding, the Directive introduced provisions with the objective of moving towards using non-human

primates that have been bred, ultimately, in self-sustaining colonies, from parents who themselves have been bred in captivity (see Article 10 of the Directive).

In order to monitor progress, more detailed information is collected on both the origin and generation of non-human primates used in scientific procedures in the Union.

IV.1.2.2.1. Non-human primates - Source

In 2020, the three main sources of non-human primates were Africa, Asia and EU-registered breeders represented 94.4% of non-human primates used for scientific purposes (Figure 9).

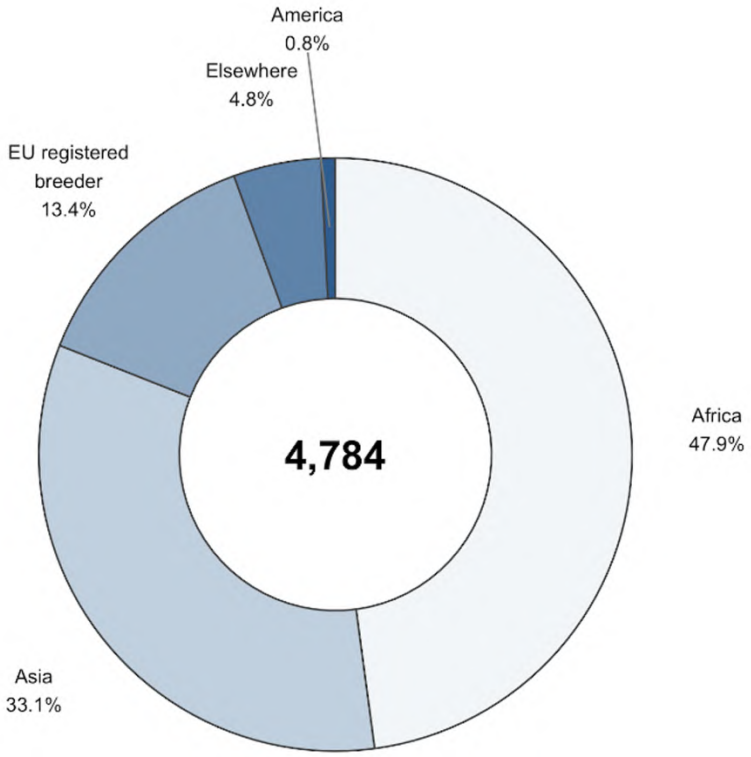


Figure 9: Source of non-human primates in 2020

In 2020, cynomolgus monkeys represented 88% of non-human primates used for the first time. These were sourced almost entirely from outside of the Union (Table 9). In contrast, other species of non-human primates were mainly sourced from EU-registered breeders with the exception of Vervet (*Chlorocebus spp*).

	Animals born at a registered breeder within EU	Animals born in rest of Europe	Animals born in Asia	Animals born in America	Animals born in Africa	Animals born elsewhere	Total

Prosimians	100% (54)	<1% (0)	<1% (0)	<1% (0)	<1% (0)	<1% (0)	**100% (54)**
Marmoset and tamarins	99% (195)	1% (1)	<1% (0)	<1% (0)	<1% (0)	<1% (0)	**100% (196)**
Cynomolgus monkey	4% (155)	<1% (0)	37% (1,573)	<1% (0)	54% (2,291)	5% (201)	**100% (4,220)**
Rhesus monkey	82% (186)	<1% (0)	5% (11)	1% (2)	<1% (0)	12% (28)	**100% (227)**
Vervets (Chlorocebus spp.)	<1% (0)	<1% (0)	<1% (0)	100% (34)	<1% (0)	<1% (0)	**100% (34)**
Baboons	100% (53)	<1% (0)	<1% (0)	<1% (0)	<1% (0)	<1% (0)	**100% (53)**
Total	**13% (643)**	**<1% (1)**	**33% (1,584)**	**1% (36)**	**48% (2,291)**	**5% (229)**	**100% (4,784)**

Table 9: Source of non-human primates by species in 2020

IV.1.2.2.2. Non-human primates - Generation

With regard to the generation of non-human primates bred in captivity in 2020, the majority of non-human primates were sourced either as second or higher generation purpose-bred (76%) or from self-sustaining colonies (6%). No non-human primates have been sourced from the wild since 2017 (Table 10).

	2015	2016	2017	2018	2019	2020
Self-sustaining colony	23% (1,112)	11% (532)	15% (877)	16% (959)	21% (1,142)	**6% (297)**
F2 or greater	41% (2,016)	57% (2,734)	63% (3,781)	67% (4,108)	64% (3,395)	**76% (3,622)**
F1	36% (1,773)	32% (1,528)	23% (1,362)	17% (1,044)	15% (782)	**18% (865)**
F0	<1% (1)	<1% (5)	<1% (0)	<1% (0)	<1% (0)	**<1% (0)**
Total	**100% (4,902)**	**100% (4,799)**	**100% (6,020)**	**100% (6,111)**	**100% (5,319)**	**100% (4,784)**

Table 10: Generation of non-human primates 2015-2020

In 2020, the proportion of non-human primates coming from self-sustaining colonies decreased (-15% in proportion) compared to 2019. The proportion of those being second or higher generation purpose-bred increased further (+12%) while first-generation purpose-bred increased as well (+3%).

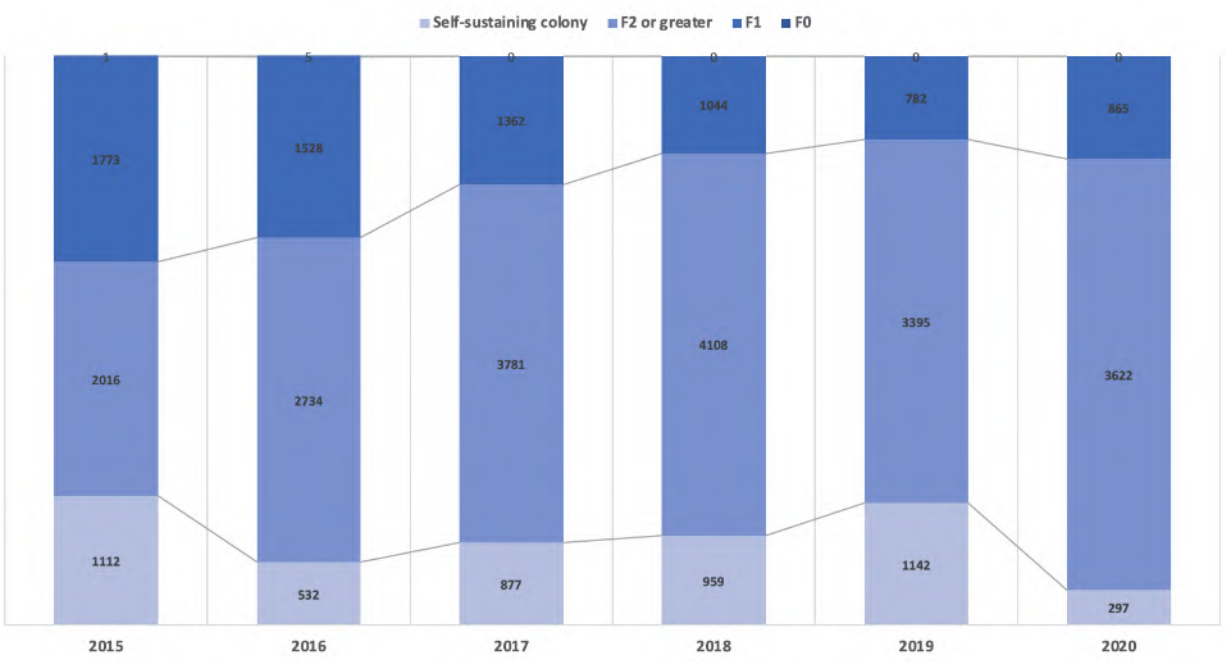


Figure 10: Evolution of the repartition of generation of non-human primates between 2015 and 2020

Looking at different non-human primate species and their generation:

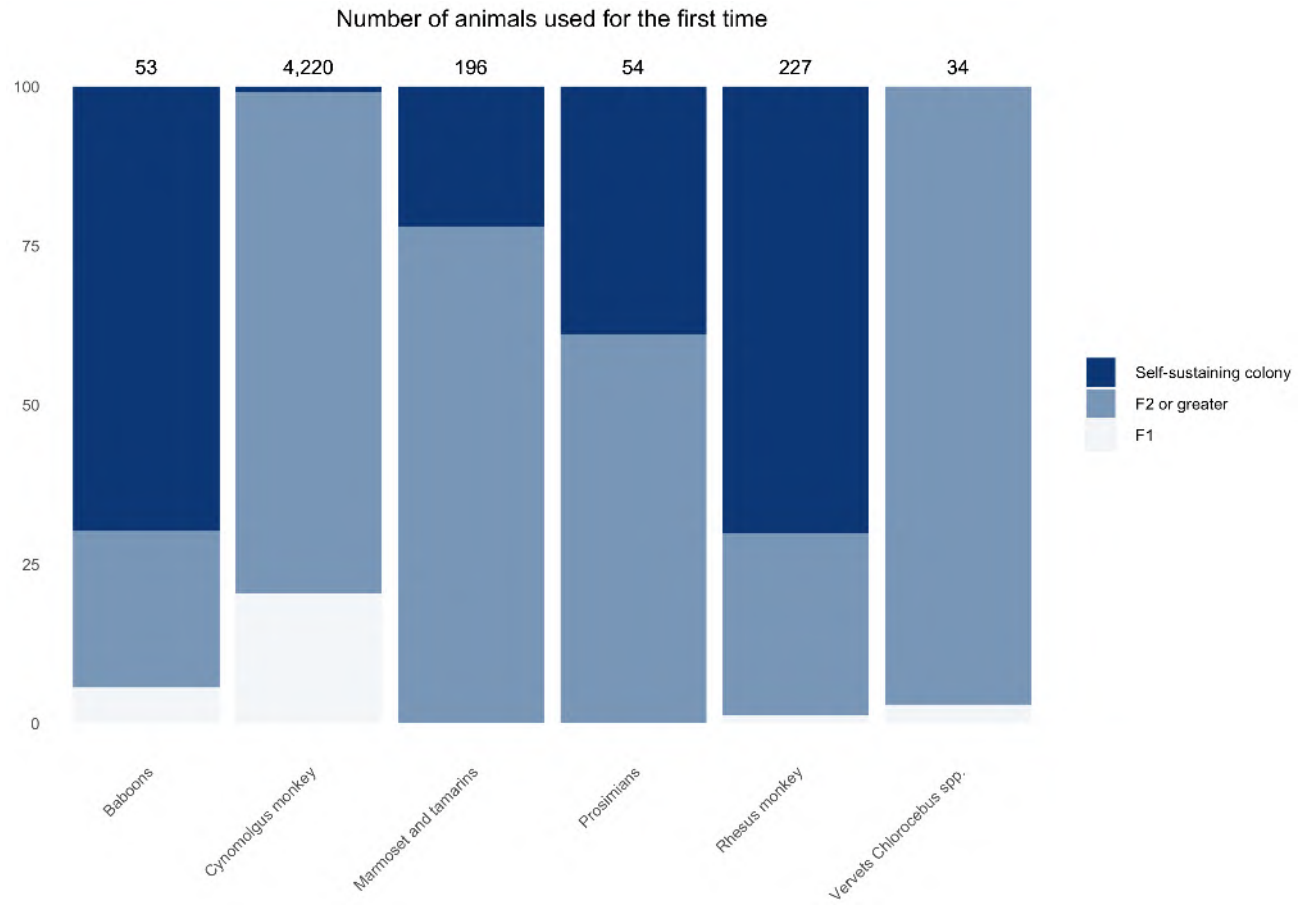


Figure 11: Generation of non-human primates by species in 2020

For non-human primates born at a registered breeder in the Union, in America or in Asia, less than 10% of non-human primates used for the first time were from the first generation. In Africa, first generation animals represented 26% and first generation non-human primates from elsewhere represented 48% (Table 11) in 2020.

	Animals born at a registered breeder within EU	Animals born in rest of Europe	Animals born in Asia	Animals born in America	Animals born in Africa	Animals born elsewhere
F2 or greater	51% (329)	100% (1)	92% (1,455)	97% (35)	74% (1,684)	52% (118)
Self-sustaining colony	45% (287)	<1% (0)	<1% (3)	<1% (0)	<1% (7)	<1% (0)
F1	4% (27)	<1% (0)	8% (126)	3% (1)	26% (600)	48% (111)
Total	**100% (643)**	**100% (1)**	**100% (1,584)**	**100% (36)**	**100% (2,291)**	**100% (229)**

Table 11: Generation of non-human primates by source in 2020

Until (and including) this 2020 report, the generation of non-human primates have included a sub-category 'self-sustaining colony'. However, animals that have been obtained from self-sustaining colonies may have also included F1 animals. Furthermore, the term 'self-sustaining colony' has not been understood in a uniform manner by all non-human primate breeders/suppliers, and this understanding may have changed over time resulting in some fluctuation in numbers.

From 2021, the reporting of whether a non-human primate is sourced from a self-sustaining colony will be separated from the reporting of generation. Moreover, a clarification on the understanding of the term 'self-sustaining colony' for the purposes of accurate reporting under the Directive was disseminated among users, breeders and suppliers of non-human primates, including from overseas, in 2022. As a result of these changes, the accuracy of reporting is expected to improve in the coming years.

IV.2. Details of all uses of animals for research, testing, routine production and educational purposes in the EU

This part focuses on all uses of animals for the purposes of research, testing, routine production and education, including the first and any subsequent reuse. It provides detailed information on the reason for use (for example the specific research area, or type of testing) as well as additional information related to the actual severity experienced by the animals, their genetic status and reuse. In addition, information on the use of animals to satisfy regulatory requirements is collected.

IV.2.1. Overview of the main scientific purposes and the related severities

In 2020, the total number of all uses (first use and any subsequent reuse) for the purposes of research, testing, routine production and education is 8,1 million. This is a decrease of 8% since 2019.

	2018	2019	2020
Total	8,979,081	8,715,224	**8,054,930**

Table 12: Total number of uses of animals between 2018 and 2020

IV.2.1.1. Main categories of scientific purposes

In 2020, 8.05 million uses of animals were reported for scientific purposes in the Union and Norway.

Most uses were conducted for research purposes (72.1%) with 40.9% of the uses being carried out for basic research and 31.2% for translational and applied research purposes. A further 18% of animal uses in procedures were carried out for regulatory use to satisfy regulatory requirements, followed by routine production (5.5%).

Other categories (5.1%) include the protection of the natural environment in the interest of the health or welfare of human beings or animals, the preservation of species, the higher education or training for the acquisition, maintenance or improvement or vocational skills and forensic enquiries (Figure 12).

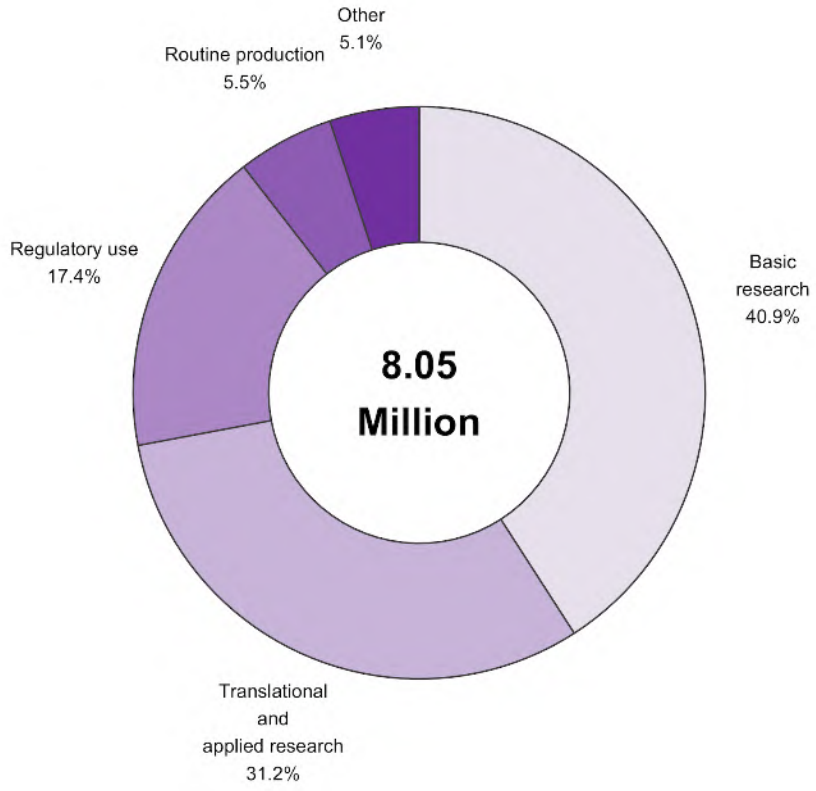


Figure 12: Uses of animals used for scientific purposes in 2020

In 2020, the number of uses for preservation of species decreased (-53%) as well as those used for the purposes of higher education or training for the acquisition, maintenance or improvement of vocational skills purposes (-32%), basic research (-13%), routine production (-7%) and regulatory uses (-5%). Protection of the natural environment in the interest of the health or welfare of human beings or animals (+10%) was the only category showing an increase. (Table 13).

	2018	2019	2020
Basic research	3,982,963	3,668,904	**3,293,349**
Translational and applied research	2,650,730	2,535,951	**2,510,499**
Regulatory use	1,622,816	1,482,372	**1,404,240**
Routine production	354,209	438,236	**406,860**
Higher education or training for the acquisition, maintenance or improvement of vocational skills	165,110	160,544	**109,334**
Protection of the natural environment in the interests of the health or welfare of human beings or animals	119,297	203,939	**224,485**
Preservation of species	83,683	224,921	**106,058**
Forensic enquiries	273	357	**105**
Total	**8,979,081**	**8,715,224**	**8,054,930**

Table 13: Uses of animals by main scientific purposes

IV.2.1.2. Severity of uses

Directive 2010/63/EU requires the reporting of the actual severity experienced by each animal when used for scientific purposes. In 2020, 49%, of uses, were reported as 'mild' (up to and including), 37% as 'moderate', and 10% as 'severe'. 4% of uses were reported as 'non-recovery'.

Compared to 2019, the number of uses reported as non-recovery decreased proportionally in 2020 (-2%) while those having resulted in moderate severity increased (+3%) (Table 14).

Since the actual severities are linked to the type of uses, and the use patterns vary between Member States, it is not advisable to compare overall actual severities between Member States. As an example, a Member State with high proportion of animal use for the purposes of regulatory testing is likely to have higher proportion of severe uses compared to another Member State having mainly uses in the areas of education and training.

	2018	2019	2020
Non-recovery	6% (521,765)	6% (494,368)	**4% (330,392)**
Mild [up to and including]	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% (8,979,081)**	**100% (8,715,224)**	**100% (8,054,930)**

Table 14: Severity of uses

In 2020, when looking at high level purposes, most of the uses reported as severe were conducted for regulatory purposes (15% of regulatory uses), while preservation of species and education and training were mostly mild. Uses in translational and applied research tended to be more severe than those reported in basic research (Figure 13).

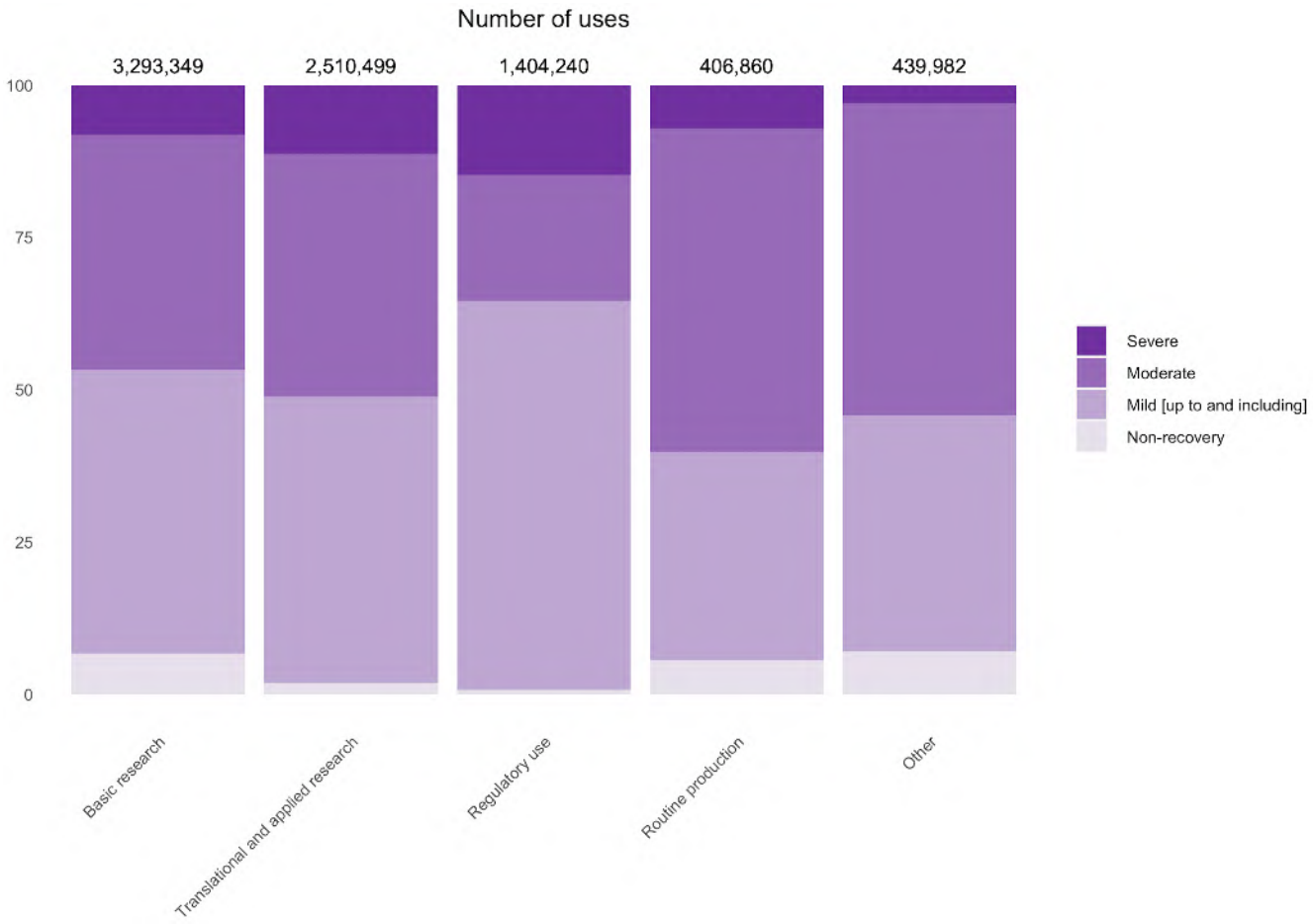


Figure 13: Uses of animals by severity and main categories of scientific purposes in 2020

When analysing all the sub-categories of purposes, batch potency testing resulted in the highest number of severe uses (134.000 uses - Figure 19), followed by animal diseases and disorders (112.000 - Figure 16) studies on nervous system (84.000 uses - Figure 15) and immune system (over 67.000 uses - Figure 15). Of the purposes listed above, it is important to note that whilst resulting in the highest number of severe uses, batch potency testing severe uses decreased by 23% since 2019.

When analysing the proportion of severe uses within a sub-category with more than 30,000 uses: acute toxicity in the area of ecotoxicity (42% – Figure 22), production of monoclonal antibodies (34% –

Figure 25), diagnostics of diseases (31% – Figure 16) and human infectious disorders (24% – Figure 16) have the highest proportion of sever uses.

Taking into account sub-categories with more than 25,000 uses, the lowest severities (severe uses below 1% of all uses within the sub-category) can be found in target animal safety (less than 0.1% of 28.000 uses – Figure 19), followed by production of blood-based products (0.1% of 229.000 uses – Figure 25), animal welfare (less than 0.1% of 688,000 uses – Figure 26) and kinetics (less than 0.1% of 44,000 uses – Figure 19)

IV.2.1.3. Main animal species used by high level purpose categories

In 2020, the main species used in basic research were mice (63%), other fish (16%), zebra fish (6%), rats (6%) and domestic fowl (4%). Similar species feature for applied and translational research with proportionally mice (44%), other fish (40%) and rats (6%).

For regulatory use, the distribution changes again slightly with mice covering only less than half (42%), followed by rats (22%), domestic fowl (11%), guinea-pigs (7%), other fish (6%) and rabbits (5%). Proportions remain similar compared with 2019.

Routine production has a relatively different pattern compared with the other purpose groups, with rabbits accounting for more than half (60%), followed by mice (25%), domestic fowl (6%) and other birds (3%) (Part B – Table 5).

When looking at different groups of species and the likely purposes they will be used for, other mammals (bats), other carnivores (minks), fish, mice, amphibians, cephalopods, reptiles and rodents are most likely to be used in basic research. Rabbits, farmed species and birds are mostly used in routine production and finally guinea-pigs, non-human primates and rats for regulatory purposes (Figure 14).

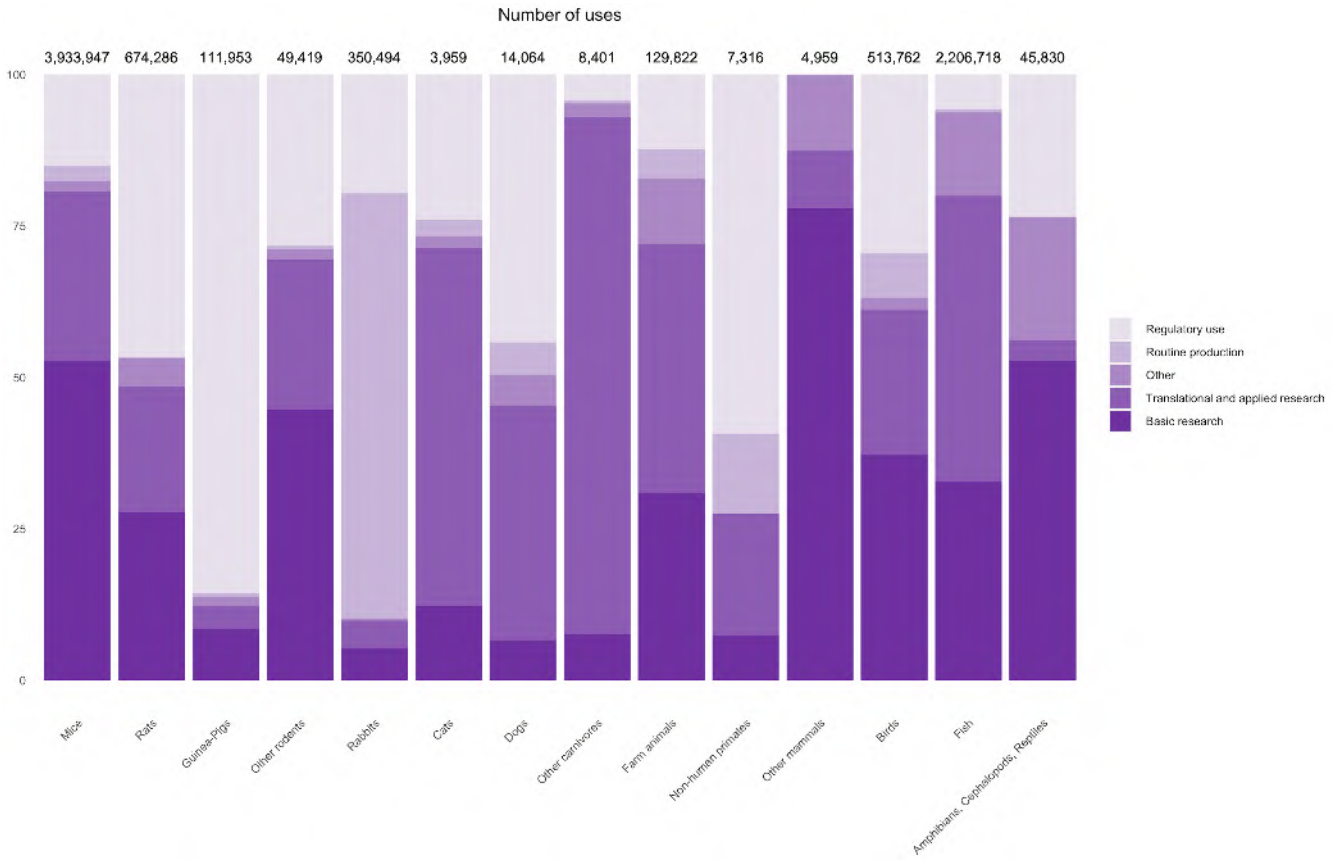


Figure 14: Uses of animals grouped by main classes of species and the main scientific purpose categories in 2020

Looking at the details of the uses of non-human primates, 59% are to satisfy regulatory requirements for medicinal products for human use (of these 71% are on studies for repeated dose toxicity and 15% for kinetics). In the areas of basic and applied research, non-human primates are mainly used for studying human infectious disorders (11% of all non-human primate uses) and other basic research (4%). Routine production, of mostly blood based products represents 13% of non-human primate uses.

The actual reported severities of uses of non-human primates are lower than the Union averages for all species. In 2020, 53% were of mild severity. Only 2.5% of uses were assessed as severe, slightly higher than in 2019.

IV.2.2. Detailed information on use purposes

IV.2.2.1. Research related uses

Research-related uses are split between basic research on one side and translational and applied research on the other. Results on these purpose categories are presented with information on related reported actual severities.

IV.2.2.1.1 Basic research

Basic research was the main area for which animals were used with more than 3.29 million uses in 2020 which is a decrease compared to 2019 (-10%).

The three main domains of basic research using most animals are nervous system, ethology / animal behaviour / animal biology and immune system that all together account for more than half of the uses in basic research (Figure 15).

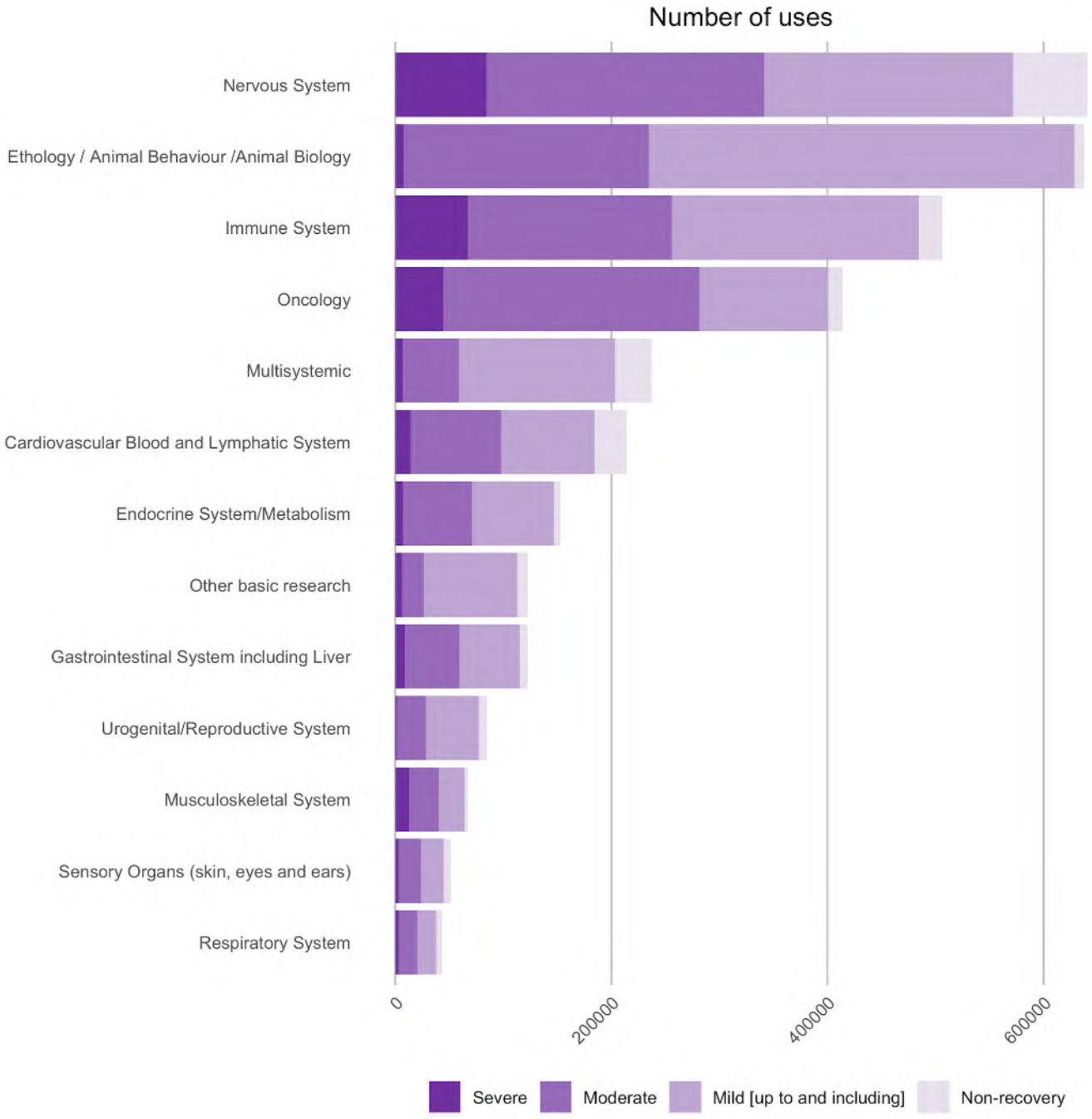


Figure 15: Basic research related uses by type of research and severity in 2020

In 2020, all categories decreased with the exception of multisystemic (+35%). Most important decreases took place in other basic research (-44%), musculoskeletal system (-25%), endocrine system/metabolism (-15%), respiratory system (-15%) and nervous system (-13%) (Table 15).

In 2020, in the area of basic research, proportionally highest severities were reported in following sub-categories: musculoskeletal system (19%), nervous system (13%), immune system (13%) and oncology (11%).

Proportionally lowest severities were reported for urogenital/reproductive system, ethology/ animal behaviour/animal biology, and multisystemic (Figure 15).

	2018	2019	2020
Nervous System	687,420	738,363	**640,405**
Ethology / Animal Behaviour /Animal Biology	988,510	724,065	**637,819**
Immune System	547,768	528,229	**506,177**
Oncology	432,191	446,116	**414,164**
Multisystemic	309,585	175,765	**236,967**
Cardiovascular Blood and Lymphatic System	254,931	240,688	**213,763**
Endocrine System/Metabolism	187,421	180,441	**152,863**
Gastrointestinal System including Liver	141,132	219,381	**122,670**
Other basic research	168,043	131,664	**122,515**
Urogenital/Reproductive System	83,859	84,852	**84,777**
Musculoskeletal System	76,753	89,109	**66,665**
Sensory Organs (skin, eyes and ears)	52,418	59,362	**51,324**
Respiratory System	52,932	50,869	**43,240**
Total	**3,982,963**	**3,668,904**	**3,293,349**

Table 15: Basic research related uses by type of research

"Other basic research" includes, for example, studies on nutrition, parasitology, antibodies production. It is important to note in this context that from 2021 data onward, the uses under developmental biology will be reported separately.[16]

[16] Commission Implementing Decision 2020/569/EU, Annex III

IV.2.2.1.2. Translational and applied research

Translational and applied research accounted for about 2.51 million uses of animals in 2020, a slight decrease compared to 2019 (-1%).

The five main areas of translational and applied research were animal welfare, animal diseases and disorders, human cancer, human nervous and mental disorders and human infectious disorders.

Animal welfare (+235%) and human musculoskeletal disorders (+14%) showed an increase, while animal diseases and disorders (-41%), human endocrine/metabolism disorders (-27%), human sensory organ disorders (skin, eyes and ears) (-21%), human nervous and mental disorders (-19%), human urogenital/reproductive disorders (-18%), human gastrointestinal disorders including liver (-14%), human infectious disorders (-14%) and diagnosis of diseases (-11%) had a decrease of uses.

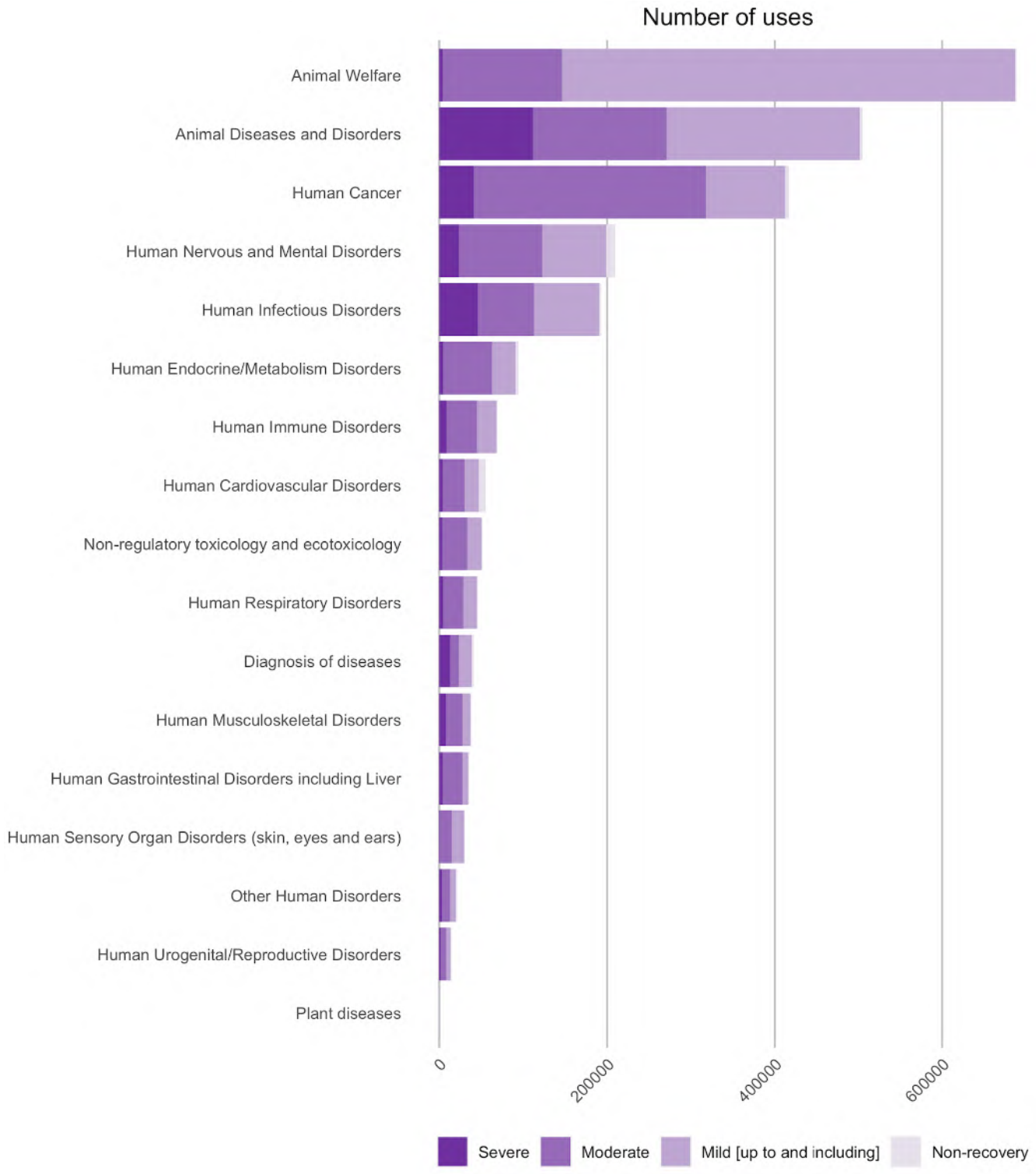


Figure 16: Translational and applied research related uses by type of research and severity in 2020

In 2020, in the area of translational and applied research, proportionally highest severities were reported in the following sub-categories: diagnosis of diseases (30%), human infectious disorders (24%), animal diseases disorders (22%), human musculoskeletal disorders (19%), and other human disorders (15%).

Proportionally lowest severities were reported for plant diseases, animal welfare, human sensory organ disorders (skin, eyes and ears) and human endocrine/ metabolism disorders (Figure 16).

	2018	2019	2020
Animal Welfare	137,426	205,137	**688,564**
Animal Diseases and Disorders	937,444	850,073	**505,383**
Human Cancer	450,538	439,884	**416,399**
Human Nervous and Mental Disorders	259,148	257,900	**209,497**
Human Infectious Disorders	190,731	224,597	**192,464**
Human Endocrine/Metabolism Disorders	115,102	128,928	**94,337**
Human Immune Disorders	85,686	68,609	**69,893**
Human Cardiovascular Disorders	66,479	60,283	**55,682**
Non-regulatory toxicology and ecotoxicology	60,432	54,879	**51,292**
Human Respiratory Disorders	54,579	46,101	**46,248**
Diagnosis of diseases	143,637	45,873	**40,999**
Human Musculoskeletal Disorders	38,092	33,562	**38,250**
Human Gastrointestinal Disorders including Liver	37,868	41,399	**35,462**
Human Sensory Organ Disorders (skin, eyes and ears)	35,175	38,339	**30,289**
Other Human Disorders	26,505	22,744	**21,316**
Human Urogenital/Reproductive Disorders	11,850	17,535	**14,318**
Plant diseases	38	108	**106**
Total	**2,650,730**	**2,535,951**	**2,510,499**

Table 16: Translational and applied research related uses by type of research

"Other Human Disorders" (-6%) includes areas such as inflammatory diseases, pharmacokinetics, radiation and aging prevention.

IV.2.2.2. Uses of animals for regulatory purposes

Regulatory uses cover the use of animals in procedures with a view to satisfying regulatory requirements, that is to say for producing, placing and maintaining products/substances on the market,

including safety and risk assessment for food and feed. It also includes tests carried out on products/substances for which a regulatory submission was foreseen but ultimately not made, for instance because these were deemed unsuitable for the market by the developer and thus failed to reach the end of the development process. Compared to 2019, the total number of uses for regulatory purposes decreased (-5%).

In 2020, regulatory uses accounted for 1.4 million uses. 54% of these uses were related to quality control (including batch safety and potency testing), 40% related to toxicity and other safety testing including pharmacology and the remainder (6%) were for other efficacy and tolerance testing (Table 17).

	2018	2019	2020
Quality control (incl. batch safety and potency testing)	942,127	824,563	**759,732**
Toxicity and other safety testing including pharmacology	583,886	569,572	**555,936**
Other efficacy and tolerance testing	96,803	88,237	**88,572**
Total	**1,622,816**	**1,482,372**	**1,404,240**

Table 17: Regulatory uses by main types of uses

IV.2.2.2.1. Details of the regulatory use purposes

IV.2.2.2.1.1. Quality control related uses

Quality control includes uses of animals in the testing of purity, stability, efficacy, potency and other quality control parameters product (and its constituents) such as vaccines, and any controls carried out during the manufacturing process for registration purposes, to satisfy any other national or international regulatory requirements or to satisfy the in-house policy of the manufacturer.

Quality control related uses represented around 759,000 uses in 2020. A large majority of these uses were related to batch potency-testing purposes (76%).

With more than 134,000 severe uses, batch potency testing was the most severe type of procedure, representing 17% of all severe uses in the Union (Figure 17). Pyrogenicity testing is the least severe with less than 1% of severe uses.

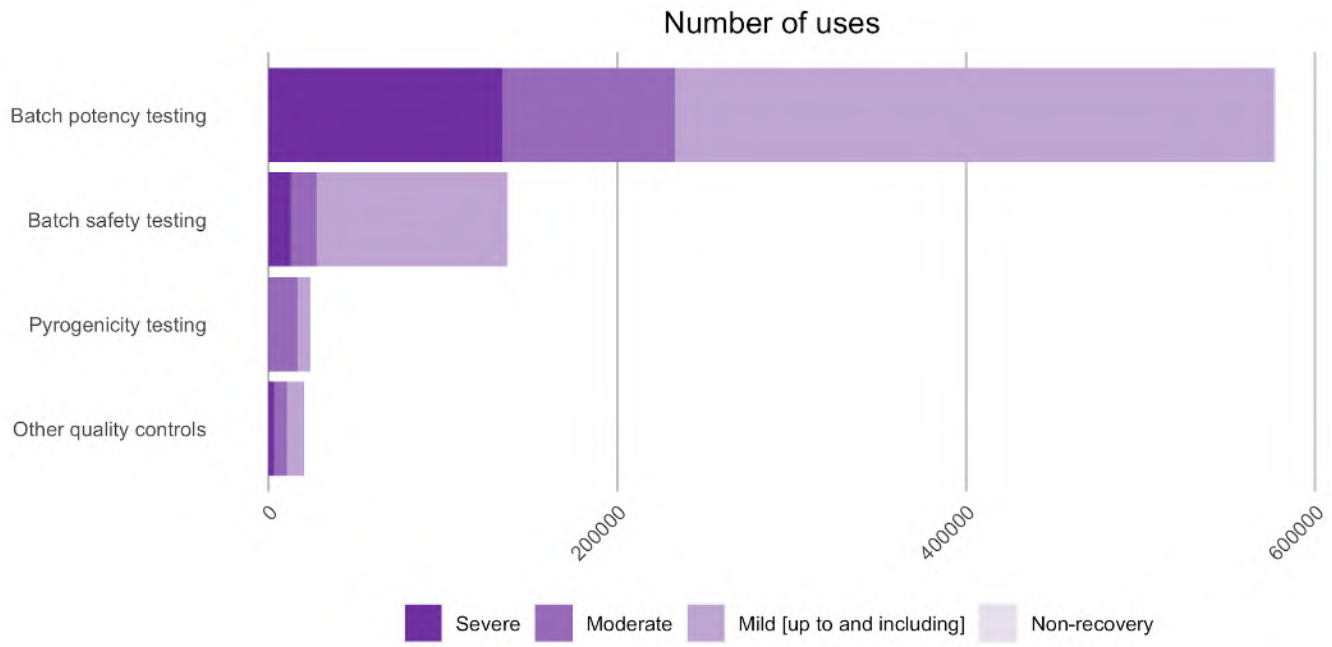


Figure 17: Quality control related uses by type of use and severity in 2020

In 2020, pyrogenicity testing decreased (-21%) as well as batch potency testing (-10%) and other quality control related uses (-7%) (Table 18). Batch safety testing (+7%) increased.

"Other quality controls" are related for example to cell lines pathogenicity tests or product purity.

	2018	2019	2020
Batch potency testing	752,958	643,369	**577,534**
Batch safety testing	137,324	128,459	**137,518**
Pyrogenicity testing	29,815	30,687	**24,139**
Other quality controls	22,030	22,048	**20,541**
Total	**942,127**	**824,563**	**759,732**

Table 18: Quality control related uses by type of use

Between 2019 and 2020, pyrogenicity testing, for which alternative methods (applicable to most use cases) are available, decreased significantly (-21%) (Table 18) continuing the previously observed downward trend despite of the temporary increase in 2019. In 2020, these uses are reported mainly by four countries covering 93% of all pyrogenicity testing, namely France (43%), Spain (29%), Germany (13%) and Italy (8%).

IV.2.2.2.1.2. Toxicity and other safety testing including pharmacology

Toxicity and other safety testing (including safety evaluation of products and devices for human medicine and dentistry and veterinary medicine) covers studies carried out on any product or substance to determine its potential to cause any dangerous or undesirable effects in humans or animals as a result of its intended or abnormal use, manufacture or as a potential or actual contaminant in the environment.

Toxicity and other safety testing including pharmacology represented just below 556,000 uses of animals in 2020, which corresponds to 7% of all uses of animals.

Most of the uses in this area were related to ecotoxicity, developmental toxicity, repeated dose toxicity, reproductive toxicity and pharmaco-dynamics.

In 2020, proportionally highest severities were reported in the following sub-categories: acute and sub-acute toxicity (28%), ecotoxicity (24%), safety testing in food and feed area (19%), eye irritation/corrosion (13%) and neurotoxicity (10%). Concerning eye irritation/corrosion, it is important to note that this concerns only very few uses, less than 500. Since alternative methods are available for this endpoint, these tests are likely to have been carried out on substances which are not within the applicability domain of the alternative methods.

Proportionally lowest severities were reported for phototoxicity, genotoxicity, target animal safety and kinetics (Figure 19).

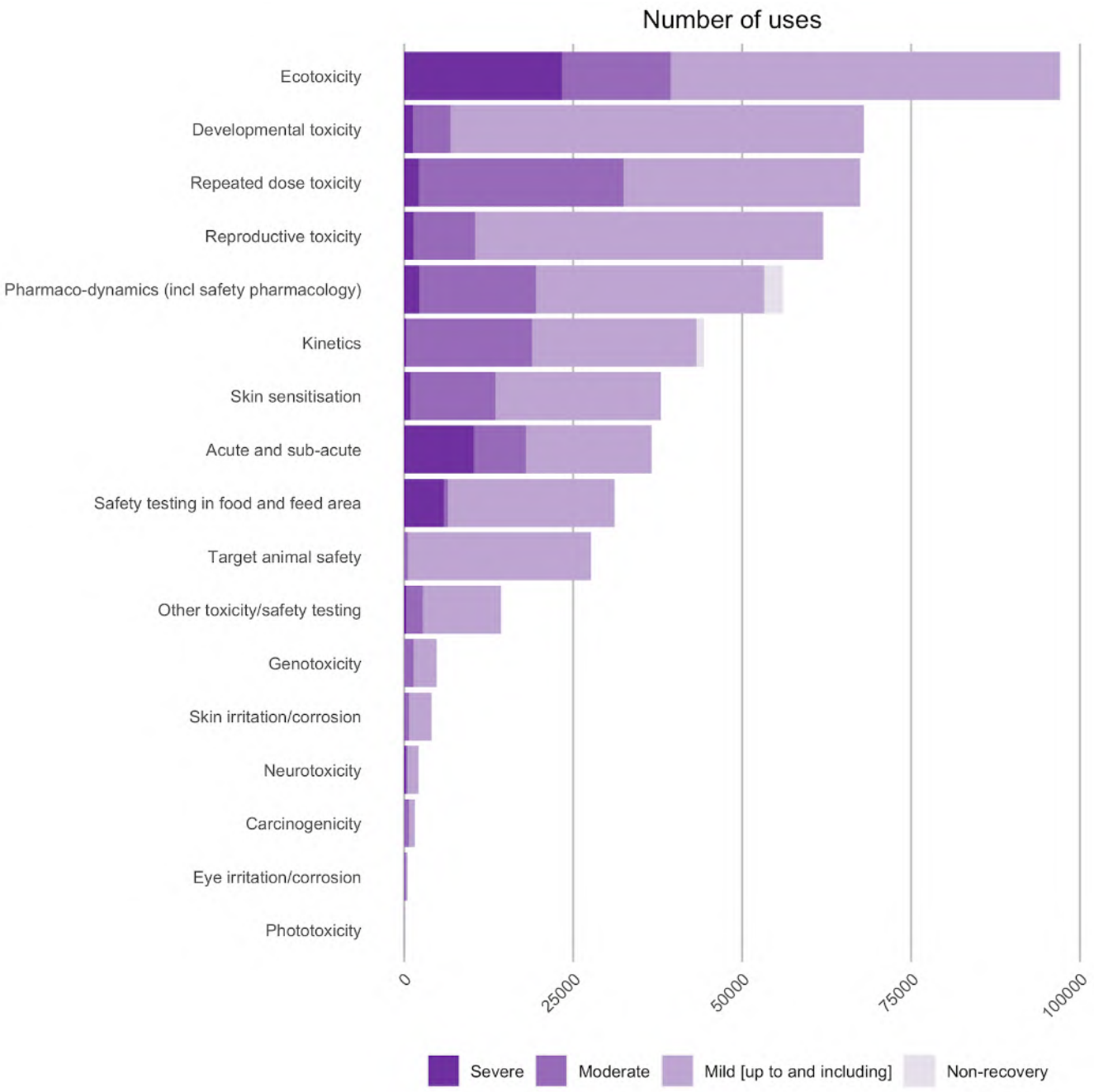


Figure 19: Toxicity and other safety testing including pharmacology by type of use and severity in 2020

Compared to 2019 (Table 19), the total number of uses for toxicity and other safety testing including pharmacology decreased (-2%).

Target animal safety (+456%), neurotoxicity (+238%), skin irritation/corrosion (+38%), genotoxicity (+17%) and reproductive toxicity (+11%) uses saw an increase. It is important to note that alternative methods (applicable to most use cases) are available for skin irritation/corrosion.

A significant decrease in the number of uses was observed in 2020 for the following areas: phototoxicity (-72%), carcinogenicity (-41%), pharmaco-dynamics (including safety pharmacology) (-23%), kinetics (-20%), safety testing in food and feed area (-17%) and acute and subacute toxicity (-13%) (Table 19).

"Other toxicity/safety testing" are related for example to immunogenicity testing. About half of these come from one Member State (Germany), of which 9000 uses were reported in relation to the regulatory requirements arising from plant protection product legislation.

	2018	2019	2020
Ecotoxicity	88,819	96,324	**97,113**
Developmental toxicity	63,271	68,330	**68,022**
Repeated dose toxicity	79,310	69,158	**67,454**
Reproductive toxicity	58,562	55,794	**61,970**
Pharmaco-dynamics (incl safety pharmacology)	78,934	72,909	**56,047**
Kinetics	62,325	55,210	**44,377**
Skin sensitisation	37,606	38,854	**38,024**
Acute and sub-acute	46,211	42,308	**36,632**
Safety testing in food and feed area	41,208	37,600	**31,124**
Target animal safety	6,290	4,979	**27,686**
Other toxicity/safety testing	4,145	16,922	**14,305**
Genotoxicity	4,342	4,094	**4,808**
Skin irritation/corrosion	3,998	2,945	**4,070**
Neurotoxicity	4,273	629	**2,130**
Carcinogenicity	3,233	2,650	**1,569**
Eye irritation/corrosion	840	452	**491**
Phototoxicity	519	414	**114**
Total	**583,886**	**569,572**	**555,936**

Table 19: Toxicity and other safety testing including pharmacology by type of use

Acute and sub-acute testing methods uses

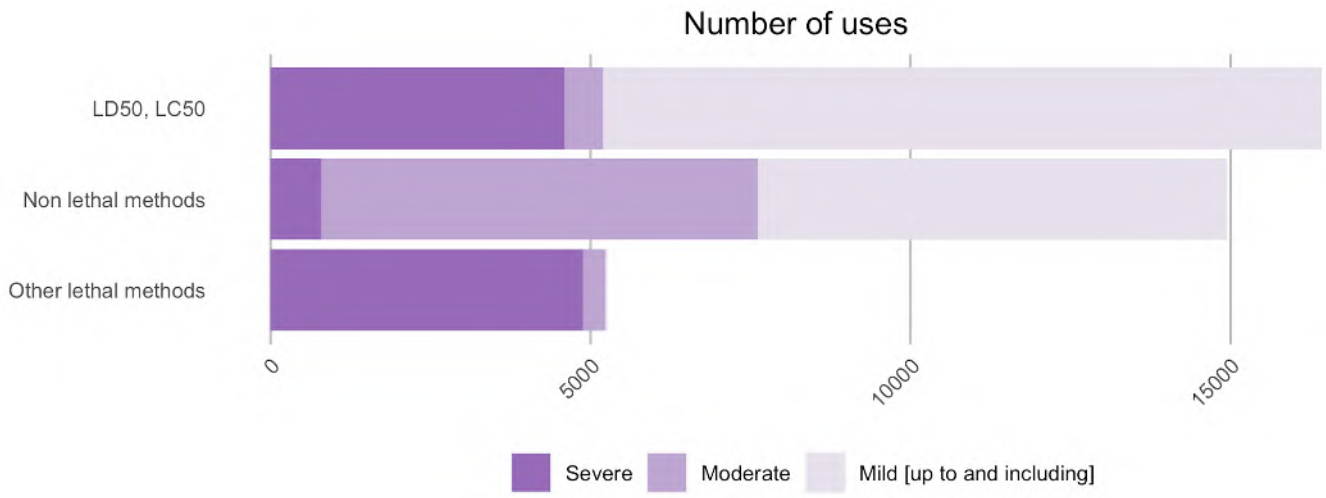


Figure 20: Acute and sub-acute uses testing methods by type of uses and severity in 2020

	2018	2019	2020
LD50, LC50	23,765	21,044	**16,421**
Non lethal methods	21,947	20,702	**14,952**
Other lethal methods	499	562	**5,259**
Total	**46,211**	**42,308**	**36,632**

Table 20: Acute and sub-acute uses testing methods by type of use

Repeated dose toxicity uses

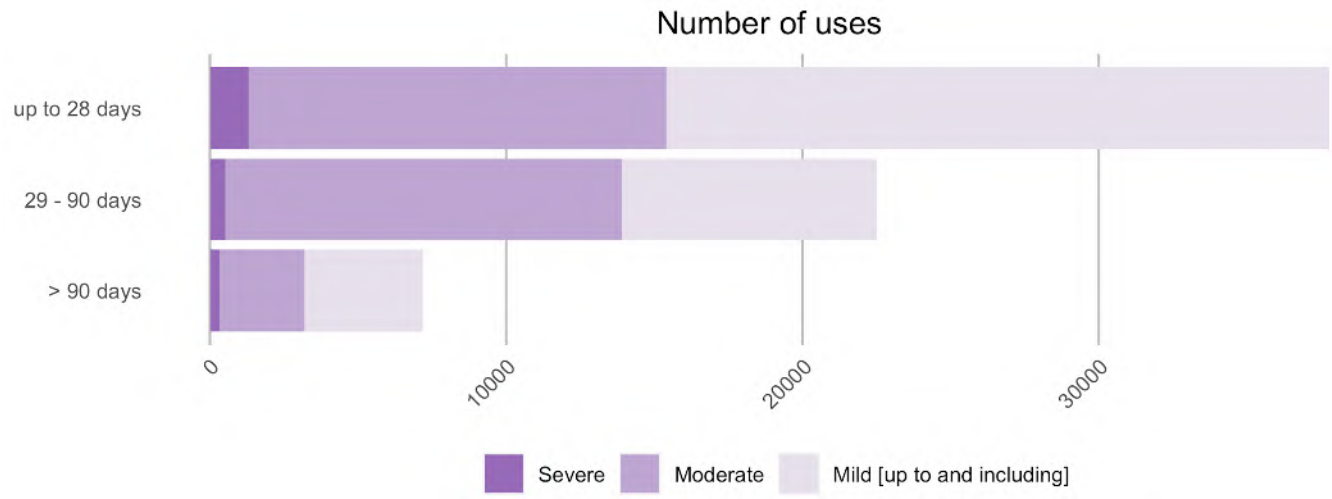


Figure 21: Repeated dose toxicity by type of uses and severity in 2020

	2018	2019	2020
up to 28 days	43,484	37,190	**37,777**
29 - 90 days	22,938	23,141	**22,503**
> 90 days	12,888	8,827	**7,174**
Total	**79,310**	**69,158**	**67,454**

Table 21: Repeated dose toxicity by type of use

Ecotoxicity

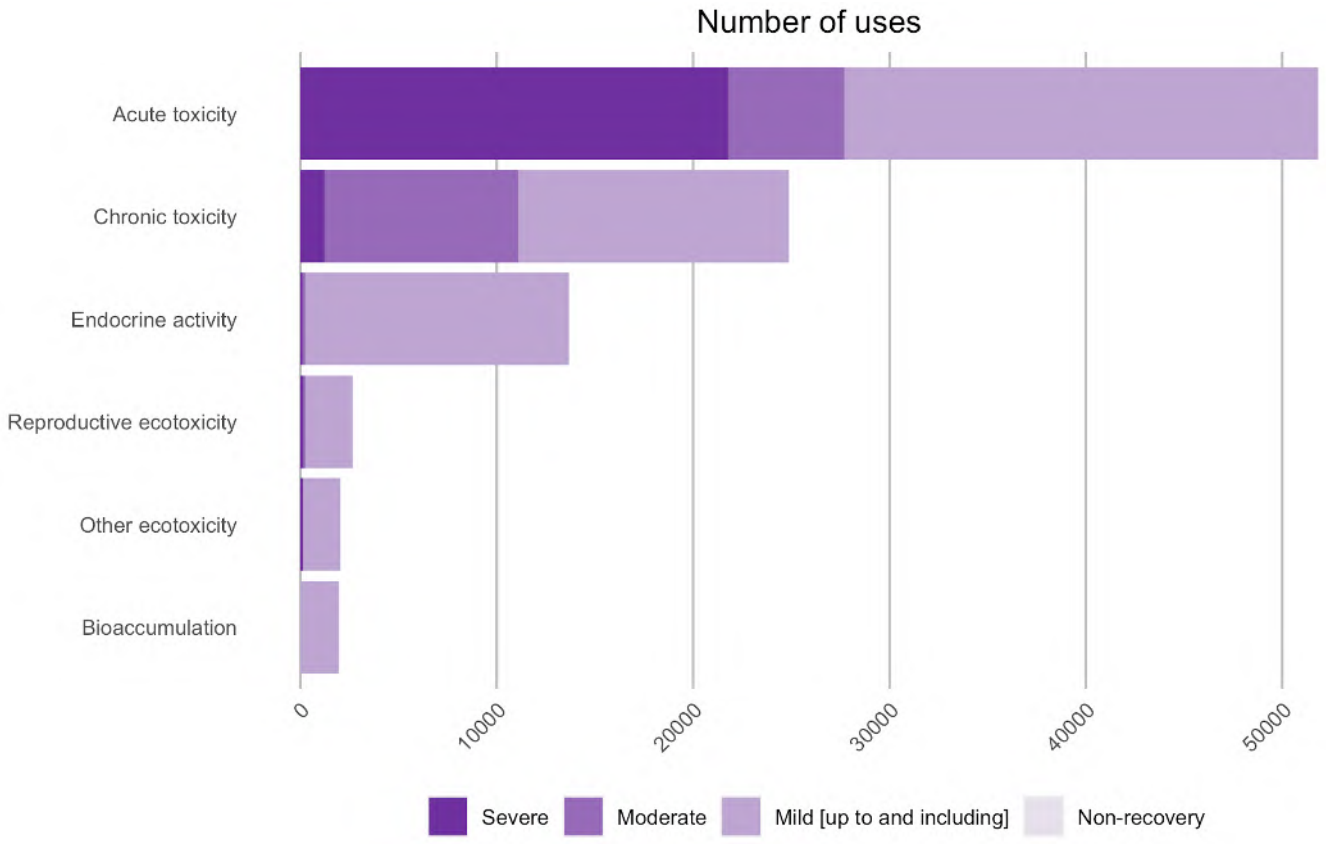


Figure 22: Ecotoxicity by type of uses and severity in 2020

	2018	2019	2020
Acute toxicity	54,115	51,523	**51,860**
Chronic toxicity	26,824	28,354	**24,910**
Endocrine activity	790	8,784	**13,679**
Reproductive ecotoxicity	240	224	**2,653**
Other ecotoxicity	3,339	3,706	**2,034**
Bioaccumulation	3,511	3,733	**1,977**
Total	**88,819**	**96,324**	**97,113**

Table 21: Ecotoxicity by type of use

IV.2.2.2.1.3. Other efficacy and tolerance testing

This category of regulatory use refers to uses that are neither linked to quality control nor to toxicity testing. These uses are related to, for example, efficacy (immunogenicity) of human and veterinary vaccines. They represented about 88,000 uses in 2020, as in 2019 (Table 22).

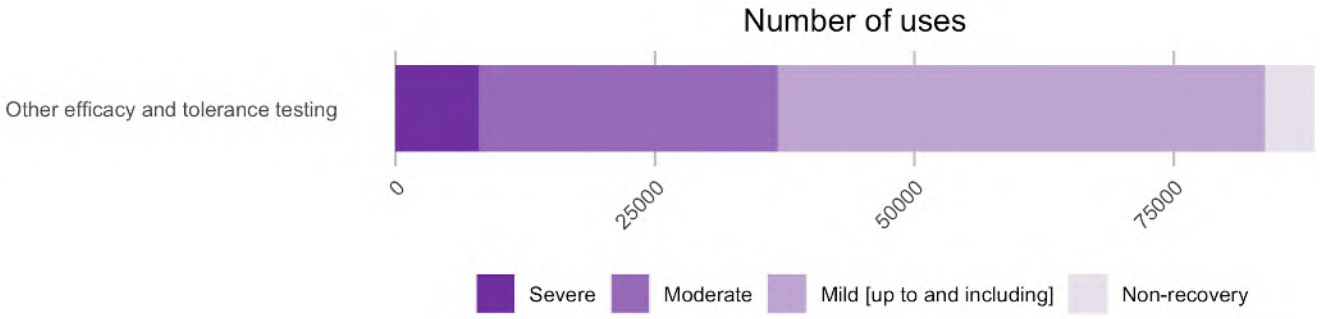


Figure 23: Other efficacy and tolerance testing by type of use and severity in 2019

	2018	2019	2020
Other efficacy and tolerance testing	96,803	88,237	**88,572**

Table 22: Other efficacy and tolerance testing

IV.2.2.2.2. Legislative aspects of regulatory uses

In 2020, the majority of uses to satisfy regulatory requirements of specific sector legislation occurred in relation to placing on the market of medicinal products for humans (54%), veterinary medicinal products (23%) and industrial chemicals (9%) (Table 23).

	2018	2019	2020
Legislation on medicinal products for human use	1,034,432	900,033	**758,902**
Legislation on medicinal products for veterinary use and their residues	265,949	270,806	**319,853**
Industrial chemicals legislation	123,837	117,867	**122,736**
Plant protection product legislation	46,189	51,778	**67,174**
Medical devices legislation	52,335	50,849	**50,427**
Food legislation including food contact material	49,445	44,290	**42,024**
Other legislation	41,641	34,252	**28,326**
Feed legislation including legislation for the safety of target animals, workers and environment	7,200	10,512	**10,356**
Biocides legislation	1,788	1,985	**4,442**
Total	**1,622,816**	**1,482,372**	**1,404,240**

Table 23: Regulatory uses by type of legislation

Between 2018 and 2020, regulatory uses saw a constant decrease (-13%) mainly due to the decrease of uses for legislation on medicinal products for human use (-27%). In the same period, food legislation including food contact material (-32%) and "Other legislation" uses decreased as well (-15%) (Table 23). Over 40% of this category seems to be related to waste legislation (Table 23).

In 2020, the majority of regulatory uses were performed to satisfy regulatory requirements originating from the Union (95%). Non-EU requirements accounted for 3% and national requirements for 2% (Table 24).

The sub-category on legislation satisfying EU requirements also includes any requirements for which international harmonisation has been achieved, such as for testing to OECD, ICH17 and VICH18 standards. Harmonisation of testing requirements at a global level is of utmost importance when aiming to avoid unnecessary duplication of testing.

	2018	2019	2020
Legislation satisfying EU requirements	95% (1,546,115)	94% (1,397,499)	**95% (1,336,241)**
Legislation satisfying Non-EU requirements only	2% (31,617)	3% (38,358)	**3% (36,633)**
Legislation satisfying national requirements only [within EU]	3% (45,084)	3% (46,515)	**2% (31,366)**
Total	**100% (1,622,816)**	**100% (1,482,372)**	**100% (1,404,240)**

Table 24: Regulatory uses by origin of regulatory requirement

Legislation on medicinal products for human or veterinary uses is mainly related to quality controls. Industrial chemical legislation, medical devices legislation, food legislation including food contact material, plant protection products legislation and other legislation focus more specifically on toxicity testing. Feed legislation is mainly related to other efficacy testing.

	Quality control (incl batch safety and potency testing)	Toxicity and other safety testing including pharmacology	Other efficacy and tolerance testing
Legislation on medicinal products for human use	519,256	191,775	**47,871**
Legislation on medicinal products for veterinary use and their residues	237,302	49,592	**32,959**
Medical devices legislation	2,468	46,802	**1,157**
Industrial chemicals legislation	0	122,736	**0**
Plant protection product legislation	0	67,174	**0**
Biocides legislation	0	3,746	**696**

17 The International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use

18 The International Cooperation on Harmonisation of Technical Requirements for Registration of Veterinary Medicinal Products

Food legislation including food contact material	127	28,059	**140**
Feed legislation including legislation for the safety of target animals, workers and environment	6	5,040	**5,310**
Other legislation	573	41,012	**439**
Total	**759,732**	**555,936**	**88,572**

Table 25: Regulatory use by type of legislation in 2020

In terms of severity levels, in 2020, for regulatory uses, 15% were reported as severe, 21% as moderate, 64% mild (and up to mild) and less than 1% as non-recovery (Figure 25).

Even if the total numbers of uses are not the most significant in the area of food legislation and biocides, the proportion of severe uses is relatively high and in the area of 'Other' legislation, about 45% of procedures were reported as severe.

Food legislation including food contact material included still in 2018, for example, the use of mouse bioassay for the purposes of shellfish toxin testing. As provided by Regulation 2017/1980[19], the mouse bioassay could still be used as reference method until the end of 2018, after which the alternative, the so-called Lawrence method, should have replaced its use. Subsequently, in 2020, there was a decrease of -34% in the use of mice in this area compared to 2018.

19 OJ L 285, 1.11.2017, p. 8–9

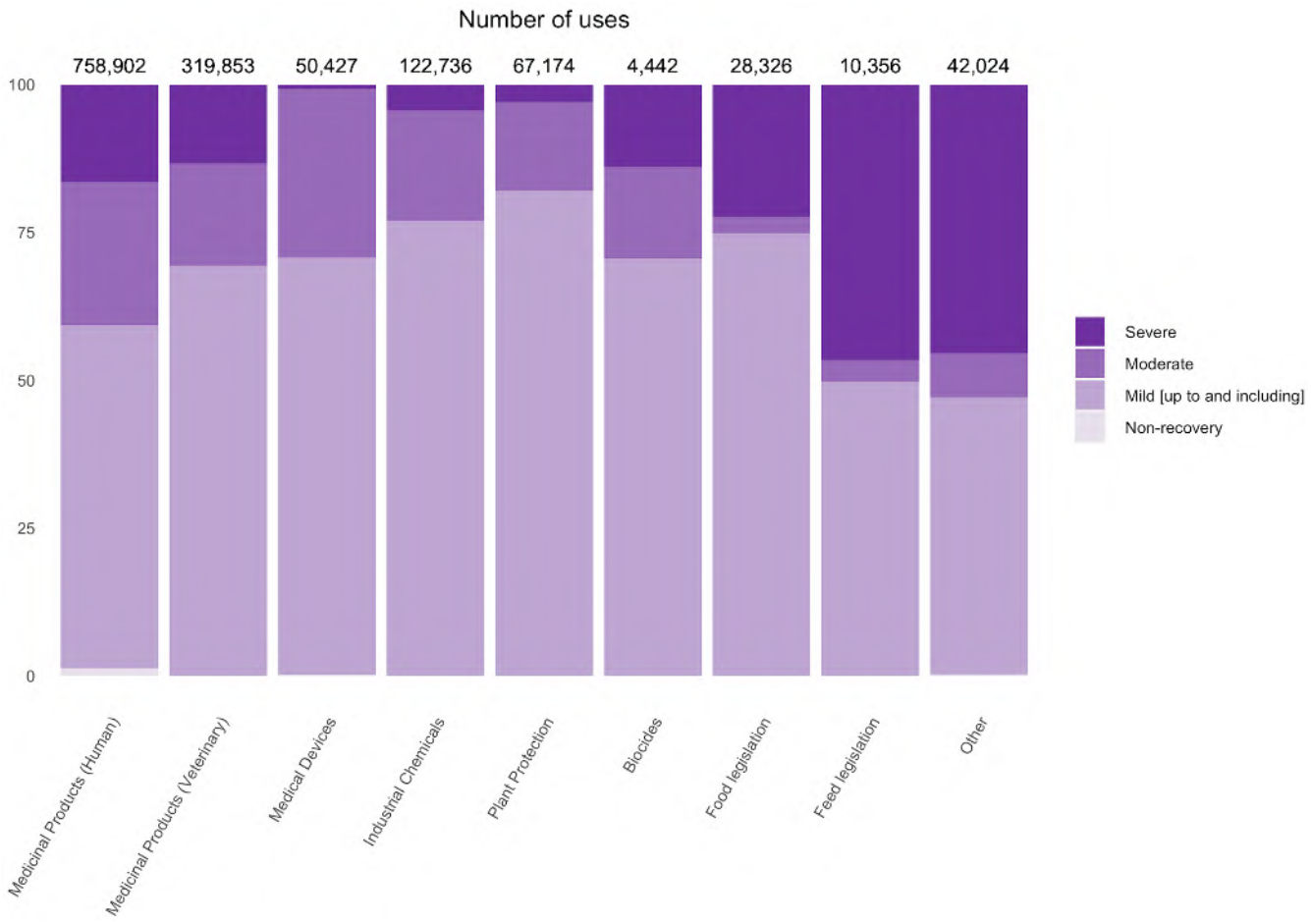


Figure 25: Regulatory use by type of legislation and severity in 2020

IV.2.2.3. Routine production uses

Routine production includes the production of antibodies and blood products, including polyclonal antisera by established methods.

In 2020, there were about 407,000 routine production uses, which represented 5% of all uses of animals in the Union. 56% of routine uses were related to the production of blood-based products and 10% for monoclonal antibodies production by mouse ascites method (Figure 26).

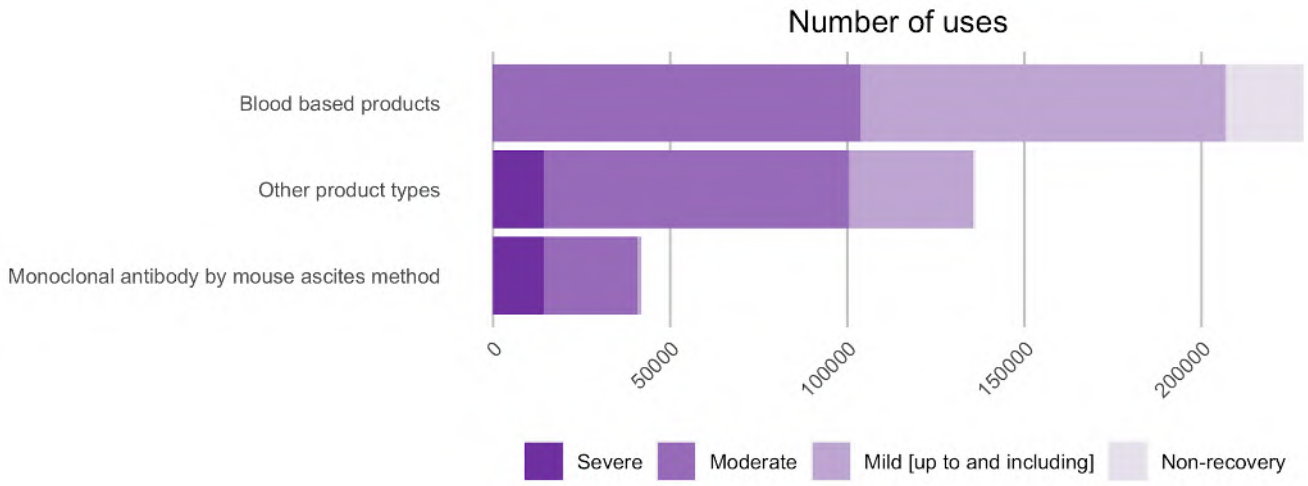


Figure 26: Routine production uses by product type and severity in 2020

While blood-based products involved only mild and moderate levels of severity, monoclonal antibody production by mouse ascites method involved mostly severe uses (34%) (Figure 28).

	2018	2019	2020
Blood based products	211,522	229,445	**228,762**
Other product types	87,746	171,318	**136,182**
Monoclonal antibody by mouse ascites method	54,941	37,473	**41,916**
Total	**354,209**	**438,236**	**406,860**

Table 26: Routine production uses by product type

Other product types that represented 33% of the uses were mostly related to antigenic production.

Monoclonal antibody production by mouse ascites method showed a decrease of 35% between 2018 and 2019. Contrary to the expectations, there was an increase of 12% compared to 2019. In total, five Member States reported the use of mouse ascites method for the production of monoclonal antibodies of which one Member State (France) represents 95%. However, the severity has decreased significantly from over 90% of the uses for this purpose reported in 2019 as severe, down to just under 34% being severe. This is likely to be the result of improved application of refinement techniques and earlier end-points.

IV.2.2.4. Other types of uses

The last four categories of uses reported as part of the Directive covered 439,982 uses: higher education and training for the acquisition, maintenance or improvement of vocational skills; protection of the natural environment in the interests of the health or welfare of human beings or animals; preservation of species; and forensic enquiries.

With more than 224,485 uses in 2020, protection of the natural environment in the interests of the health or welfare of human beings or animals is the biggest category of the remaining purposes.

At the same time, it is important to note that the severities linked to higher education and training, and on studies on preservation of species, are some of the lowest. Higher education and training has the largest proportion of non-recovery uses. Forensic inquiry uses are limited to about a hundred. (Figure 27).

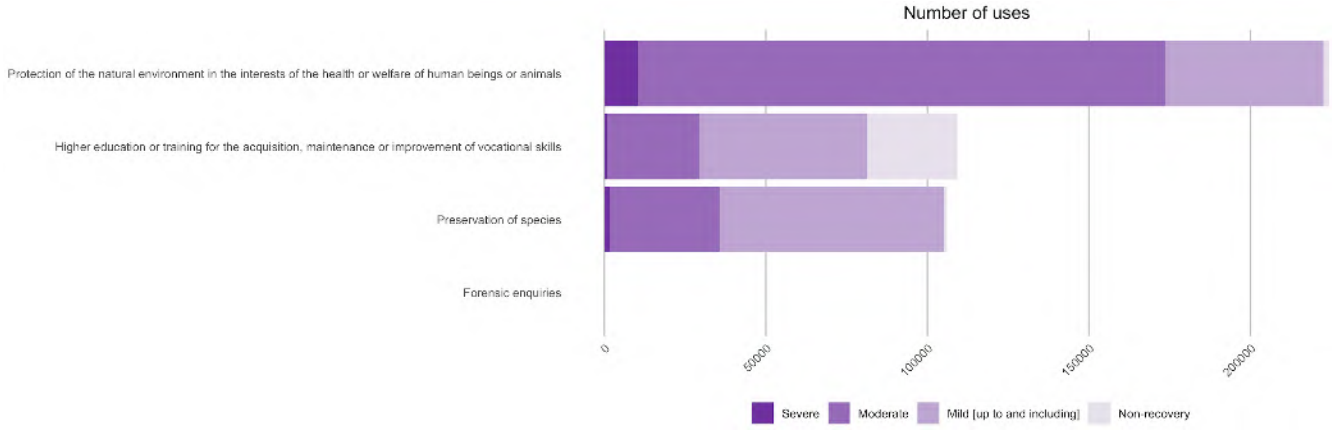


Figure 27: Other types of uses in 2020 including their severity

In 2020, there was an increase in the number of uses for the protection of the natural environment (+10%) (Table 27). Preservation of species (-53%) and higher education or training for the acquisition, maintenance or improvement of vocational skills decreased (-32%).

	2018	2019	2020
Protection of the natural environment in the interests of the health or welfare of human beings or animals	119,297	203,939	**224,485**
Higher education or training for the acquisition, maintenance or improvement of vocational skills	165,110	160,544	**109,334**
Preservation of species	83,683	224,921	**106,058**
Forensic enquiries	273	357	**105**
Total	**368,363**	**589,761**	**439,982**

Table 27: Other types of uses

IV.2.3. Information on reuses and genetic status of animals

The Directive requires additional elements to be recorded related to the use of animals for scientific purposes, such as reuse and information on the genetic status of the animals.

IV.2.3.1. Reuses

In line with the principle of the Three Rs, the total number of animals used in procedures can be reduced by performing procedures on animals more than once. However, this should only take place when this does not result in poor animal welfare and is evaluated on a case-by-case basis. Under Directive 2010/63/EU, reuse of animals in procedures is permitted only under specific conditions related to the actual level of severity the animal has experienced in a previous procedure, and the health and well-being of the animal, taking into account the lifetime experience of the individual animal. A reuse cannot be authorised for a procedure, in which the animal may reach 'severe' level of pain, suffering or distress. Also, an animal may be reused following a severe procedure only in exceptional circumstances and after a veterinary examination of that animal.

In 2020, the proportion of reuses was at 1.4% (Table 28).

	2018	2019	2020
No	98% (8,822,404)	98% (8,579,439)	**99% (7,938,064)**
Yes	2% (156,677)	2% (135,785)	**1% (116,866)**
Total	**100% (8,979,081)**	**100% (8,715,224)**	**100% (8,054,930)**

Table 28: Reuses of animals used for research, testing, routine production and educational purposes

IV.2.3.2.1. Animal species reused

In absolute numbers, the main species reused for scientific purposed in 2020 were mice, rats, rabbits and cattle.

In proportion, large mammals are more often reused such as horses, donkeys and cross-breeds (21%), goats (34%), cats (38%), dogs (38%) and non-human primates.

Reptiles (38%) and xenopus (14%) amongst amphibians were also often reused (Table 29).

	Total number of uses	Number of reuses	Proportion of reuses
Mice	3,960,315	54,256	1%

Rats	674,286	9,131	1%
Guinea-Pigs	113,830	781	1%
Hamsters (Syrian)	17,433	78	<1%
Hamsters (Chinese)	149	0	<1%
Mongolian gerbil	3,004	26	1%
Other rodents	28,833	647	2%
Rabbits	350,494	6,973	2%
Cats	3,959	1,495	38%
Dogs	14,064	5,348	38%
Ferrets	1,285	35	3%
Other carnivores	7,116	249	3%
Horses, donkeys and cross-breeds	4,829	998	21%
Pigs	75,980	2,471	3%
Goats	1,587	589	37%
Sheep	19,704	2,215	11%
Cattle	27,722	5,547	20%
Prosimians	80	26	32%
Marmoset and tamarins	364	168	46%
Cynomolgus monkey	6,373	2,153	34%
Rhesus monkey	354	127	36%
Vervets Chlorocebus spp.	37	3	8%
Baboons	90	37	41%
Other species of Old World Monkeys (Cercopithecoidea)	18	18	100%
Other mammals	4,959	186	4%
Domestic fowl	426,513	2,776	1%
Other birds	87,249	878	1%
Reptiles	3,363	1,291	38%
Rana	1,722	0	<1%
Xenopus	20,672	2,866	14%
Other amphibians	18,440	147	1%
Zebra fish	280,735	3,407	1%
Other fish	1,925,983	11,944	1%
Cephalopods	1,633	0	<1%
Total	**8,083,175**	**116,866**	**1%**

Table 29: Reuses by type of species in 2020

IV.2.3.2.2. Reuse by purposes of procedures

In 2020, education or training for the acquisition, maintenance or improvement of vocational skills (12%) had the largest proportion of reuses mainly for blood-based products (Table 30). Note: routine production re-uses dropped from 10% to 2% in 2020 compared to 2019.

	Total number of uses	Number of re-uses	Proportion
Basic research	3,293,409	33,811	1%
Translational and applied research	2,516,665	24,311	1%
Regulatory use	1,426,259	34,592	2%
Routine production	406,860	9,619	2%
Higher education or training for the acquisition, maintenance or improvement of vocational skills	109,334	12,928	12%
Protection of the natural environment in the interests of the health or welfare of human beings or animals	224,485	1,308	1%
Preservation of species	106,058	297	<1%
Forensic enquiries	105	0	<1%
Total	**8,083,175**	**116,866**	**1%**

Table 30: Reuses by purposes in 2020

IV.2.3.2.3. Severity of reuse

According to the Directive, reuse of an animal is not allowed in a procedure classified prospectively as severe. In 2020, most of the reuses, the actual reported severities were mild (71.5%) or moderate (26.5%) (Figure 28).

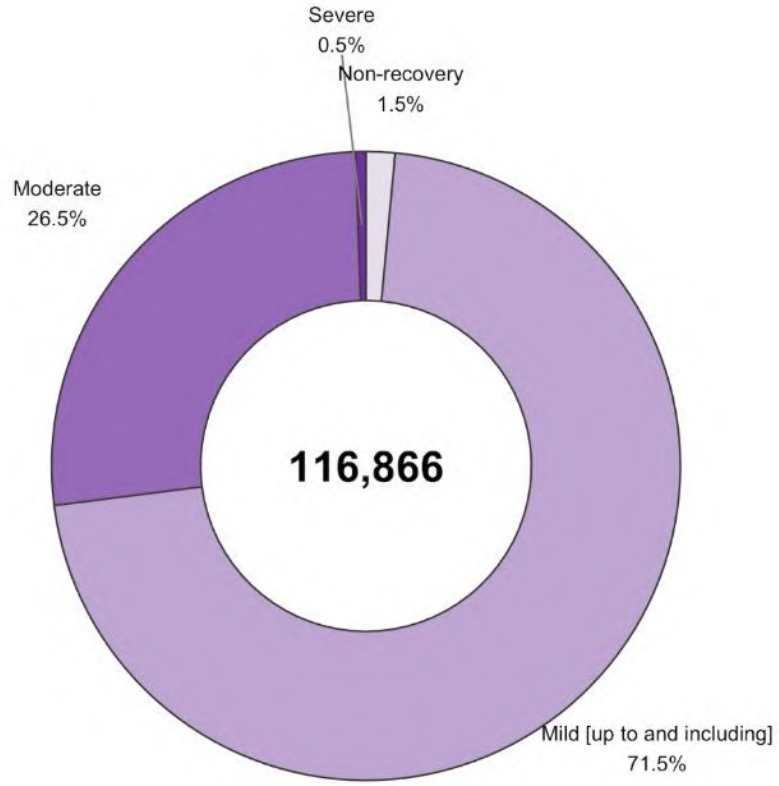


Figure 28: Reuses by severity in 2020

However, in some cases, even if the procedure is prospectively classified in a lower severity category, an individual animal may reach severity category "severe" due to unforeseen events occurring during the procedure. Only a very small number of such cases (<1 %) was reported, with an increase of 289 such cases compared to 2019.

These 613 uses should be investigated by the authorities to eliminate any recurrence of any repetitive unforeseen adverse effects. Furthermore, these events, if recurring, may suggest a need for a revision of the prospective classification for future uses.

	2018	2019	2020
Non-recovery	8% (12,762)	2% (3,022)	**2% (1,733)**
Mild [up to and including]	69% (107,781)	73% (99,518)	**72% (83,574)**
Moderate	23% (36,053)	24% (32,921)	**26% (30,946)**
Severe	<1% (81)	0% (324)	**<1% (613)**
Total	**100% (156,677)**	**100% (135,785)**	**100% (116,866)**

Table 31: Severity classification of reuse procedures

IV.2.3.2. Use of genetically altered animals

Some of the animals used in procedures for purposes of research, testing, routine production and education are genetically altered. This section presents the types of genetic alteration reported. A welfare assessment is required to be performed on a newly created genetically altered animal line to establish whether the line is expected to have an intended non-harmful or harmful phenotype.

Intended non-harmful phenotypes include animal models where no adverse effects are noted during development, breeding and maintenance under conventional laboratory animal conditions. In addition, non-harmful phenotype lines include inducible and cre-lox lines, which require an active intervention for the harmful phenotype to be expressed.

Intended harmful phenotypes include animal models where gene alteration induces a specific genetic disorder or disease, or increases incidence of / susceptibility to for example tumour development. Other examples of harmful phenotype lines include those that require a specific bio-secure environment (for example, special housing arrangements to protect animals that are particularly sensitive to infection as a consequence of the gene alteration) or additional care beyond that required for conventional animals to maintain their health and well-being.

IV.2.3.2.1. Type of genetic alteration

In 2020, 1.8 million uses for the purposes of research were carried out on animals that were genetically altered. Of these, 17.4% were carrying a harmful phenotype.

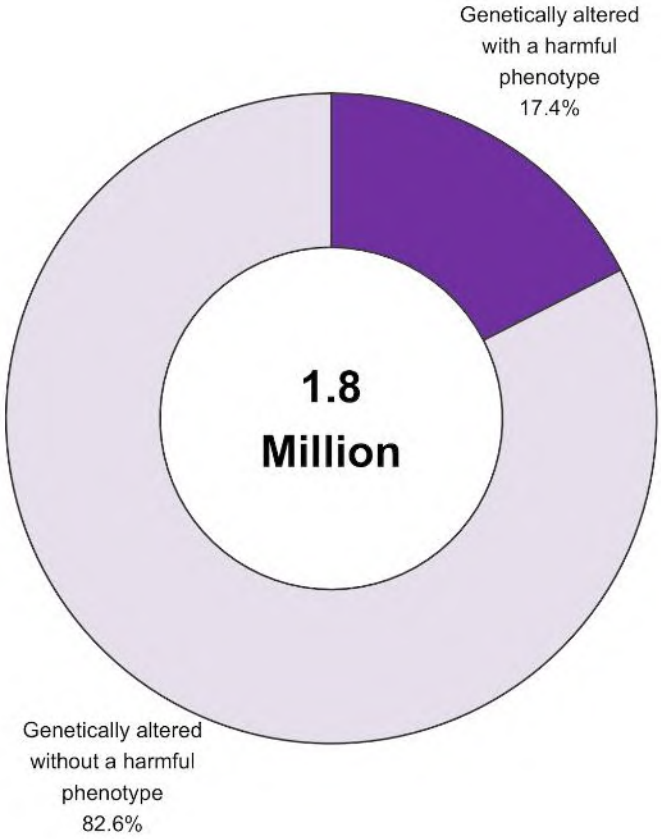


Figure 31: Uses of animals by type of genetic alteration in 2020

In 2020, the proportion of the uses of genetically altered animals for scientific purposes decreased slightly. Compared to 2019, the percentage of the uses of such animals without a harmful phenotype remained stable at 18%, and the uses of such animals with a harmful phenotype remained at 4%.

	2018	2019	2020
Genetically altered with a harmful phenotype	3% (275,660)	4% (326,789)	**4% (313,937)**
Genetically altered without a harmful phenotype	17% (1,518,800)	18% (1,590,870)	**18% (1,485,665)**
Not genetically altered	80% (7,184,621)	78% (6,797,565)	**78% (6,255,328)**
Total	**100% (8,979,081)**	**100% (8,715,224)**	**100% (8,054,930)**

Table 32: Genetic status of animals used

IV.2.3.2.2. Genetically altered animals by species

Amongst the species, which have been genetically altered, uses of mice accounted for the highest numbers, followed by zebra fish and rats.

Even if mice account for the most animals being genetically altered, in proportion, 52% of zebra fish was genetically altered, followed by mice (40%), while only 3% of rats were genetically altered used in procedures for purposes of research, testing, routine production in 2020 (Table 33).

	Total number of uses	Uses of genetically altered animals	Proportion
Zebra fish	280,735	146,982	52%
Mice	3,933,947	1,597,899	41%
Other amphibians	18,440	5,049	27%
Xenopus	20,672	1,523	7%
Rabbits	350,494	17,945	5%
Rats	674,286	23,035	3%
Ferrets	1,285	39	3%
Pigs	75,980	638	1%
Other fish	1,925,983	6,344	<1%
Dogs	14,064	13	<1%
Domestic fowl	426,513	133	<1%
Cattle	27,722	2	<1%

Table 33: Genetically altered animals by species in 2020

This situation is mainly explained by the fact that genetically altered animals are used almost exclusively for research purposes. In 2020, basic research accounted for 74% of uses of genetically altered animals and translational and applied research for 22% (Table 34).

	Not genetically altered	Genetically altered without a harmful phenotype	Genetically altered with a harmful phenotype	Total
Basic research	59% (1,955,028)	34% (1,115,360)	7% (222,961)	**100% (3,293,349)**
Translational and applied research	84% (2,114,937)	12% (307,509)	4% (88,053)	**100% (2,510,499)**
Regulatory use	98% (1,378,659)	2% (23,739)	0% (1,842)	**100% (1,404,240)**
Routine production	95% (387,783)	5% (19,075)	0% (2)	**100% (406,860)**
Higher education or training for the acquisition, maintenance or improvement of vocational skills	88% (96,106)	12% (12,653)	1% (575)	**100% (109,334)**
Preservation of species	98% (219,745)	2% (4,740)	<1% (0)	**100% (224,485)**

Protection of the natural environment in the interests of the health or welfare of human beings or animals	97% (102,967)	2% (2,587)	<1% (504)	**100% (106,058)**
Forensic enquiries	98% (103)	2% (2)	<1% (0)	**100% (105)**

Table 34: Genetic status of animals by use purposes in 2020

IV.3. Numbers and uses of animals for the creation and maintenance of genetically altered animals in the EU

In the context of Directive 2010/63/EU, Member States are also required to report the animals used in procedures for the creation of new genetically altered animal lines and the maintenance of colonies of established genetically altered animal lines to support the research needs in the Union.

Diagram in part IV.3 provides further understanding of the reporting requirements for both creation and maintenance of genetically altered animal lines.

IV.3.1. Numbers of animals used for the creation and maintenance of genetically altered animals

In 2020, 686,628 animals were used for the provision of genetically altered animals for the purposes of scientific research.

This included 388,729 animals used for the first time for the creation of new genetically altered animal lines (Table 35), which represents an increase of +24% from 2019.

297,899 animals were used for the first time for the maintenance of colonies of established genetically altered animal lines (Table 3.8). In comparison to 2018, this represents a decrease of 14%. It is important to note in this context that the reporting requirements for the maintenance of colonies of established genetically altered animal lines are particularly complex. This is likely to be the greatest single contributing factor for such significant year to year fluctuations. The Commission, Member States and key stakeholder organisations have been working to provide more guidance to the users. A guidance document on genetically altered animals was endorsed by Member State National Contact Points responsible for the implementation of the Directive in their meeting in November 2021. More information is provided under section IV.3.3 below.

IV.3.2. All uses of animals for the creation of new genetic altered animal lines

The creation of a new genetic altered animal line is reported under the research purpose category for which the line is being created for. The reporting covers all animals carrying the genetic alteration. In addition, those used for superovulation, vasectomy and embryo implantation are equally reported (these

may or may not be genetically altered themselves). Genetically normal animals (wild type offspring) produced as a result of creation of a new genetically altered line are not reported in the annual statistics. (Diagram in Part IV.4).

Counting all uses, the main species that were used for the creation of new genetic altered animal lines were mice and zebra fish, 75% and 23% respectively. Other species, although in small numbers, include rats, other species of fish, xenopus, domestic fowl, rabbits, other species of amphibians and pigs.

	2018	2019	2020
Mice	274,354	214,078	**293,821**
Zebra fish	84,996	89,392	**89,787**
Rats	6,168	3,635	**5,138**
Other fish	16,087	3,122	**2,103**
Xenopus	0	1,748	**819**
Hamsters (Syrian)	89	116	**449**
Other amphibians	100	271	**368**
Domestic fowl	100	286	**293**
Rabbits	324	305	**277**
Sheep	0	0	**263**
Other birds	0	10	**183**
Pigs	62	124	**131**
Reptiles	0	0	**42**
Cattle	0	1	**28**
Dogs	0	0	**18**
Horses, donkeys and cross-breeds	0	0	**10**
Other mammals	70	6	**10**
Other carnivores	0	0	**6**
Ferrets	4	0	**0**
Marmoset and tamarins	10	47	**0**
Total	**382,364**	**313,141**	**393,746**

Table 35: Uses of animals for the creation of new genetically altered animal lines by species

IV.3.2.1. Creation of new genetically altered animal lines by genetic status

Animals that are not genetically altered but reported under the category creation of a new genetically altered animal lines include, for example, genetically normal parent animals or a part of the offspring that does not carry the genetic alteration. Of those that were genetically altered, over 64% were of a non-harmful phenotype.

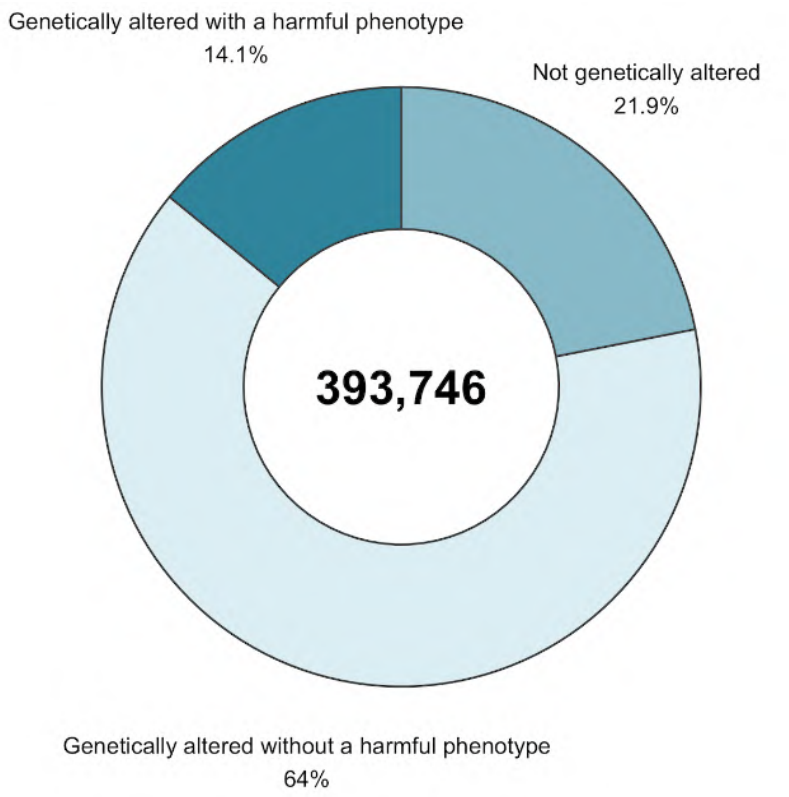


Figure 30: Creation of new genetically altered animal lines: genetic types of animal used in 2020

	2018	2019	2020
Not genetically altered	22% (83,250)	23% (73,175)	**22% (86,332)**
Genetically altered without a harmful phenotype	63% (240,460)	62% (193,988)	**64% (251,978)**
Genetically altered with a harmful phenotype	15% (58,654)	15% (45,978)	**14% (55,436)**
Total	**100% (382,364)**	**100% (313,141)**	**100% (393,746)**

Table 36: Creation of new genetically altered animal lines: genetic types of animal used

IV.3.2.2. Creation of new genetically altered animal lines by scientific purposes

The creation of new genetic lines is only carried out for research purposes. In 2020, 393,746 uses (first and any subsequent reuses) were reported for the purposes of creating new genetically altered animal lines.

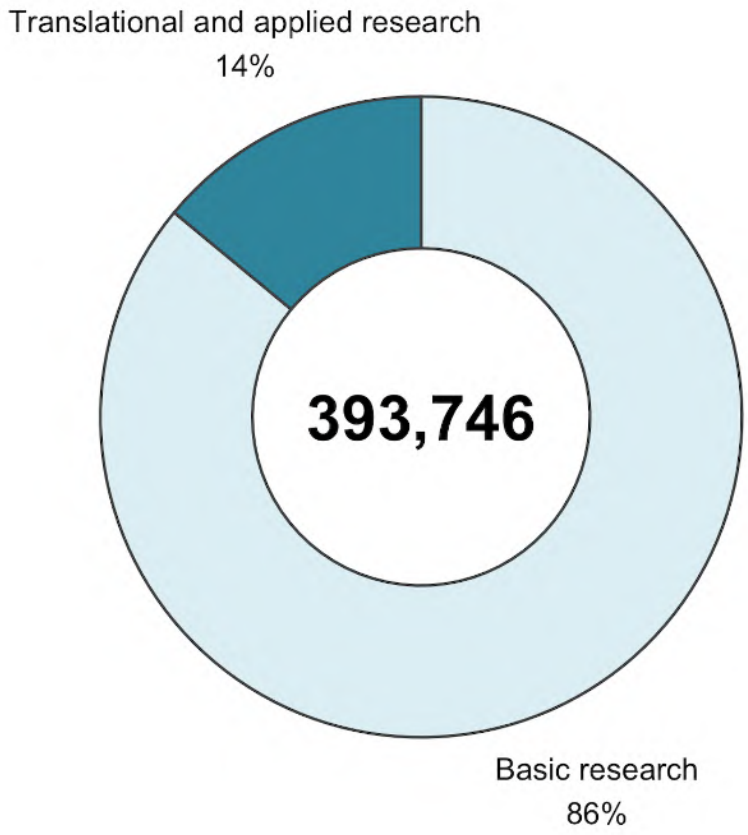


Figure 31: Creation of new genetically altered animal lines: uses for research purposes in 2020

86% of the new genetically altered lines were created for purposes covered under basic research. The table below presents all sub-categories from both basic and translational and applied research together.

In 2020, basic research purposes concerned 20% of uses for nervous system, 18% for multisystemic research (where more than one body system is the primary interest of the research, such as in some infectious diseases), 11% for oncology and 10% for immune system (Table 37).

The most important sub-category under translational and applied research for which new genetically altered animal lines were created was other human disorders (11%), mainly for rare genetic disorders. Due to the relatively low number of uses for the creation of new genetically altered animal lines for the applied and translational research purposes, Table 37 combines all research purposes both from basic, and translational and applied research.

	2018	2019	2020
Nervous System	63,676	53,772	**82,050**
Multisystemic	59,131	55,062	**71,956**
Oncology	50,180	38,803	**43,817**
Cardiovascular Blood and Lymphatic System	42,560	41,118	**43,422**
Other Human Disorders	820	3,018	**38,953**
Immune System	33,529	26,794	**25,299**
Endocrine System/Metabolism	17,086	11,787	**16,411**
Urogenital/Reproductive System	22,100	20,606	**15,246**
Gastrointestinal System including Liver	9,283	12,091	**13,739**
Other basic research	23,830	22,099	**13,257**
Musculoskeletal System	11,068	6,259	**7,936**
Human Nervous and Mental Disorders	3,156	2,467	**4,036**
Sensory Organs (skin, eyes and ears)	10,957	8,172	**3,637**
Human Cancer	3,221	2,562	**3,048**
Human Infectious Disorders	1,062	84	**2,456**
Human Endocrine/Metabolism Disorders	10,551	2,434	**1,726**
Human Cardiovascular Disorders	2,298	1,844	**1,619**
Ethology / Animal Behaviour /Animal Biology	2,388	1,410	**1,363**
Human Sensory Organ Disorders (skin, eyes and ears)	783	729	**894**
Respiratory System	510	200	**521**
Human Immune Disorders	429	769	**491**
Human Gastrointestinal Disorders including Liver	3,224	344	**443**
Human Musculoskeletal Disorders	317	217	**430**
Human Respiratory Disorders	608	35	**377**
Human Urogenital/Reproductive Disorders	171	122	**207**
Animal Diseases and Disorders	9,169	295	**157**
Animal Welfare	223	0	**127**
Diagnosis of diseases	0	20	**87**
Non-regulatory toxicology and ecotoxicology	34	28	**41**
Total	**382,364**	**313,141**	**393,746**

Table 37: Uses of animals for the creation of new genetically altered animal lines by type of research

IV.3.2.3. Creation of new genetically altered animal lines by severity

Severities reported under the creation of new genetically altered animal lines include impacts from surgical techniques used during creation (embryo transfer; vasectomy), tissue sampling (using an invasive method for genotyping) and effects caused by the phenotype of the genetic alteration.

	2018	2019	2020
Non-recovery	8% (29,555)	6% (19,361)	**11% (42,116)**
Mild [up to and including]	65% (248,494)	67% (210,937)	**69% (270,188)**
Moderate	26% (97,869)	25% (78,743)	**20% (78,073)**
Severe	2% (6,446)	1% (4,100)	**1% (3,369)**
Total	**100% (382,364)**	**100% (313,141)**	**100% (393,746)**

Table 38: Uses of animals for the creation of new genetically altered animal lines by severities

IV.3.2.4. Reuses

In 2020, the number of reuses for the creation of new genetic lines was 1% and concerned mostly mice and zebra fish.

	2018	2019	2020
Yes	1% (3,488)	0% (1,427)	**1% (5,017)**
No	99% (378,876)	100% (311,714)	**99% (388,729)**
Total	**100% (382,364)**	**100% (313,141)**	**100% (393,746)**

Table 39: Reuse of animals used for the creation of new genetically altered animal lines

IV.3.3. All uses of animals for the maintenance of colonies of established genetically altered animal lines

Directive 2010/63/EU requires Member States to report animals used for the maintenance of colonies for genetically altered animals. This category contains animals required for the maintenance of colonies of genetically altered animals of established lines *with an intended harmful phenotype* and which *have exhibited pain, suffering, distress or lasting harm as a consequence of the harmful genotype* before being killed.

This category also includes genetically altered animals of an established line, irrespective of whether the line is of non-harmful or harmful phenotype, and

- for which the genotype has been confirmed using an invasive method (tissue sampling/ genotyping), which was not carried out for the purposes of marking of the animal, and the animal is killed without further use;
- that are of unsuitable genotype, confirmed using an invasive method, which was not carried out for the purposes of marking of the animal.

Given the complexity of the reporting obligations, errors in the reporting of uses under maintenance of colonies continued to be detected. The new guidance document on genetically altered animals under the Directive, finalised in November 2021[4], is expected to improve consistency and accuracy of reporting.

IV.3.3.1. Maintenance of colonies of established genetically altered animal lines by genetic status

In 2020, 304,628 uses were reported under the maintenance of colonies of established genetically altered animal lines. Amongst these uses, 58% were genetically altered without a harmful phenotype, 27% with a harmful phenotype and 14.8 without genetic alteration (Figure 34). This seems to suggest that the majority of uses reported under maintenance of colonies of established genetically altered animal lines concern animals that have been genotyped using an invasive method. Those reported with a harmful phenotype are likely to be a mix of those that were genotyped and those having exhibited the harmful phenotype before being killed.

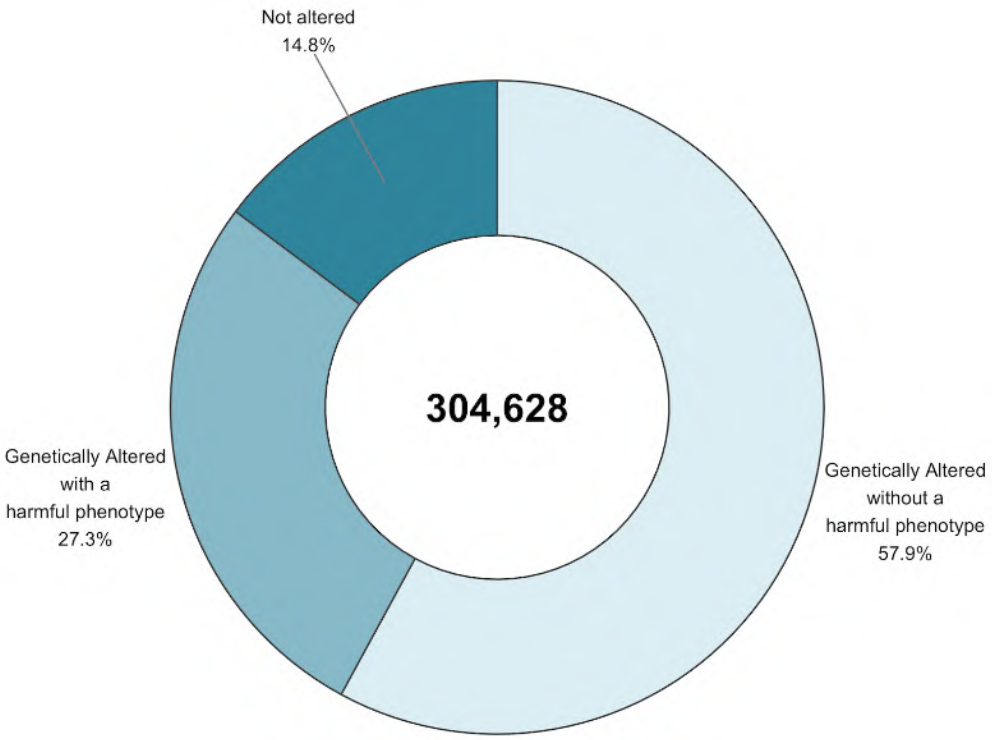


Figure 34: Genetic status of animals used for the maintenance of colonies of established genetically altered animal lines in 2020

IV.3.3.2. Maintenance of colonies of established genetically altered animal lines by severity

In 2020, in 86% of the uses the severities remained at mild (and up to mild) level (Table 40). Drawing from the previous figure 34 in which it was stated that 57,9% percent of animals were of non-harmful phenotype, the severities seem to relate to the effects of tissue sampling (invasive genotyping). For those classed as having a harmful phenotype, the severities can be linked to the phenotype and invasive tissue sampling. Where animals are found dead and no informed decision can be made on the cause and the events preceding death, this results in reporting these as 'severe'.

	2018	2019	2020
Non-recovery	<1% (1,313)	0% (512)	**1% (2,152)**
Mild [up to and including]	87% (461,752)	82% (290,884)	**86% (262,680)**
Moderate	10% (52,753)	12% (43,162)	**10% (29,681)**
Severe	3% (15,515)	5% (18,245)	**3% (10,115)**
Total	**100% (531,333)**	**100% (352,803)**	**100% (304,628)**

Table 40: Uses of animals for the maintenance of colonies of genetically altered animal lines by severity in 2020

IV.3.3.2. Maintenance of colonies of established genetically altered animal lines by species

Mice and rats are the most common genetically altered animals used for scientific purposes and are therefore the main species also used for the maintenance of colonies.

	2018	2019	2020
Mice	518,180	336,427	**292,513**
Rats	3,827	3,935	**8,214**
Dogs	5	10	**14**
Pigs	0	0	**92**
Sheep	0	0	**0**
Other mammals	0	0	**0**
Domestic fowl	219	0	**0**
Xenopus	0	0	**0**
Zebra fish	7,840	11,520	**2,001**
Other fish	1,262	911	**1,794**
Total	**531,333**	**352,803**	**304,628**

Table 41: Uses of animals for the maintenance of colonies of established genetically altered animal lines by species

IV.3.3.3. Reuses

These reuses involved mainly three types of species: mice, zebra fish and rats.

	Yes	No
Mice	6,327	**286,186**
Rats	2	**8,212**
Dogs	0	**14**
Xenopus	0	**92**
Zebra fish	400	**1,601**
Other fish	0	**1,794**
Total	**6,729**	**297,899**

Table 42: Reuses by species for the maintenance of colonies of established genetically altered animal lines

PART B: EU DATA IN 2020

V. Detailed EU tables 2020

This section presents the basic consolidated tables used for the conclusions at the EU level.

Part 1: Numbers of animals used for research, testing, routine production and educational purposes in the EU

Table 1: Numbers of animals used for the first time by species (2020)

		Number of animals	%
Mammals			
	Rodents		
	Mice	3,879,691	**48.9**
	Rats	665,155	**8.4**
	Guinea-Pigs	111,172	**1.4**
	Hamsters (Syrian)	17,355	**0.2**
	Hamsters (Chinese)	149	**0**
	Mongolian gerbil	2,978	**0**
	Other rodents	28,186	**0.4**
	Rabbits		
	Rabbits	343,521	**4.3**
	Carnivores		
	Cats	2,464	**0**
	Dogs	8,716	**0.1**
	Ferrets	1,250	**0**
	Other carnivores	6,867	**0.1**
	Farm animals		
	Horses, donkeys and cross-breeds	3,831	**0**
	Pigs	73,509	**0.9**
	Goats	998	**0**
	Sheep	17,489	**0.2**
	Cattle	22,175	**0.3**
	Non-human primates		
	Prosimians	54	**0**
	Marmoset and tamarins	196	**0**
	Cynomolgus monkey	4,220	**0.1**
	Rhesus monkey	227	**0**
	Vervets Chlorocebus spp.	34	**0**
	Baboons	53	**0**
	Other mammals		
	Other mammals	4,773	**0.1**
Birds			
	Domestic fowl	423,737	**5.3**
	Other birds	86,371	**1.1**
Reptiles			
	Reptiles	2,072	**0**
Amphibians			
	Rana	1,722	**0**
	Xenopus	17,806	**0.2**
	Other amphibians	18,293	**0.2**
Fish			
	Zebra fish	277,328	**3.5**
	Other fish	1,914,039	**24.1**
Cephalopods			
	Cephalopods	1,633	**0**
Totals			
	Total	**7,938,064**	**100**
	%	**100**	

Table 2: Place of birth by species (other than non-human primates) (2020)

	Animals born in the EU at a registered breeder	Animals born in the EU but not at a registered breeder	Animals born in rest of Europe	Animals born in rest of world	Total	%
Mammals						
Rodents						
Mice	3,661,365	154,529	11,150	52,647	**3,879,691**	**48.9**
Rats	646,259	14,430	1,149	3,317	**665,155**	**8.4**
Guinea-Pigs	110,080	1,092	0	0	**111,172**	**1.4**
Hamsters (Syrian)	15,695	0	0	1,660	**17,355**	**0.2**
Hamsters (Chinese)	149	0	0	0	**149**	**0**
Mongolian gerbil	2,596	382	0	0	**2,978**	**0**
Other rodents	6,291	21,550	34	311	**28,186**	**0.4**
Rabbits						
Rabbits	332,945	10,120	80	376	**343,521**	**4.3**
Carnivores						
Cats	1,011	1,219	0	234	**2,464**	**0**
Dogs	3,544	3,233	23	1,916	**8,716**	**0.1**
Ferrets	918	122	0	210	**1,250**	**0**
Other carnivores	306	6,560	1	0	**6,867**	**0.1**
Farm animals						
Horses, donkeys and cross-breeds	1,153	2,638	40	0	**3,831**	**0**
Pigs	32,724	40,709	36	40	**73,509**	**0.9**
Goats	568	430	0	0	**998**	**0**
Sheep	10,567	6,781	141	0	**17,489**	**0.2**
Cattle	10,038	11,815	322	0	**22,175**	**0.3**
Other mammals						
Other mammals	420	4,086	184	83	**4,773**	**0.1**
Birds						
Domestic fowl	299,808	123,929	0	0	**423,737**	**5.3**
Other birds	31,081	54,097	554	639	**86,371**	**1.1**
Reptiles						
Reptiles	113	1,289	561	109	**2,072**	**0**
Amphibians						
Rana	930	792	0	0	**1,722**	**0**
Xenopus	9,365	4,954	2,247	1,240	**17,806**	**0.2**
Other amphibians	9,887	8,347	54	5	**18,293**	**0.2**
Fish						
Zebra fish	255,768	20,610	255	695	**277,328**	**3.5**
Other fish	1,224,213	643,395	33,952	12,479	**1,914,039**	**24.1**
Cephalopods						
Cephalopods	964	669	0	0	**1,633**	**0**
Totals						
Total	**6,668,758**	**1,137,778**	**50,783**	**75,961**	**7,933,280**	**100**
%	**84.1**	**14.3**	**0.6**	**1**	**100**	

Table 3: Source of non-human primates by species (2020)

	Animals born at a registered breeder within EU	Animals born in rest of Europe	Animals born in Asia	Animals born in America	Animals born in Africa	Animals born elsewhere	Total	%
Non-human primates								
New World Monkeys								
Prosimians	54	0	0	0	0	0	**54**	**1.1**
Marmoset and tamarins	195	1	0	0	0	0	**196**	**4.1**
Old World Monkeys								
Cynomolgus monkey	155	0	1,573	0	2,291	201	**4,220**	**88.2**
Rhesus monkey	186	0	11	2	0	28	**227**	**4.7**
Vervets Chlorocebus spp.	0	0	0	34	0	0	**34**	**0.7**
Baboons	53	0	0	0	0	0	**53**	**1.1**
Totals								
Total	**643**	**1**	**1,584**	**36**	**2,291**	**229**	**4,784**	**100**
%	**13.4**	**0**	**33.1**	**0.8**	**47.9**	**4.8**	**100**	

Table 4: Generation of non-human primates by species (2020)

	F1	F2 or greater	Self-sustaining colony	Total	%
Non-human primates					
New World Monkeys					
Prosimians	0	33	21	**54**	**1.1**
Marmoset and tamarins	0	153	43	**196**	**4.1**
Old World Monkeys					

		F1	F2 or greater	Self-sustaining colony	Total	%
	Cynomolgus monkey	858	3,325	37	**4,220**	**88.2**
	Rhesus monkey	3	65	159	**227**	**4.7**
	Vervets Chlorocebus spp.	1	33	0	**34**	**0.7**
	Baboons	3	13	37	**53**	**1.1**
Totals						
	Total	**865**	**3,622**	**297**	**4,784**	**100**
	%	**18.1**	**75.7**	**6.2**	**100**	

Part 2: Details of all uses of animals for research, testing, routine production and educational purposes in the EU

Table 5: Uses of animals by species, main categories of scientific purposes and severities (2020)

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Non-recovery	165,041	27,135	2,785	640	35	20	10,091	0	205,747	5.2
	Mild	833,218	331,382	332,540	9,058	394	2,055	31,706	2	1,540,355	39.2
Mice	Moderate	878,811	597,208	120,226	77,640	0	2,783	18,713	0	1,695,381	43.1
	Severe	194,255	146,540	136,629	14,236	56	0	748	0	492,464	12.5
	Total	**2,071,325**	**1,102,265**	**592,180**	**101,574**	**485**	**4,858**	**61,258**	**2**	**3,933,947**	**100.0**
	Non-recovery	21,574	9,344	1,857	147	0	0	12,664	0	45,586	6.8
	Mild	56,464	43,567	251,961	890	10	0	10,081	0	362,973	53.8
Rats	Moderate	80,420	72,418	53,101	63	4,635	519	3,650	0	214,806	31.9
	Severe	28,512	14,332	7,998	0	9	0	70	0	50,921	7.6
	Total	**186,970**	**139,661**	**314,917**	**1,100**	**4,654**	**519**	**26,465**	**0**	**674,286**	**100.0**
	Non-recovery	7,682	440	107	314	0	0	105	0	8,648	7.7
	Mild	1,090	2,578	47,772	218	11	0	527	0	52,196	46.6
Guinea-Pigs	Moderate	760	779	34,861	51	380	0	640	0	37,471	33.5
	Severe	0	449	13,188	0	0	0	1	0	13,638	12.2
	Total	**9,532**	**4,246**	**95,928**	**583**	**391**	**0**	**1,273**	**0**	**111,953**	**100.0**
	Non-recovery	108	156	15	1	0	0	40	0	320	1.8
	Mild	717	2,002	2,602	0	0	0	135	0	5,456	31.3
Hamsters (Syrian)	Moderate	1,889	5,842	708	9	0	0	60	0	8,508	48.8
	Severe	150	1,562	1,437	0	0	0	0	0	3,149	18.1
	Total	**2,864**	**9,562**	**4,762**	**10**	**0**	**0**	**235**	**0**	**17,433**	**100.0**
	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	78	21	0	0	0	0	0	0	99	66.4
Hamsters (Chinese)	Moderate	15	35	0	0	0	0	0	0	50	33.6
	Severe	0	0	0	0	0	0	0	0	0	0.0
	Total	**93**	**56**	**0**	**0**	**0**	**0**	**0**	**0**	**149**	**100.0**

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Mongolian gerbil	Non-recovery	142	184	0	0	0	0	1	0	327	10.9
	Mild	305	441	64	132	0	0	15	0	957	31.9
	Moderate	632	884	6	137	0	0	5	0	1,664	55.4
	Severe	9	47	0	0	0	0	0	0	56	1.9
	Total	**1,088**	**1,556**	**70**	**269**	**0**	**0**	**21**	**0**	**3,004**	**100.0**
Other rodents	Non-recovery	300	195	0	0	40	0	0	0	535	1.9
	Mild	14,066	452	9,040	42	80	25	90	0	23,795	82.5
	Moderate	3,307	278	55	0	239	101	14	0	3,994	13.9
	Severe	323	139	47	0	0	0	0	0	509	1.8
	Total	**17,996**	**1,064**	**9,142**	**42**	**359**	**126**	**104**	**0**	**28,833**	**100.0**
Rabbits	Non-recovery	1,505	904	5,233	20,537	0	0	357	0	28,536	8.1
	Mild	12,506	6,474	39,985	114,502	2	0	606	77	174,152	49.7
	Moderate	4,519	7,440	22,379	104,809	0	0	32	0	139,179	39.7
	Severe	129	1,077	1,191	6,230	0	0	0	0	8,627	2.5
	Total	**18,659**	**15,895**	**68,788**	**246,078**	**2**	**0**	**995**	**77**	**350,494**	**100.0**
Cats	Non-recovery	24	0	0	0	0	0	0	0	24	0.6
	Mild	400	2,226	537	112	0	0	73	0	3,348	84.6
	Moderate	61	110	376	0	0	0	2	0	549	13.9
	Severe	0	1	37	0	0	0	0	0	38	1.0
	Total	**485**	**2,337**	**950**	**112**	**0**	**0**	**75**	**0**	**3,959**	**100.0**
Dogs	Non-recovery	71	63	76	3	0	0	18	0	231	1.6
	Mild	739	4,709	3,658	735	31	0	646	0	10,518	74.8
	Moderate	118	588	2,385	12	0	0	11	0	3,114	22.1
	Severe	3	89	105	0	0	0	4	0	201	1.4
	Total	**931**	**5,449**	**6,224**	**750**	**31**	**0**	**679**	**0**	**14,064**	**100.0**
Ferrets	Non-recovery	80	0	0	0	0	0	0	0	80	6.2
	Mild	121	72	0	42	0	0	38	0	273	21.2
	Moderate	55	541	214	2	0	0	0	0	812	63.2
	Severe	0	120	0	0	0	0	0	0	120	9.3
	Total	**256**	**733**	**214**	**44**	**0**	**0**	**38**	**0**	**1,285**	**100.0**
Other carnivores	Non-recovery	6	1	0	0	0	0	0	0	7	0.1
	Mild	72	6,089	28	0	18	128	0	0	6,335	89.0

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Moderate	306	348	118	0	0	2	0	0	774	10.9
	Severe	0	0	0	0	0	0	0	0	0	0.0
	Total	**384**	**6,438**	**146**	**0**	**18**	**130**	**0**	**0**	**7,116**	**100.0**
	Non-recovery	0	5	0	0	0	0	15	0	20	0.4
	Mild	1,124	2,444	168	50	0	45	297	0	4,128	85.5
Horses, donkeys and cross-breeds	Moderate	344	230	29	31	0	0	27	0	661	13.7
	Severe	0	0	20	0	0	0	0	0	20	0.4
	Total	**1,468**	**2,679**	**217**	**81**	**0**	**45**	**339**	**0**	**4,829**	**100.0**
	Non-recovery	1,432	2,485	216	62	6	0	3,498	0	7,699	10.1
	Mild	16,214	17,256	9,479	825	2,372	64	1,200	0	47,410	62.4
Pigs	Moderate	2,998	8,531	2,553	1,155	32	0	1,540	0	16,809	22.1
	Severe	880	1,233	111	1,585	252	0	1	0	4,062	5.3
	Total	**21,524**	**29,505**	**12,359**	**3,627**	**2,662**	**64**	**6,239**	**0**	**75,980**	**100.0**
	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	947	166	44	111	0	0	44	0	1,312	82.7
Goats	Moderate	84	103	2	39	0	0	1	0	229	14.4
	Severe	0	33	13	0	0	0	0	0	46	2.9
	Total	**1,031**	**302**	**59**	**150**	**0**	**0**	**45**	**0**	**1,587**	**100.0**
	Non-recovery	158	137	0	0	0	0	244	0	539	2.7
	Mild	9,076	3,342	805	1,936	121	52	414	0	15,746	79.9
Sheep	Moderate	714	1,561	150	355	14	0	97	0	2,891	14.7
	Severe	162	347	2	0	17	0	0	0	528	2.7
	Total	**10,110**	**5,387**	**957**	**2,291**	**152**	**52**	**755**	**0**	**19,704**	**100.0**
	Non-recovery	25	22	0	0	0	0	0	0	47	0.2
	Mild	4,745	13,686	2,069	85	62	0	1,963	26	22,636	81.7
Cattle	Moderate	1,099	1,812	359	14	271	0	1,375	0	4,930	17.8
	Severe	14	88	4	0	0	0	3	0	109	0.4
	Total	**5,883**	**15,608**	**2,432**	**99**	**333**	**0**	**3,341**	**26**	**27,722**	**100.0**
	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
Prosimians	Mild	50	0	0	0	0	0	0	0	50	62.5
	Moderate	10	0	0	0	0	0	0	0	10	12.5

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Severe	20	0	0	0	0	0	0	0	20	25.0
	Total	**80**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**80**	**100.0**
Marmoset and tamarins	Non-recovery	6	1	0	0	0	0	0	0	7	1.9
	Mild	3	3	81	109	0	0	0	0	196	53.8
	Moderate	11	32	114	0	0	0	0	0	157	43.1
	Severe	1	0	3	0	0	0	0	0	4	1.1
	Total	**21**	**36**	**198**	**109**	**0**	**0**	**0**	**0**	**364**	**100.0**
Cynomolgus monkey	Non-recovery	1	74	0	20	0	0	0	0	95	1.5
	Mild	241	486	1,926	809	0	0	0	0	3,462	54.3
	Moderate	46	515	2,100	0	0	0	0	0	2,661	41.8
	Severe	0	51	104	0	0	0	0	0	155	2.4
	Total	**288**	**1,126**	**4,130**	**829**	**0**	**0**	**0**	**0**	**6,373**	**100.0**
Rhesus monkey	Non-recovery	2	2	0	0	0	0	0	0	4	1.1
	Mild	6	48	0	25	0	0	0	0	79	22.3
	Moderate	56	202	8	0	0	0	0	0	266	75.1
	Severe	4	1	0	0	0	0	0	0	5	1.4
	Total	**68**	**253**	**8**	**25**	**0**	**0**	**0**	**0**	**354**	**100.0**
Vervets Chlorocebus spp	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	4	16	0	3	0	0	0	0	23	62.2
	Moderate	0	14	0	0	0	0	0	0	14	37.8
	Severe	0	0	0	0	0	0	0	0	0	0.0
	Total	**4**	**30**	**0**	**3**	**0**	**0**	**0**	**0**	**37**	**100.0**
Baboons	Non-recovery	0	4	0	0	0	0	0	0	4	4.4
	Mild	65	0	0	0	0	0	0	0	65	72.2
	Moderate	2	17	0	0	0	0	0	0	19	21.1
	Severe	0	2	0	0	0	0	0	0	2	2.2
	Total	**67**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**90**	**100.0**
Other species of old world monkeys (Cercopithecoidea)	Non-recovery	18	0	0	0	0	0	0	0	18	100.0
	Mild	0	0	0	0	0	0	0	0	0	0.0
	Moderate	0	0	0	0	0	0	0	0	0	0.0
	Severe	0	0	0	0	0	0	0	0	0	0.0
	Total	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**100.0**

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Other mammals	Non-recovery	43	3	0	0	0	2	0	0	48	1.0
	Mild	2,808	389	0	0	120	269	217	0	3,803	76.7
	Moderate	981	73	0	7	2	8	0	0	1,071	21.6
	Severe	30	7	0	0	0	0	0	0	37	0.7
	Total	**3,862**	**472**	**0**	**7**	**122**	**279**	**217**	**0**	**4,959**	**100.0**
Domestic fowl	Non-recovery	541	560	135	527	0	0	80	0	1,843	0.4
	Mild	117,424	70,242	106,718	6,829	2,119	340	1,319	0	304,991	71.5
	Moderate	21,729	32,870	33,595	15,565	272	0	213	0	104,244	24.4
	Severe	294	5,189	7,052	2,768	96	0	36	0	15,435	3.6
	Total	**139,988**	**108,861**	**147,500**	**25,689**	**2,487**	**340**	**1,648**	**0**	**426,513**	**100.0**
Other birds	Non-recovery	732	0	0	496	1,212	0	133	0	2,573	2.9
	Mild	37,682	3,000	1,951	177	2,248	892	301	0	46,251	53.0
	Moderate	12,707	9,727	845	11,862	335	323	77	0	35,876	41.1
	Severe	40	1,092	1,022	389	0	0	6	0	2,549	2.9
	Total	**51,161**	**13,819**	**3,818**	**12,924**	**3,795**	**1,215**	**517**	**0**	**87,249**	**100.0**
Reptiles	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	1,196	16	0	0	1,102	426	28	0	2,768	82.3
	Moderate	570	18	0	0	0	0	0	0	588	17.5
	Severe	7	0	0	0	0	0	0	0	7	0.2
	Total	**1,773**	**34**	**0**	**0**	**1,102**	**426**	**28**	**0**	**3,363**	**100.0**
Rana	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	792	0	0	0	0	0	530	0	1,322	76.8
	Moderate	0	0	0	0	0	0	400	0	400	23.2
	Severe	0	0	0	0	0	0	0	0	0	0.0
	Total	**792**	**0**	**0**	**0**	**0**	**0**	**930**	**0**	**1,722**	**100.0**
Xenopus	Non-recovery	239	0	0	0	0	0	9	0	248	1.2
	Mild	5,599	1,302	10,438	0	1,679	0	228	0	19,246	93.1
	Moderate	646	72	136	0	0	0	43	0	897	4.3
	Severe	91	0	190	0	0	0	0	0	281	1.4
	Total	**6,575**	**1,374**	**10,764**	**0**	**1,679**	**0**	**280**	**0**	**20,672**	**100.0**

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Non-recovery	474	0	0	0	30	0	1	0	505	2.7
	Mild	6,581	0	0	0	2,172	2,200	164	0	11,117	60.3
Other amphibians	Moderate	2,969	0	0	0	0	0	353	0	3,322	18.0
	Severe	3,496	0	0	0	0	0	0	0	3,496	19.0
	Total	**13,520**	**0**	**0**	**0**	**2,202**	**2,200**	**518**	**0**	**18,440**	**100.0**
	Non-recovery	9,498	1	35	0	90	0	175	0	9,799	3.5
	Mild	126,379	26,354	17,419	0	4,676	0	781	0	175,609	62.6
Zebra fish	Moderate	44,028	5,545	11,548	0	794	0	24	0	61,939	22.1
	Severe	18,270	5,893	8,979	0	230	0	16	0	33,388	11.9
	Total	**198,175**	**37,793**	**37,981**	**0**	**5,790**	**0**	**996**	**0**	**280,735**	**100.0**
	Non-recovery	10,116	3,894	0	0	412	990	679	0	16,091	0.8
	Mild	282,914	641,820	57,282	2,506	31,761	62,951	477	0	1,079,711	56.1
Other fish	Moderate	211,495	254,980	4,585	4,494	156,357	30,233	1,182	0	663,326	34.4
	Severe	20,350	103,091	28,629	3,464	9,691	1,630	0	0	166,855	8.7
	Total	**524,875**	**1,003,785**	**90,496**	**10,464**	**198,221**	**95,804**	**2,338**	**0**	**1,925,983**	**100.0**
	Non-recovery	811	0	0	0	0	0	0	0	811	49.7
	Mild	642	0	0	0	0	0	0	0	642	39.3
Cephalopods	Moderate	2	150	0	0	0	0	0	0	152	9.3
	Severe	28	0	0	0	0	0	0	0	28	1.7
	Total	**1,483**	**150**	**0**	**0**	**0**	**0**	**0**	**0**	**1,633**	**100.0**
	Non-recovery	**220,629**	**45,610**	**10,459**	**22,747**	**1,825**	**1,012**	**28,110**	**0**	**330,392**	**4.1**
	Mild	**1,534,268**	**1,180,583**	**896,567**	**139,196**	**48,978**	**69,447**	**51,880**	**105**	**3,921,024**	**48.7**
All Species	**Moderate**	**1,271,384**	**1,002,923**	**290,453**	**216,245**	**163,331**	**33,969**	**28,459**	**0**	**3,006,764**	**37.3**
	Severe	**267,068**	**281,383**	**206,761**	**28,672**	**10,351**	**1,630**	**885**	**0**	**796,750**	**9.9**
	Total	**3,293,349**	**2,510,499**	**1,404,240**	**406,860**	**224,485**	**106,058**	**109,334**	**105**	**8,054,930**	**100.0**

Table 6: Uses of animals in all sub-categories of research and testing by severities (2020)

	Non-recovery	Mild [up to and including]	Moderate	Severe	Total	%
Basic research						
Oncology	13,093	119,530	237,240	44,301	**414,164**	**5.1**
Cardiovascular Blood and Lymphatic System	29,298	86,634	83,877	13,954	**213,763**	**2.7**
Nervous System	68,608	230,563	256,811	84,423	**640,405**	**8**
Respiratory System	5,216	17,798	17,163	3,063	**43,240**	**0.5**
Gastrointestinal System including Liver	7,420	55,909	50,187	8,999	**122,515**	**1.5**
Musculoskeletal System	2,303	24,427	27,282	12,653	**66,665**	**0.8**
Immune System	21,920	228,011	188,841	67,405	**506,177**	**6.3**
Urogenital/Reproductive System	7,257	49,429	26,725	1,366	**84,777**	**1.1**
Sensory Organs (skin, eyes and ears)	6,357	21,087	20,974	2,906	**51,324**	**0.6**
Endocrine System/Metabolism	6,332	75,875	63,711	6,945	**152,863**	**1.9**
Multisystemic	33,736	144,560	51,862	6,809	**236,967**	**2.9**
Ethology / Animal Behaviour /Animal Biology	9,434	393,798	226,441	8,146	**637,819**	**7.9**
Other basic research	9,655	86,647	20,270	6,098	**122,670**	**1.5**
Translational and applied research						
Human Cancer	3,974	94,860	276,414	41,151	**416,399**	**5.2**
Human Infectious Disorders	2,201	77,524	66,734	46,005	**192,464**	**2.4**
Human Cardiovascular Disorders	8,500	17,022	26,216	3,944	**55,682**	**0.7**
Human Nervous and Mental Disorders	10,563	76,017	99,517	23,400	**209,497**	**2.6**
Human Respiratory Disorders	1,238	16,426	24,273	4,311	**46,248**	**0.6**
Human Gastrointestinal Disorders including Liver	821	6,810	23,772	4,059	**35,462**	**0.4**
Human Musculoskeletal Disorders	1,280	9,454	20,138	7,378	**38,250**	**0.5**
Human Immune Disorders	1,965	23,122	36,294	8,512	**69,893**	**0.9**
Human Urogenital/Reproductive Disorders	722	5,641	6,001	1,954	**14,318**	**0.2**
Human Sensory Organ Disorders (skin, eyes and ears)	531	14,965	13,816	977	**30,289**	**0.4**
Human Endocrine/Metabolism Disorders	3,791	27,781	58,316	4,449	**94,337**	**1.2**
Other Human Disorders	1,383	6,949	9,888	3,096	**21,316**	**0.3**
Animal Diseases and Disorders	3,763	230,758	158,925	111,937	**505,383**	**6.3**
Animal Welfare	1,448	540,790	142,191	4,135	**688,564**	**8.5**
Diagnosis of diseases	2,228	15,499	10,608	12,664	**40,999**	**0.5**
Plant diseases	0	106	0	0	**106**	**0**
Non-regulatory toxicology and ecotoxicology	1,202	16,859	29,820	3,411	**51,292**	**0.6**
Regulatory use						
Quality control (incl batch safety and potency testing)						
Batch safety testing	761	109,182	14,900	12,675	**137,518**	**1.7**
Pyrogenicity testing	0	7,570	16,344	225	**24,139**	**0.3**
Batch potency testing	836	343,569	99,112	134,017	**577,534**	**7.2**
Other quality controls	1	9,888	7,513	3,139	**20,541**	**0.3**
Toxicity and other safety testing including pharmacology						
Acute and sub-acute toxicity testing methods						
LD50, LC50	0	11,223	610	4,588	**16,421**	**0.2**
Other lethal methods	0	37	343	4,879	**5,259**	**0.1**
Non lethal methods	0	7,332	6,827	793	**14,952**	**0.2**
Skin irritation/corrosion	0	3,376	571	123	**4,070**	**0.1**
Skin sensitisation	0	24,550	12,539	935	**38,024**	**0.5**
Eye irritation/corrosion	0	273	151	67	**491**	**0**
Repeated dose toxicity						
up to 28 days	0	22,385	14,082	1,310	**37,777**	**0.5**
29 - 90 days	0	8,601	13,389	513	**22,503**	**0.3**
> 90 days	0	3,988	2,868	318	**7,174**	**0.1**
Carcinogenicity	0	888	662	19	**1,569**	**0**
Genotoxicity	28	3,407	1,369	4	**4,808**	**0.1**
Reproductive toxicity	0	51,502	9,064	1,404	**61,970**	**0.8**
Developmental toxicity	0	61,139	5,539	1,344	**68,022**	**0.8**
Neurotoxicity	0	1,659	257	214	**2,130**	**0**
Kinetics	1,116	24,360	18,580	321	**44,377**	**0.6**
Pharmaco-dynamics (incl safety pharmacology)	2,831	33,671	17,303	2,242	**56,047**	**0.7**
Phototoxicity	0	68	46	0	**114**	**0**
Ecotoxicity						
Acute toxicity	35	24,127	5,907	21,791	**51,860**	**0.6**
Chronic toxicity	41	13,794	9,852	1,223	**24,910**	**0.3**
Reproductive ecotoxicity	0	2,404	95	154	**2,653**	**0**
Endocrine activity	0	13,428	169	82	**13,679**	**0.2**
Bioaccumulation	0	1,977	0	0	**1,977**	**0**
Other ecotoxicity	6	1,890	28	110	**2,034**	**0**
Safety testing in food and feed area	0	24,695	496	5,933	**31,124**	**0.4**
Target animal safety	0	27,133	536	17	**27,686**	**0.3**

		Non-recovery	Mild [up to and including]	Moderate	Severe	Total	%
	Other toxicity/safety testing	9	11,512	2,516	268	**14,305**	**0.2**
	Other efficacy and tolerance testing						
	Other efficacy and tolerance testing	4,795	46,939	28,785	8,053	**88,572**	**1.1**
Routine production							
	Blood based products	21,939	103,084	103,550	189	**228,762**	**2.8**
	Monoclonal antibody by mouse ascites method	78	1,131	26,551	14,156	**41,916**	**0.5**
	Other product types	730	34,981	86,144	14,327	**136,182**	**1.7**
Other							
	Protection of the natural environment in the interests of the health or welfare of human beings or animals	1,825	48,978	163,331	10,351	**224,485**	**2.8**
	Preservation of species	1,012	69,447	33,969	1,630	**106,058**	**1.3**
	Higher education or training for the acquisition, maintenance or improvement of vocational skills	28,110	51,880	28,459	885	**109,334**	**1.4**
	Forensic enquiries	0	105	0	0	**105**	**0**
Total		**330,392**	**3,921,024**	**3,006,764**	**796,750**	**8,054,930**	**100**
%		**4.1**	**48.7**	**37.3**	**9.9**	**100**	

Table 7: Basic research related uses by species and type of research (2020)

		Oncology	Cardiovascular Blood and Lymphatic System	Nervous System	Respiratory System	Gastrointestinal System including Liver	Musculoskeletal System	Immune System	Urogenital/Reproductive System	Sensory Organs (skin, eyes and ears)	Endocrine System/Metabolism	Multisystemic	Ethology / Animal Behaviour /Animal Biology	Other basic research	Total	%
Mammals																
	Rodents															
	Mice	385,432	161,833	461,270	37,942	88,646	48,482	446,731	53,734	39,974	111,666	172,088	14,036	49,491	**2,071,325**	**62.9**
	Rats	4,127	17,976	86,595	3,042	7,766	4,201	6,110	5,785	4,786	13,392	16,517	13,091	3,582	**186,970**	**5.7**
	Guinea-Pigs	8	21	121	356	6	0	241	10	398	103	7,526	202	540	**9,532**	**0.3**
	Hamsters (Syrian)	0	494	1,177	0	0	0	653	11	112	20	197	0	200	**2,864**	**0.1**
	Hamsters (Chinese)	0	0	0	0	0	0	78	0	0	0	0	0	15	**93**	**0**
	Mongolian gerbil	0	0	205	0	17	7	368	0	449	0	0	25	17	**1,088**	**0**
	Other rodents	97	0	644	0	0	4	477	24	120	173	181	13,371	2,905	**17,996**	**0.5**
	Rabbits															
	Rabbits	295	1,274	234	754	244	321	413	493	293	107	63	8,672	5,496	**18,659**	**0.6**
	Carnivores															
	Cats	10	0	35	0	56	0	0	24	4	186	39	0	131	**485**	**0**
	Dogs	34	96	44	62	131	208	45	38	2	126	32	14	99	**931**	**0**
	Ferrets	0	0	192	0	0	0	8	0	0	0	48	0	8	**256**	**0**
	Other carnivores	0	0	0	0	0	0	0	0	0	160	0	224	0	**384**	**0**
	Farm animals															
	Horses, donkeys and cross-breeds	0	18	0	5	35	38	77	251	25	188	736	8	87	**1,468**	**0**
	Pigs	68	1,311	406	384	5,201	221	467	344	77	1,897	3,817	3,808	3,523	**21,524**	**0.7**
	Goats	24	3	4	0	28	0	427	175	0	81	15	187	87	**1,031**	**0**
	Sheep	0	591	177	9	350	98	99	126	1	381	6,203	1,698	377	**10,110**	**0.3**
	Cattle	0	20	0	0	305	18	289	355	0	502	839	2,934	621	**5,883**	**0.2**
	Non-human primates															
	Prosimians	0	0	35	0	0	0	0	0	0	0	0	45	0	**80**	**0**
	Marmoset and tamarins	0	0	13	0	0	0	0	0	0	8	0	0	0	**21**	**0**
	Cynomolgus monkey	0	4	18	0	0	0	19	7	0	1	0	0	239	**288**	**0**
	Rhesus monkey	0	0	68	0	0	0	0	0	0	0	0	0	0	**68**	**0**
	Vervets Chlorocebus spp.	0	0	0	0	0	0	0	0	0	0	0	0	4	**4**	**0**
	Baboons	0	0	2	0	0	0	0	0	0	0	0	33	32	**67**	**0**
	Other species of old world monkeys (Cercopithecoidea)	0	0	0	0	0	0	0	0	0	0	0	18	0	**18**	**0**
	Other mammals															
	Other mammals	0	23	111	0	0	6	13	86	9	16	17	3,182	399	**3,862**	**0.1**
Birds																
	Domestic fowl	600	26	7,086	4	8,406	0	955	0	152	130	987	113,439	8,203	**139,988**	**4.3**
	Other birds	0	52	475	0	1,076	35	578	55	30	1,102	191	46,887	680	**51,161**	**1.6**
Reptiles																
	Reptiles	0	28	162	0	0	0	0	0	3	0	57	1,509	14	**1,773**	**0.1**
Amphibians																
	Rana	0	0	0	0	0	0	0	0	0	792	0	0	0	**792**	**0**
	Xenopus	307	86	2,641	30	0	74	0	545	50	53	1,173	38	1,578	**6,575**	**0.2**
	Other amphibians	0	248	1,026	0	0	5,438	0	0	55	15	37	5,619	1,082	**13,520**	**0.4**
Fish																
	Zebra fish	22,035	27,970	74,079	65	6,564	6,109	9,041	3,794	2,709	15,189	18,054	3,587	8,979	**198,175**	**6**
	Other fish	1,127	1,689	3,548	587	3,684	1,378	39,088	18,920	2,075	6,575	8,150	404,073	33,981	**524,875**	**15.9**
Cephalopods																
	Cephalopods	0	0	37	0	0	27	0	0	0	0	0	1,119	300	**1,483**	**0**
Totals																
	Total	**414,164**	**213,763**	**640,405**	**43,240**	**122,515**	**66,665**	**506,177**	**84,777**	**51,324**	**152,863**	**236,967**	**637,819**	**122,670**	**3,293,349**	**100**
	%	**12.6**	**6.5**	**19.4**	**1.3**	**3.7**	**2**	**15.4**	**2.6**	**1.6**	**4.6**	**7.2**	**19.4**	**3.7**	**100**	

Table 8.1: Translational and applied research related uses by species and type of research (Part 1) (2020)

	Human Cancer	Human Infectious Disorders	Human Cardiovascular Disorders	Human Nervous and Mental Disorders	Human Respiratory Disorders	Human Gastrointestinal Disorders including Liver	Human Musculoskeletal Disorders	Human Immune Disorders	Human Urogenital/Reproductive Disorders
Mammals									
Rodents									
Mice	409,118	168,099	38,495	142,018	37,613	27,032	29,289	64,878	9,043
Rats	3,986	2,801	12,693	53,178	4,890	6,983	7,061	4,509	4,836
Guinea-Pigs	0	349	301	150	1,944	81	11	51	0
Hamsters (Syrian)	138	5,752	180	269	210	0	0	0	0
Hamsters (Chinese)	0	56	0	0	0	0	0	0	0
Mongolian gerbil	0	802	0	0	0	0	0	0	0
Other rodents	0	610	0	31	73	0	0	0	0
Rabbits									
Rabbits	1,517	1,023	772	334	962	14	572	339	71
Carnivores									
Cats	0	37	0	0	0	0	0	0	0
Dogs	35	35	63	133	23	14	45	54	2
Ferrets	0	582	0	0	0	122	0	0	0
Other carnivores	0	0	0	0	0	0	0	0	0
Farm animals									
Horses, donkeys and cross-breeds	0	123	0	0	0	0	6	0	0
Pigs	217	360	2,359	273	434	896	564	41	246
Goats	0	7	26	0	0	5	58	2	2
Sheep	0	1,874	494	40	53	0	202	0	49
Cattle	0	16	7	6	0	0	0	0	46
Non-human primates									
Marmoset and tamarins	0	25	0	7	0	0	0	0	0
Cynomolgus monkey	4	516	5	146	44	12	0	6	22
Rhesus monkey	2	216	19	3	0	0	0	0	1
Vervets Chlorocebus spp.	0	13	0	0	0	0	0	0	0
Baboons	0	13	6	0	0	0	0	0	0
Other mammals									
Other mammals	37	22	10	1	2	0	0	12	0
Birds									
Domestic fowl	0	165	0	0	0	208	0	1	0
Other birds	0	884	0	0	0	0	0	0	0
Reptiles									
Reptiles	0	0	0	0	0	0	0	0	0
Amphibians									
Xenopus	250	0	0	0	0	0	0	0	0
Fish									
Zebra fish	1,095	7,684	252	12,908	0	95	442	0	0
Other fish	0	400	0	0	0	0	0	0	0
Cephalopods									
Cephalopods	0	0	0	0	0	0	0	0	0
Totals									
Total	**416,399**	**192,464**	**55,682**	**209,497**	**46,248**	**35,462**	**38,250**	**69,893**	**14,318**
%	**16.6**	**7.7**	**2.2**	**8.3**	**1.8**	**1.4**	**1.5**	**2.8**	**0.6**

Table 8.2: Translational and applied research related uses by species and type of research (Part 2) (2020)

	Human Sensory Organ Disorders (skin, eyes and ears)	Human Endocrine/Metabolism Disorders	Other Human Disorders	Animal Diseases and Disorders	Animal Welfare	Diagnosis of diseases	Plant diseases	Non-regulatory toxicology and ecotoxicology	Total	%
Mammals										
Rodents										
Mice	19,969	77,028	15,609	20,416	1,381	27,779	84	14,414	**1,102,265**	**43.9**
Rats	5,073	14,085	3,834	868	5	4,942	0	9,917	**139,661**	**5.6**
Guinea-Pigs	495	4	41	476	0	48	0	295	**4,246**	**0.2**
Hamsters (Syrian)	0	1,050	0	1,914	0	0	0	49	**9,562**	**0.4**
Hamsters (Chinese)	0	0	0	0	0	0	0	0	**56**	**0**
Mongolian gerbil	63	0	0	691	0	0	0	0	**1,556**	**0.1**
Other rodents	0	0	0	76	0	56	0	218	**1,064**	**0**
Rabbits										
Rabbits	585	179	305	1,927	6,717	371	22	185	**15,895**	**0.6**
Carnivores										
Cats	0	0	0	1,835	409	48	0	8	**2,337**	**0.1**
Dogs	32	86	8	3,544	89	293	0	993	**5,449**	**0.2**
Ferrets	0	0	0	27	0	0	0	2	**733**	**0**
Other carnivores	0	0	0	364	6,074	0	0	0	**6,438**	**0.3**
Farm animals										
Horses, donkeys and cross-breeds	0	0	0	2,302	161	87	0	0	**2,679**	**0.1**
Pigs	171	1,074	335	13,408	8,797	170	0	160	**29,505**	**1.2**
Goats	0	0	0	181	13	8	0	0	**302**	**0**
Sheep	8	120	35	937	391	1,168	0	16	**5,387**	**0.2**
Cattle	0	209	6	7,127	6,149	2,026	0	16	**15,608**	**0.6**
Non-human primates										
Marmoset and tamarins	1	0	3	0	0	0	0	0	**36**	**0**
Cynomolgus monkey	49	6	30	3	50	31	0	202	**1,126**	**0**
Rhesus monkey	2	0	10	0	0	0	0	0	**253**	**0**
Vervets Chlorocebus spp.	0	0	0	0	0	17	0	0	**30**	**0**
Baboons	4	0	0	0	0	0	0	0	**23**	**0**
Other mammals										
Other mammals	0	0	9	303	52	13	0	11	**472**	**0**
Birds										
Domestic fowl	0	0	11	70,423	34,528	3,517	0	8	**108,861**	**4.3**
Other birds	0	0	0	6,769	5,993	117	0	56	**13,819**	**0.6**
Reptiles										
Reptiles	0	0	0	18	0	16	0	0	**34**	**0**
Amphibians										
Xenopus	0	0	0	70	23	12	0	1,019	**1,374**	**0.1**
Fish										
Zebra fish	3,837	355	1,080	790	0	0	0	9,255	**37,793**	**1.5**
Other fish	0	141	0	370,764	617,732	280	0	14,468	**1,003,785**	**40**
Cephalopods										
Cephalopods	0	0	0	150	0	0	0	0	**150**	**0**
Totals										
Total	**30,289**	**94,337**	**21,316**	**505,383**	**688,564**	**40,999**	**106**	**51,292**	**2,510,499**	**100**
%	**1.2**	**3.8**	**0.8**	**20.1**	**27.4**	**1.6**	**0**	**2**	**100**	

Table 9: Regulatory uses by species and type of use (2020)

	Quality				Toxicity	Other		
	Quality: Batch safety testing	Quality: Pyrogenicity testing	Quality: Batch potency testing	Quality: Other quality controls	Toxicity and other safety testing including pharmacology	Other efficacy and tolerance testing	Total	%
Mammals								
Rodents								
Mice	63,149	143	325,899	12,903	149,412	40,674	**592,180**	**42.2**
Rats	7,313	0	99,109	2,357	203,733	2,405	**314,917**	**22.4**
Guinea-Pigs	9,011	141	57,010	315	29,165	286	**95,928**	**6.8**
Hamsters (Syrian)	8	0	3,642	191	603	318	**4,762**	**0.3**
Mongolian gerbil	0	0	0	0	70	0	**70**	**0**
Other rodents	0	0	0	0	9,095	47	**9,142**	**0.7**
Rabbits								
Rabbits	1,690	23,855	6,789	114	28,994	7,346	**68,788**	**4.9**
Carnivores								
Cats	139	0	10	86	272	443	**950**	**0.1**
Dogs	389	0	0	41	4,927	867	**6,224**	**0.4**
Ferrets	126	0	42	0	46	0	**214**	**0**
Other carnivores	0	0	146	0	0	0	**146**	**0**
Farm animals								
Horses, donkeys and cross-breeds	6	0	32	0	105	74	**217**	**0**
Pigs	1,730	0	400	239	7,773	2,217	**12,359**	**0.9**
Goats	0	0	2	0	44	13	**59**	**0**
Sheep	252	0	421	6	160	118	**957**	**0.1**
Cattle	494	0	523	50	780	585	**2,432**	**0.2**
Non-human primates								
Marmoset and tamarins	0	0	0	0	198	0	**198**	**0**
Cynomolgus monkey	0	0	0	0	4,130	0	**4,130**	**0.3**
Rhesus monkey	0	0	0	0	8	0	**8**	**0**
Birds								
Domestic fowl	34,758	0	74,530	3,170	9,518	25,524	**147,500**	**10.5**
Other birds	338	0	301	0	524	2,655	**3,818**	**0.3**
Amphibians								
Xenopus	0	0	0	0	10,764	0	**10,764**	**0.8**
Fish								
Zebra fish	0	0	0	84	37,897	0	**37,981**	**2.7**
Other fish	18,115	0	8,678	985	57,718	5,000	**90,496**	**6.4**
Totals								
Total	**137,518**	**24,139**	**577,534**	**20,541**	**555,936**	**88,572**	**1,404,240**	**100**
%	**9.8**	**1.7**	**41.1**	**1.5**	**39.6**	**6.3**	**100**	

Table 10.1: Toxicity and other safety testing including pharmacology by species and type of use (Part 1) (2020)

	Acute						Repeated Dose							
	LD50, LC50	Other lethal methods	Non lethal methods	Skin irritation / corrosion	Skin sensitisation	Eye irritation / corrosion	up to 28 days	29 - 90 days	> 90 days	Carcinogenicity	Reproductive toxicity	Genotoxicity	Developmental toxicity	Safety testing in food and feed area
Mammals														
Rodents														
Mice	11,138	4,780	6,911	93	10,218	0	10,175	4,706	1	852	153	2,222	232	26,076
Rats	1,911	449	6,859	315	60	0	23,591	15,909	4,860	717	61,072	2,525	49,072	96
Guinea-Pigs	1,240	30	31	0	27,616	0	0	0	0	0	0	0	0	0
Hamsters (Syrian)	0	0	153	77	0	0	3	0	0	0	0	0	0	0
Mongolian gerbil	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other rodents	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabbits														
Rabbits	0	0	482	3,579	115	491	755	602	302	0	739	34	18,654	0
Carnivores														
Cats	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Dogs	0	0	331	0	15	0	1,685	366	341	0	6	14	0	24
Ferrets	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Farm animals														
Horses, donkeys and cross-breeds	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigs	0	0	112	6	0	0	496	153	418	0	0	13	6	272
Goats	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheep	0	0	0	0	0	0	0	0	0	0	0	0	0	32
Cattle	0	0	0	0	0	0	0	0	0	0	0	0	0	21
Non-human primates														
Marmoset and tamarins	0	0	0	0	0	0	0	56	88	0	0	0	0	0
Cynomolgus monkey	0	0	73	0	0	0	1,072	711	1,160	0	0	0	58	0
Rhesus monkey	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Birds														
Domestic fowl	134	0	0	0	0	0	0	0	0	0	0	0	0	4,089
Other birds	0	0	0	0	0	0	0	0	0	0	0	0	0	142
Amphibians														
Xenopus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fish														
Zebra fish	1,170	0	0	0	0	0	0	0	0	0	0	0	0	0
Other fish	828	0	0	0	0	0	0	0	0	0	0	0	0	360
Totals														
Total	**16,421**	**5,259**	**14,952**	**4,070**	**38,024**	**491**	**37,777**	**22,503**	**7,174**	**1,569**	**61,970**	**4,808**	**68,022**	**31,124**
%	**3**	**0.9**	**2.7**	**0.7**	**6.8**	**0.1**	**6.8**	**4**	**1.3**	**0.3**	**11.1**	**0.9**	**12.2**	**5.6**

Table 10.2: Toxicity and other safety testing including pharmacology by species and type of use (Part 2) (2020)

						EcoToxicity									
	Target animal safety	Neurotoxicity	Kinetics	Pharmaco - dynamics (incl safety pharmacology)	Phototoxicity	Acute toxicity	Chronic toxicity	Reproductive ecotoxicity	Endocrine activity	Bioaccumulation	Other ecotoxicity	Other toxicity / safety testing	Total	%
Mammals														
Rodents														
Mice	277	235	29,459	33,480	54	6,123	0	0	0	92	10	2,125	**149,412**	**26.9**
Rats	0	1,895	11,542	19,317	40	711	1,626	6	0	0	0	1,160	**203,733**	**36.6**
Guinea-Pigs	0	0	36	184	20	0	0	0	0	0	0	8	**29,165**	**5.2**
Hamsters (Syrian)	0	0	130	210	0	0	0	0	0	0	0	30	**603**	**0.1**
Mongolian gerbil	0	0	0	70	0	0	0	0	0	0	0	0	**70**	**0**
Other rodents	1,858	0	0	0	0	0	0	0	0	0	407	6,830	**9,095**	**1.6**
Rabbits														
Rabbits	166	0	220	918	0	32	170	0	0	0	28	1,707	**28,994**	**5.2**
Carnivores														
Cats	12	0	109	103	0	0	0	0	0	0	0	36	**272**	**0**
Dogs	48	0	1,321	642	0	0	0	0	0	0	0	134	**4,927**	**0.9**
Ferrets	0	0	0	0	0	0	0	0	0	0	0	46	**46**	**0**
Farm animals														
Horses, donkeys and cross-breeds	14	0	78	0	0	0	0	0	0	0	0	13	**105**	**0**
Pigs	5,370	0	501	357	0	0	0	0	0	26	0	43	**7,773**	**1.4**
Goats	0	0	2	0	0	0	0	0	0	0	0	42	**44**	**0**
Sheep	46	0	82	0	0	0	0	0	0	0	0	0	**160**	**0**
Cattle	387	0	228	78	0	0	0	0	0	51	0	15	**780**	**0.1**
Non-human primates														
Marmoset and tamarins	0	0	2	6	0	0	0	0	0	0	0	46	**198**	**0**
Cynomolgus monkey	0	0	657	196	0	0	0	0	0	0	0	203	**4,130**	**0.7**
Rhesus monkey	0	0	0	0	0	0	0	0	0	0	0	4	**8**	**0**
Birds														
Domestic fowl	3,495	0	10	0	0	0	0	0	0	84	0	1,706	**9,518**	**1.7**
Other birds	58	0	0	0	0	251	0	0	0	0	0	73	**524**	**0.1**
Amphibians														
Xenopus	0	0	0	0	0	670	0	0	10,094	0	0	0	**10,764**	**1.9**
Fish														
Zebra fish	0	0	0	0	0	13,084	20,648	1,200	1,200	511	0	84	**37,897**	**6.8**
Other fish	15,955	0	0	486	0	30,989	2,466	1,447	2,385	1,213	1,589	0	**57,718**	**10.4**
Totals														
Total	**27,686**	**2,130**	**44,377**	**56,047**	**114**	**51,860**	**24,910**	**2,653**	**13,679**	**1,977**	**2,034**	**14,305**	**555,936**	**100**
%	**5**	**0.4**	**8**	**10.1**	**0**	**9.3**	**4.5**	**0.5**	**2.5**	**0.4**	**0.4**	**2.6**	**100**	

Table 11: Regulatory uses by species and type of legislation (2020)

	Legislation on medicinal products for human use	Legislation on medicinal products for veterinary use and their residues	Medical devices legislation	Industrial chemicals legislation	Plant protection product legislation	Biocides legislation	Food legislation including food contact material	Feed legislation including legislation for the safety of target animals, workers and environment	Other legislation	Total	%
Mammals											
Rodents											
Mice	462,072	81,283	13,112	2,912	3,749	868	26,621	256	1,307	**592,180**	**42.2**
Rats	188,004	5,605	4,036	89,638	23,519	2,001	1,532	102	480	**314,917**	**22.4**
Guinea-Pigs	53,716	15,784	25,251	940	0	138	30	38	31	**95,928**	**6.8**
Hamsters (Syrian)	587	3,915	249	0	0	0	0	0	11	**4,762**	**0.3**
Mongolian gerbil	0	70	0	0	0	0	0	0	0	**70**	**0**
Other rodents	0	0	0	0	9,095	47	0	0	0	**9,142**	**0.7**
Rabbits											
Rabbits	34,382	9,939	6,855	10,884	5,483	1,244	0	0	1	**68,788**	**4.9**
Carnivores											
Cats	36	796	0	0	0	0	86	32	0	**950**	**0.1**
Dogs	4,230	1,803	32	0	54	0	41	64	0	**6,224**	**0.4**
Ferrets	214	0	0	0	0	0	0	0	0	**214**	**0**
Farm animals											
Other carnivores	0	146	0	0	0	0	0	0	0	**146**	**0**
Horses, donkeys and cross-breeds	62	155	0	0	0	0	0	0	0	**217**	**0**
Pigs	2,072	9,884	155	0	0	0	0	248	0	**12,359**	**0.9**
Goats	2	42	13	0	2	0	0	0	0	**59**	**0**
Sheep	30	776	139	0	0	0	6	6	0	**957**	**0.1**
Cattle	0	2,108	0	0	0	0	0	57	267	**2,432**	**0.2**
Non-human primates											
Marmoset and tamarins	198	0	0	0	0	0	0	0	0	**198**	**0**
Cynomolgus monkey	4,130	0	0	0	0	0	0	0	0	**4,130**	**0.3**
Rhesus monkey	8	0	0	0	0	0	0	0	0	**8**	**0**
Birds											
Domestic fowl	3,621	135,088	0	0	0	0	10	8,781	0	**147,500**	**10.5**
Other birds	28	3,425	0	0	223	0	0	142	0	**3,818**	**0.3**
Amphibians											
Xenopus	0	0	0	69	10,695	0	0	0	0	**10,764**	**0.8**
Fish											
Zebra fish	3,464	85	286	15,641	7,058	84	0	0	11,363	**37,981**	**2.7**
Other fish	2,046	48,949	299	2,652	7,296	60	0	630	28,564	**90,496**	**6.4**
Totals											
Total	**758,902**	**319,853**	**50,427**	**122,736**	**67,174**	**4,442**	**28,326**	**10,356**	**42,024**	**1,404,240**	**100**
%	**54**	**22.8**	**3.6**	**8.7**	**4.8**	**0.3**	**2**	**0.7**	**3**	**100**	

Table 12: Regulatory uses by species and origin of regulatory requirement (2020)

	Legislation satisfying EU requirements	Legislation satisfying national requirements only [within EU]	Legislation satisfying Non-EU requirements only	Total	%
Mammals					
Rodents					
Mice	572,466	5,620	14,094	**592,180**	**42.2**
Rats	313,947	591	379	**314,917**	**22.4**
Guinea-Pigs	92,444	0	3,484	**95,928**	**6.8**
Hamsters (Syrian)	4,762	0	0	**4,762**	**0.3**
Mongolian gerbil	70	0	0	**70**	**0**
Other rodents	9,142	0	0	**9,142**	**0.7**
Rabbits					
Rabbits	63,605	3	5,180	**68,788**	**4.9**
Carnivores					
Cats	950	0	0	**950**	**0.1**
Dogs	6,182	4	38	**6,224**	**0.4**
Ferrets	214	0	0	**214**	**0**
Farm animals					
Other carnivores	146	0	0	**146**	**0**
Horses, donkeys and cross-breeds	211	0	6	**217**	**0**
Pigs	11,202	2	1,155	**12,359**	**0.9**
Goats	59	0	0	**59**	**0**
Sheep	830	123	4	**957**	**0.1**
Cattle	2,426	0	6	**2,432**	**0.2**
Non-human primates					
Marmoset and tamarins	198	0	0	**198**	**0**
Cynomolgus monkey	4,130	0	0	**4,130**	**0.3**
Rhesus monkey	8	0	0	**8**	**0**
Birds					
Domestic fowl	133,170	7,470	6,860	**147,500**	**10.5**
Other birds	3,818	0	0	**3,818**	**0.3**
Amphibians					
Xenopus	10,764	0	0	**10,764**	**0.8**
Fish					
Zebra fish	37,943	0	38	**37,981**	**2.7**
Other fish	67,554	22,820	122	**90,496**	**6.4**
Totals					
Total	**1,336,241**	**36,633**	**31,366**	**1,404,240**	**100**
%	**95.2**	**2.6**	**2.2**	**100**	

Table 13: Routine production uses by species and product type (2020)

		Blood based products	Other product types	Monoclonal antibody by mouse ascites method	Total	%
Mammals						
	Rodents					
	Mice	1,577	58,890	41,107	**101,574**	**25**
	Rats	553	522	25	**1,100**	**0.3**
	Guinea-Pigs	499	84	0	**583**	**0.1**
	Hamsters (Syrian)	1	9	0	**10**	**0**
	Mongolian gerbil	0	269	0	**269**	**0.1**
	Other rodents	0	42	0	**42**	**0**
	Rabbits					
	Rabbits	219,338	25,960	780	**246,078**	**60.5**
	Carnivores					
	Cats	96	16	0	**112**	**0**
	Dogs	704	46	0	**750**	**0.2**
	Ferrets	44	0	0	**44**	**0**
	Farm animals					
	Horses, donkeys and cross-breeds	81	0	0	**81**	**0**
	Pigs	256	3,371	0	**3,627**	**0.9**
	Goats	66	80	4	**150**	**0**
	Sheep	2,275	16	0	**2,291**	**0.6**
	Cattle	52	47	0	**99**	**0**
	Non-human primates					
	Marmoset and tamarins	109	0	0	**109**	**0**
	Cynomolgus monkey	555	274	0	**829**	**0.2**
	Rhesus monkey	21	4	0	**25**	**0**
	Vervets Chlorocebus spp.	3	0	0	**3**	**0**
	Other mammals					
	Other mammals	5	2	0	**7**	**0**
Birds						
	Domestic fowl	2,488	23,201	0	**25,689**	**6.3**
	Other birds	39	12,885	0	**12,924**	**3.2**
Fish						
	Other fish	0	10,464	0	**10,464**	**2.6**
Totals						
	Total	**228,762**	**136,182**	**41,916**	**406,860**	**100**
	%	**56.2**	**33.5**	**10.3**	**100**	

Table 14: Reuses of animals by species and main categories of scientific purposes in research, testing routine production and education (2020)

	Reuse	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Yes	8,397	12,968	19,787	6,063	0	47	6,994	0	54,256	1.4
Mice	No	2,062,928	1,089,297	572,393	95,511	485	4,811	54,264	2	3,879,691	98.6
	Total	**2,071,325**	**1,102,265**	**592,180**	**101,574**	**485**	**4,858**	**61,258**	**2**	**3,933,947**	**100.0**
	Yes	3,271	1,203	2,506	120	0	0	2,031	0	9,131	1.4
Rats	No	183,699	138,458	312,411	980	4,654	519	24,434	0	665,155	98.6
	Total	**186,970**	**139,661**	**314,917**	**1,100**	**4,654**	**519**	**26,465**	**0**	**674,286**	**100.0**
	Yes	0	46	624	19	11	0	81	0	781	0.7
Guinea-Pigs	No	9,532	4,200	95,304	564	380	0	1,192	0	111,172	99.3
	Total	**9,532**	**4,246**	**95,928**	**583**	**391**	**0**	**1,273**	**0**	**111,953**	**100.0**
	Yes	0	75	3	0	0	0	0	0	78	0.4
Hamsters (Syrian)	No	2,864	9,487	4,759	10	0	0	235	0	17,355	99.6
	Total	**2,864**	**9,562**	**4,762**	**10**	**0**	**0**	**235**	**0**	**17,433**	**100.0**
	Yes	0	0	0	0	0	0	0	0	0	0.0
Hamsters (Chinese)	No	93	56	0	0	0	0	0	0	149	100.0
	Total	**93**	**56**	**0**	**0**	**0**	**0**	**0**	**0**	**149**	**100.0**
	Yes	26	0	0	0	0	0	0	0	26	0.9
Mongolian gerbil	No	1,062	1,556	70	269	0	0	21	0	2,978	99.1
	Total	**1,088**	**1,556**	**70**	**269**	**0**	**0**	**21**	**0**	**3,004**	**100.0**
	Yes	647	0	0	0	0	0	0	0	647	2.2
Other rodents	No	17,349	1,064	9,142	42	359	126	104	0	28,186	97.8
	Total	**17,996**	**1,064**	**9,142**	**42**	**359**	**126**	**104**	**0**	**28,833**	**100.0**
	Yes	112	223	5,622	747	0	0	269	0	6,973	2.0
Rabbits	No	18,547	15,672	63,166	245,331	2	0	726	77	343,521	98.0
	Total	**18,659**	**15,895**	**68,788**	**246,078**	**2**	**0**	**995**	**77**	**350,494**	**100.0**

	Reuse	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Yes	356	676	395	8	0	0	60	0	1,495	37.8
Cats	No	129	1,661	555	104	0	0	15	0	2,464	62.2
	Total	**485**	**2,337**	**950**	**112**	**0**	**0**	**75**	**0**	**3,959**	**100.0**
	Yes	381	1,703	2,414	331	0	0	519	0	5,348	38.0
Dogs	No	550	3,746	3,810	419	31	0	160	0	8,716	62.0
	Total	**931**	**5,449**	**6,224**	**750**	**31**	**0**	**679**	**0**	**14,064**	**100.0**
	Yes	0	9	0	0	0	0	26	0	35	2.7
Ferrets	No	256	724	214	44	0	0	12	0	1,250	97.3
	Total	**256**	**733**	**214**	**44**	**0**	**0**	**38**	**0**	**1,285**	**100.0**
	Yes	63	186	0	0	0	0	0	0	249	3.5
Other carnivores	No	321	6,252	146	0	18	130	0	0	6,867	96.5
	Total	**384**	**6,438**	**146**	**0**	**18**	**130**	**0**	**0**	**7,116**	**100.0**
	Yes	439	341	11	50	0	0	157	0	998	20.7
Horses, donkeys and cross-breeds	No	1,029	2,338	206	31	0	45	182	0	3,831	79.3
	Total	**1,468**	**2,679**	**217**	**81**	**0**	**45**	**339**	**0**	**4,829**	**100.0**
	Yes	543	670	600	31	0	0	627	0	2,471	3.3
Pigs	No	20,981	28,835	11,759	3,596	2,662	64	5,612	0	73,509	96.7
	Total	**21,524**	**29,505**	**12,359**	**3,627**	**2,662**	**64**	**6,239**	**0**	**75,980**	**100.0**
	Yes	461	21	0	86	0	0	21	0	589	37.1
Goats	No	570	281	59	64	0	0	24	0	998	62.9
	Total	**1,031**	**302**	**59**	**150**	**0**	**0**	**45**	**0**	**1,587**	**100.0**
	Yes	297	697	327	713	30	0	151	0	2,215	11.2
Sheep	No	9,813	4,690	630	1,578	122	52	604	0	17,489	88.8
	Total	**10,110**	**5,387**	**957**	**2,291**	**152**	**52**	**755**	**0**	**19,704**	**100.0**
	Yes	1,207	2,416	115	11	333	0	1,465	0	5,547	20.0
Cattle	No	4,676	13,192	2,317	88	0	0	1,876	26	22,175	80.0
	Total	**5,883**	**15,608**	**2,432**	**99**	**333**	**0**	**3,341**	**26**	**27,722**	**100.0**
	Yes	26	0	0	0	0	0	0	0	26	32.5
Prosimians	No	54	0	0	0	0	0	0	0	54	67.5
	Total	**80**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**80**	**100.0**

	Reuse	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Marmoset and tamarins	Yes	5	3	51	109	0	0	0	0	168	46.2
	No	16	33	147	0	0	0	0	0	196	53.8
	Total	**21**	**36**	**198**	**109**	**0**	**0**	**0**	**0**	**364**	**100.0**
Cynomolgus monkey	Yes	14	500	810	829	0	0	0	0	2,153	33.8
	No	274	626	3,320	0	0	0	0	0	4,220	66.2
	Total	**288**	**1,126**	**4,130**	**829**	**0**	**0**	**0**	**0**	**6,373**	**100.0**
Rhesus monkey	Yes	42	60	0	25	0	0	0	0	127	35.9
	No	26	193	8	0	0	0	0	0	227	64.1
	Total	**68**	**253**	**8**	**25**	**0**	**0**	**0**	**0**	**354**	**100.0**
Vervets Chlorocebus spp	Yes	0	0	0	3	0	0	0	0	3	8.1
	No	4	30	0	0	0	0	0	0	34	91.9
	Total	**4**	**30**	**0**	**3**	**0**	**0**	**0**	**0**	**37**	**100.0**
Baboons	Yes	33	4	0	0	0	0	0	0	37	41.1
	No	34	19	0	0	0	0	0	0	53	58.9
	Total	**67**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**90**	**100.0**
Other species of old world monkeys (Cercopithecoidea)	Yes	18	0	0	0	0	0	0	0	18	100.0
	No	0	0	0	0	0	0	0	0	0	0.0
	Total	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**100.0**
Other mammals	Yes	126	45	0	0	0	12	3	0	186	3.8
	No	3,736	427	0	7	122	267	214	0	4,773	96.2
	Total	**3,862**	**472**	**0**	**7**	**122**	**279**	**217**	**0**	**4,959**	**100.0**
Domestic fowl	Yes	1,542	207	680	59	0	60	228	0	2,776	0.7
	No	138,446	108,654	146,820	25,630	2,487	280	1,420	0	423,737	99.3
	Total	**139,988**	**108,861**	**147,500**	**25,689**	**2,487**	**340**	**1,648**	**0**	**426,513**	**100.0**
Other birds	Yes	497	11	0	10	24	95	241	0	878	1.0
	No	50,664	13,808	3,818	12,914	3,771	1,120	276	0	86,371	99.0
	Total	**51,161**	**13,819**	**3,818**	**12,924**	**3,795**	**1,215**	**517**	**0**	**87,249**	**100.0**
Reptiles	Yes	838	0	0	0	450	0	3	0	1,291	38.4
	No	935	34	0	0	652	426	25	0	2,072	61.6
	Total	**1,773**	**34**	**0**	**0**	**1,102**	**426**	**28**	**0**	**3,363**	**100.0**

	Reuse	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Yes	0	0	0	0	0	0	0	0	0	0.0
Rana	No	792	0	0	0	0	0	930	0	1,722	100.0
	Total	**792**	**0**	**0**	**0**	**0**	**0**	**930**	**0**	**1,722**	**100.0**
	Yes	1,805	1,015	0	0	0	0	46	0	2,866	13.9
Xenopus	No	4,770	359	10,764	0	1,679	0	234	0	17,806	86.1
	Total	**6,575**	**1,374**	**10,764**	**0**	**1,679**	**0**	**280**	**0**	**20,672**	**100.0**
	Yes	147	0	0	0	0	0	0	0	147	0.8
Other amphibians	No	13,373	0	0	0	2,202	2,200	518	0	18,293	99.2
	Total	**13,520**	**0**	**0**	**0**	**2,202**	**2,200**	**518**	**0**	**18,440**	**100.0**
	Yes	2,364	1,043	0	0	0	0	0	0	3,407	1.2
Zebra fish	No	195,811	36,750	37,981	0	5,790	0	996	0	277,328	98.8
	Total	**198,175**	**37,793**	**37,981**	**0**	**5,790**	**0**	**996**	**0**	**280,735**	**100.0**
	Yes	10,154	189	647	405	460	83	6	0	11,944	0.6
Other fish	No	514,721	1,003,596	89,849	10,059	197,761	95,721	2,332	0	1,914,039	99.4
	Total	**524,875**	**1,003,785**	**90,496**	**10,464**	**198,221**	**95,804**	**2,338**	**0**	**1,925,983**	**100.0**
	Yes	0	0	0	0	0	0	0	0	0	0.0
Cephalopods	No	**1,483**	**150**	**0**	**0**	**0**	**0**	**0**	**0**	**1,633**	**100.0**
	Total	**1,483**	**150**	**0**	**0**	**0**	**0**	**0**	**0**	**1,633**	**100.0**
	Yes	**33,811**	**24,311**	**34,592**	**9,619**	**1,308**	**297**	**12,928**	**0**	**116,866**	**1.5**
All Species	**No**	**3,259,538**	**2,486,188**	**1,369,648**	**397,241**	**223,177**	**105,761**	**96,406**	**105**	**7,938,064**	**98.5**
	Total	**3,293,349**	**2,510,499**	**1,404,240**	**406,860**	**224,485**	**106,058**	**109,334**	**105**	**8,054,930**	**100.0**

Table 15: Genetic status of animals used by species and main categories of scientific purposes (2020)

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Mice	Not altered	887,765	727,499	568,629	100,529	485	2,271	48,870	0	2,336,048	59.4
	Non harmful	973,246	292,263	21,753	1,043	0	2,587	11,885	2	1,302,779	33.1
	Harmful	210,314	82,503	1,798	2	0	0	503	0	295,120	7.5
	Total	**2,071,325**	**1,102,265**	**592,180**	**101,574**	**485**	**4,858**	**61,258**	**2**	**3,933,947**	**100.0**
Rats	Not altered	174,191	132,789	312,901	752	4,654	15	25,949	0	651,251	96.6
	Non harmful	10,431	4,333	1,972	348	0	0	444	0	17,528	2.6
	Harmful	2,348	2,539	44	0	0	504	72	0	5,507	0.8
	Total	**186,970**	**139,661**	**314,917**	**1,100**	**4,654**	**519**	**26,465**	**0**	**674,286**	**100.0**
Guinea-Pigs	Not altered	9,532	4,246	95,928	583	391	0	1,273	0	111,953	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**9,532**	**4,246**	**95,928**	**583**	**391**	**0**	**1,273**	**0**	**111,953**	**100.0**
Hamsters (Syrian)	Not altered	2,864	9,562	4,762	10	0	0	235	0	17,433	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**2,864**	**9,562**	**4,762**	**10**	**0**	**0**	**235**	**0**	**17,433**	**100.0**
Hamsters (Chinese)	Not altered	93	56	0	0	0	0	0	0	149	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**93**	**56**	**0**	**0**	**0**	**0**	**0**	**0**	**149**	**100.0**
Mongolian gerbil	Not altered	1,088	1,556	70	269	0	0	21	0	3,004	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,088**	**1,556**	**70**	**269**	**0**	**0**	**21**	**0**	**3,004**	**100.0**
Other rodents	Not altered	17,996	1,064	9,142	42	359	126	104	0	28,833	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**17,996**	**1,064**	**9,142**	**42**	**359**	**126**	**104**	**0**	**28,833**	**100.0**
Rabbits	Not altered	18,521	15,771	68,788	228,395	2	0	995	77	332,549	94.9
	Non harmful	125	124	0	17,683	0	0	0	0	17,932	5.1
	Harmful	13	0	0	0	0	0	0	0	13	0.0
	Total	**18,659**	**15,895**	**68,788**	**246,078**	**2**	**0**	**995**	**77**	**350,494**	**100.0**
Cats	Not altered	485	2,337	950	112	0	0	75	0	3,959	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**485**	**2,337**	**950**	**112**	**0**	**0**	**75**	**0**	**3,959**	**100.0**
Dogs	Not altered	920	5,447	6,224	750	31	0	679	0	14,051	99.9
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	11	2	0	0	0	0	0	0	13	0.1
	Total	**931**	**5,449**	**6,224**	**750**	**31**	**0**	**679**	**0**	**14,064**	**100.0**
Ferrets	Not altered	217	733	214	44	0	0	38	0	1,246	97.0
	Non harmful	39	0	0	0	0	0	0	0	39	3.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**256**	**733**	**214**	**44**	**0**	**0**	**38**	**0**	**1,285**	**100.0**
Other carnivores	Not altered	384	6,438	146	0	18	130	0	0	7,116	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**384**	**6,438**	**146**	**0**	**18**	**130**	**0**	**0**	**7,116**	**100.0**
Horses, donkeys and cross-breeds	Not altered	1,468	2,679	217	81	0	45	339	0	4,829	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,468**	**2,679**	**217**	**81**	**0**	**45**	**339**	**0**	**4,829**	**100.0**
Pigs	Not altered	21,360	29,063	12,345	3,627	2,662	64	6,221	0	75,342	99.2
	Non harmful	137	215	14	0	0	0	18	0	384	0.5
	Harmful	27	227	0	0	0	0	0	0	254	0.3
	Total	**21,524**	**29,505**	**12,359**	**3,627**	**2,662**	**64**	**6,239**	**0**	**75,980**	**100.0**
Goats	Not altered	1,031	302	59	150	0	0	45	0	1,587	100.0

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,031**	**302**	**59**	**150**	**0**	**0**	**45**	**0**	**1,587**	**100.0**
Sheep	Not altered	10,110	5,387	957	2,291	152	52	755	0	19,704	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**10,110**	**5,387**	**957**	**2,291**	**152**	**52**	**755**	**0**	**19,704**	**100.0**
Cattle	Not altered	5,883	15,607	2,432	98	333	0	3,341	26	27,720	100.0
	Non harmful	0	0	0	1	0	0	0	0	1	0.0
	Harmful	0	1	0	0	0	0	0	0	1	0.0
	Total	**5,883**	**15,608**	**2,432**	**99**	**333**	**0**	**3,341**	**26**	**27,722**	**100.0**
Prosimians	Not altered	80	0	0	0	0	0	0	0	80	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**80**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**80**	**100.0**
Marmoset and tamarins	Not altered	21	36	198	109	0	0	0	0	364	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**21**	**36**	**198**	**109**	**0**	**0**	**0**	**0**	**364**	**100.0**
Cynomolgus monkey	Not altered	288	1,126	4,130	829	0	0	0	0	6,373	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**288**	**1,126**	**4,130**	**829**	**0**	**0**	**0**	**0**	**6,373**	**100.0**
Rhesus monkey	Not altered	68	253	8	25	0	0	0	0	354	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**68**	**253**	**8**	**25**	**0**	**0**	**0**	**0**	**354**	**100.0**
Vervets Chlorocebus spp	Not altered	4	30	0	3	0	0	0	0	37	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Total	**4**	**30**	**0**	**3**	**0**	**0**	**0**	**0**	**37**	**100.0**
Baboons	Not altered	67	23	0	0	0	0	0	0	90	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**67**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**90**	**100.0**
Other species of old world monkeys (Cercopithecoidea)	Not altered	18	0	0	0	0	0	0	0	18	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**100.0**
Other mammals	Not altered	3,862	472	0	7	122	279	217	0	4,959	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**3,862**	**472**	**0**	**7**	**122**	**279**	**217**	**0**	**4,959**	**100.0**
Domestic fowl	Not altered	139,946	108,770	147,500	25,689	2,487	340	1,648	0	426,380	100.0
	Non harmful	42	91	0	0	0	0	0	0	133	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**139,988**	**108,861**	**147,500**	**25,689**	**2,487**	**340**	**1,648**	**0**	**426,513**	**100.0**
Other birds	Not altered	51,161	13,819	3,818	12,924	3,795	1,215	517	0	87,249	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**51,161**	**13,819**	**3,818**	**12,924**	**3,795**	**1,215**	**517**	**0**	**87,249**	**100.0**
Reptiles	Not altered	1,773	34	0	0	1,102	426	28	0	3,363	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,773**	**34**	**0**	**0**	**1,102**	**426**	**28**	**0**	**3,363**	**100.0**
Rana	Not altered	792	0	0	0	0	0	930	0	1,722	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**792**	**0**	**0**	**0**	**0**	**0**	**930**	**0**	**1,722**	**100.0**
Xenopus	Not altered	5,577	849	10,764	0	1,679	0	280	0	19,149	92.6
	Non harmful	998	335	0	0	0	0	0	0	1,333	6.4

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Harmful	0	190	0	0	0	0	0	0	190	0.9
	Total	**6,575**	**1,374**	**10,764**	**0**	**1,679**	**0**	**280**	**0**	**20,672**	**100.0**
Other amphibians	Not altered	8,560	0	0	0	2,202	2,200	429	0	13,391	72.6
	Non harmful	4,960	0	0	0	0	0	89	0	5,049	27.4
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**13,520**	**0**	**0**	**0**	**2,202**	**2,200**	**518**	**0**	**18,440**	**100.0**
Zebra fish	Not altered	67,675	26,268	37,981	0	1,050	0	779	0	133,753	47.6
	Non harmful	120,972	8,934	0	0	4,740	0	217	0	134,863	48.0
	Harmful	9,528	2,591	0	0	0	0	0	0	12,119	4.3
	Total	**198,175**	**37,793**	**37,981**	**0**	**5,790**	**0**	**996**	**0**	**280,735**	**100.0**
Other fish	Not altered	519,745	1,002,571	90,496	10,464	198,221	95,804	2,338	0	1,919,639	99.7
	Non harmful	4,410	1,214	0	0	0	0	0	0	5,624	0.3
	Harmful	720	0	0	0	0	0	0	0	720	0.0
	Total	**524,875**	**1,003,785**	**90,496**	**10,464**	**198,221**	**95,804**	**2,338**	**0**	**1,925,983**	**100.0**
Cephalopods	Not altered	1,483	150	0	0	0	0	0	0	1,633	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,483**	**150**	**0**	**0**	**0**	**0**	**0**	**0**	**1,633**	**100.0**
All Species	**Harmful**	**222,961**	**88,053**	**1,842**	**2**	**0**	**504**	**575**	**0**	**313,937**	**3.9**
	Non harmful	**1,115,360**	**307,509**	**23,739**	**19,075**	**4,740**	**2,587**	**12,653**	**2**	**1,485,665**	**18.4**
	Not altered	**1,955,028**	**2,114,937**	**1,378,659**	**387,783**	**219,745**	**102,967**	**96,106**	**103**	**6,255,328**	**77.7**
	Total	**3,293,349**	**2,510,499**	**1,404,240**	**406,860**	**224,485**	**106,058**	**109,334**	**105**	**8,054,930**	**100.0**

Part 3: Numbers and uses of animals for the creation and maintenance of genetically altered animals in the EU

Table 16: Use of animals for the creation of new genetically altered animal lines by research type species and severity (2020)

	Severity	Basic research	Translational and applied research	Total	%
Mice	Non-recovery	24,704	12,999	37,703	12.8
	Mild	159,435	30,111	189,546	64.5
	Moderate	57,296	6,197	63,493	21.6
	Severe	2,378	701	3,079	1.0
	Total	**243,813**	**50,008**	**293,821**	**100.0**
Rats	Non-recovery	162	541	703	13.7
	Mild	1,318	1,518	2,836	55.2
	Moderate	1,467	87	1,554	30.2
	Severe	45	0	45	0.9
	Total	**2,992**	**2,146**	**5,138**	**100.0**
Hamsters (Syrian)	Non-recovery	45	0	45	10.0
	Mild	259	0	259	57.7
	Moderate	145	0	145	32.3
	Severe	0	0	0	0.0
	Total	**449**	**0**	**449**	**100.0**
Rabbits	Non-recovery	0	149	149	53.8
	Mild	9	0	9	3.2
	Moderate	0	119	119	43.0
	Severe	0	0	0	0.0
	Total	**9**	**268**	**277**	**100.0**
Dogs	Non-recovery	0	0	0	0.0
	Mild	18	0	18	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**18**	**0**	**18**	**100.0**
Other carnivores	Non-recovery	0	0	0	0.0
	Mild	0	0	0	0.0

	Severity	Basic research	Translational and applied research	Total	%
	Moderate	6	0	6	100.0
	Severe	0	0	0	0.0
	Total	**6**	**0**	**6**	**100.0**
Horses, donkeys and cross-breeds	Non-recovery	0	0	0	0.0
	Mild	0	10	10	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**0**	**10**	**10**	**100.0**
Pigs	Non-recovery	0	0	0	0.0
	Mild	33	34	67	51.1
	Moderate	0	58	58	44.3
	Severe	0	6	6	4.6
	Total	**33**	**98**	**131**	**100.0**
Sheep	Non-recovery	0	0	0	0.0
	Mild	263	0	263	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**263**	**0**	**263**	**100.0**
Cattle	Non-recovery	0	0	0	0.0
	Mild	1	27	28	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**1**	**27**	**28**	**100.0**
Other mammals	Non-recovery	4	0	4	40.0
	Mild	0	0	0	0.0
	Moderate	6	0	6	60.0
	Severe	0	0	0	0.0
	Total	**10**	**0**	**10**	**100.0**
Domestic fowl	Non-recovery	0	0	0	0.0
	Mild	204	0	204	69.6
	Moderate	70	0	70	23.9
	Severe	19	0	19	6.5

	Severity	Basic research	Translational and applied research	Total	%
	Total	**293**	**0**	**293**	**100.0**
Other birds	Non-recovery	0	0	0	0.0
	Mild	171	0	171	93.4
	Moderate	12	0	12	6.6
	Severe	0	0	0	0.0
	Total	**183**	**0**	**183**	**100.0**
Reptiles	Non-recovery	0	0	0	0.0
	Mild	2	0	2	4.8
	Moderate	40	0	40	95.2
	Severe	0	0	0	0.0
	Total	**42**	**0**	**42**	**100.0**
Xenopus	Non-recovery	0	0	0	0.0
	Mild	759	0	759	92.7
	Moderate	60	0	60	7.3
	Severe	0	0	0	0.0
	Total	**819**	**0**	**819**	**100.0**
Other amphibians	Non-recovery	0	0	0	0.0
	Mild	368	0	368	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**368**	**0**	**368**	**100.0**
Zebra fish	Non-recovery	3,231	41	3,272	3.6
	Mild	72,728	1,070	73,798	82.2
	Moderate	11,208	1,289	12,497	13.9
	Severe	85	135	220	0.2
	Total	**87,252**	**2,535**	**89,787**	**100.0**
Other fish	Non-recovery	240	0	240	11.4
	Mild	1,850	0	1,850	88.0
	Moderate	13	0	13	0.6
	Severe	0	0	0	0.0
	Total	**2,103**	**0**	**2,103**	**100.0**
All Species	**Non-recovery**	**28,386**	**13,730**	**42,116**	**10.7**

Severity	Basic research	Translational and applied research	Total	%
Mild	237,418	32,770	270,188	68.6
Moderate	70,323	7,750	78,073	19.8
Severe	2,527	842	3,369	0.9
Total	338,654	55,092	393,746	100.0

Table 17: Use of animals for the creation of new genetically altered animal lines by research type species and severity (2020)

	Reuse	Basic research	Translational and applied research	Total	%
Mice	Yes	2,888	82	2,970	1.0
	No	240,925	49,926	290,851	99.0
	Total	**243,813**	**50,008**	**293,821**	**100.0**
Rats	Yes	0	40	40	0.8
	No	2,992	2,106	5,098	99.2
	Total	**2,992**	**2,146**	**5,138**	**100.0**
Hamsters (Syrian)	Yes	0	0	0	0.0
	No	449	0	449	100.0
	Total	**449**	**0**	**449**	**100.0**
Rabbits	Yes	0	0	0	0.0
	No	9	268	277	100.0
	Total	**9**	**268**	**277**	**100.0**
Dogs	Yes	0	0	0	0.0
	No	18	0	18	100.0
	Total	**18**	**0**	**18**	**100.0**
Other carnivores	Yes	0	0	0	0.0
	No	6	0	6	100.0
	Total	**6**	**0**	**6**	**100.0**
Horses, donkeys and cross-breeds	Yes	0	10	10	100.0
	No	0	0	0	0.0
	Total	**0**	**10**	**10**	**100.0**
Pigs	Yes	0	0	0	0.0
	No	33	98	131	100.0
	Total	**33**	**98**	**131**	**100.0**
Sheep	Yes	18	0	18	6.8
	No	245	0	245	93.2
	Total	**263**	**0**	**263**	**100.0**

	Reuse	Basic research	Translational and applied research	Total	%
Cattle	Yes	0	7	7	25.0
	No	1	20	21	75.0
	Total	**1**	**27**	**28**	**100.0**
Other mammals	Yes	0	0	0	0.0
	No	10	0	10	100.0
	Total	**10**	**0**	**10**	**100.0**
Domestic fowl	Yes	0	0	0	0.0
	No	293	0	293	100.0
	Total	**293**	**0**	**293**	**100.0**
Other birds	Yes	0	0	0	0.0
	No	183	0	183	100.0
	Total	**183**	**0**	**183**	**100.0**
Reptiles	Yes	0	0	0	0.0
	No	42	0	42	100.0
	Total	**42**	**0**	**42**	**100.0**
Xenopus	Yes	0	0	0	0.0
	No	819	0	819	100.0
	Total	**819**	**0**	**819**	**100.0**
Other amphibians	Yes	0	0	0	0.0
	No	368	0	368	100.0
	Total	**368**	**0**	**368**	**100.0**
Zebra fish	Yes	1,845	127	1,972	2.2
	No	85,407	2,408	87,815	97.8
	Total	**87,252**	**2,535**	**89,787**	**100.0**
Other fish	Yes	0	0	0	0.0
	No	2,103	0	2,103	100.0
	Total	**2,103**	**0**	**2,103**	**100.0**
All Species	**Yes**	**4,751**	**266**	**5,017**	**1.3**
	No	**333,903**	**54,826**	**388,729**	**98.7**
	Total	**338,654**	**55,092**	**393,746**	**100.0**

Table 18: Uses of animals for the creation of new genetically altered animal lines in basic research by species and type of research (2020)

	Oncology	Cardiovascular Blood and Lymphatic System	Nervous System	Respiratory System	Gastrointestinal System including Liver	Musculoskeletal System	Immune System	Urogenital/Reproductive System	Sensory Organs (skin, eyes and ears)	Endocrine System/Metabolism	Multisystemic	Ethology / Animal Behaviour /Animal Biology	Other basic research	Total	%
Mammals															
Rodents															
Mice	43,275	16,291	51,204	266	11,407	5,015	19,639	12,956	2,782	12,543	62,021	0	6,414	**243,813**	**72**
Rats	0	860	470	255	12	114	675	0	0	0	546	0	60	**2,992**	**0.9**
Hamsters (Syrian)	0	0	145	0	0	0	259	45	0	0	0	0	0	**449**	**0.1**
Rabbits															
Rabbits	0	0	0	0	0	0	0	9	0	0	0	0	0	**9**	**0**
Carnivores															
Dogs	0	0	0	0	0	18	0	0	0	0	0	0	0	**18**	**0**
Other carnivores	0	0	0	0	0	0	0	0	0	0	0	6	0	**6**	**0**
Farm animals															
Pigs	0	0	0	0	0	0	0	0	33	0	0	0	0	**33**	**0**
Sheep	0	0	0	0	0	0	0	0	0	50	168	45	0	**263**	**0.1**
Cattle	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0**
Non-human primates															
Other mammals	0	0	6	0	0	0	0	0	0	0	4	0	0	**10**	**0**
Other mammals															
Domestic fowl	0	0	0	0	0	0	223	0	0	0	0	0	70	**293**	**0.1**
Birds															
Other birds	0	0	0	0	0	0	0	0	0	0	0	183	0	**183**	**0.1**
Reptiles	0	0	0	0	0	0	0	0	0	0	0	40	2	**42**	**0**
Amphibians															
Xenopus	0	0	717	0	0	0	0	42	0	60	0	0	0	**819**	**0.2**
Other amphibians	0	0	0	0	0	0	0	0	0	0	0	0	368	**368**	**0.1**
Fish															

	Oncology	Cardiovascular Blood and Lymphatic System	Nervous System	Respiratory System	Gastrointestinal System including Liver	Musculoskeletal System	Immune System	Urogenital/Reproductive System	Sensory Organs (skin, eyes and ears)	Endocrine System/Metabolism	Multisystemic	Ethology / Animal Behaviour /Animal Biology	Other basic research	Total	%
Zebra fish	542	26,074	29,241	0	2,320	2,789	4,503	2,034	499	3,758	8,085	1,089	6,318	**87,252**	**25.8**
Other fish	0	196	267	0	0	0	0	160	323	0	1,132	0	25	**2,103**	**0.6**
Totals															
Total	**43,817**	**43,422**	**82,050**	**521**	**13,739**	**7,936**	**25,299**	**15,246**	**3,637**	**16,411**	**71,956**	**1,363**	**13,257**	**338,654**	**100**
%	**12.9**	**12.8**	**24.2**	**0.2**	**4.1**	**2.3**	**7.5**	**4.5**	**1.1**	**4.8**	**21.2**	**0.4**	**3.9**	**100**	

Table 19.1: Uses of animals for the creation of new genetically altered animal lines in basic, translational and applied research by species and type of research (Part 1) (2020)

	Human Cancer	Human Infectious Disorders	Human Cardiovascular Disorders	Human Nervous and Mental Disorders	Human Respiratory Disorders	Human Gastrointestinal Disorders including Liver	Human Musculoskeletal Disorders	Human Immune Disorders
Mammals								
Rodents								
Mice	2,879	2,456	812	2,715	329	443	423	391
Rats	0	0	29	0	0	0	0	60
Rabbits								
Rabbits	0	0	0	0	48	0	0	0
Farm animals								
Horses, donkeys and cross-breeds	0	0	0	0	0	0	0	0
Pigs	34	0	18	0	0	0	7	0
Cattle	0	0	0	0	0	0	0	0
Fish								
Zebra fish	135	0	760	1,321	0	0	0	40
Totals								
Total	**3,048**	**2,456**	**1,619**	**4,036**	**377**	**443**	**430**	**491**
%	**5.5**	**4.5**	**2.9**	**7.3**	**0.7**	**0.8**	**0.8**	**0.9**

Table 19.2: Uses of animals for the creation of new genetically altered animal lines in basic translational and applied research by species and type of research (Part 2) (2020)

	Human Urogenital/Reproductive Disorders	Human Sensory Organ Disorders (skin, eyes and ears)	Human Endocrine/Metabolism Disorders	Other Human Disorders	Animal Diseases and Disorders	Animal Welfare	Diagnosis of diseases	Non-regulatory toxicology and ecotoxicology	Total	%
Mammals										
Rodents										
Mice	207	590	1,434	37,122	120	0	**87**	**0**	50,008	90.8
Rats	0	192	61	1,804	0	0	**0**	**0**	2,146	3.9
Rabbits										
Rabbits	0	0	220	0	0	0	**0**	**0**	268	0.5
Farm animals										
Horses, donkeys and cross-breeds	0	0	0	0	10	0	**0**	**0**	10	0
Pigs	0	1	11	27	0	0	**0**	**0**	98	0.2
Cattle	0	0	0	0	27	0	**0**	**0**	27	0
Fish										
Zebra fish	0	111	0	0	0	127	**0**	**41**	2,535	4.6
Totals										
Total	**207**	**894**	**1,726**	**38,953**	**157**	**127**	**87**	**41**	**55,092**	**100**
%	**0.4**	**1.6**	**3.1**	**70.7**	**0.3**	**0.2**	**0.2**	**0.1**	**100**	

Table 20: Uses of animals for the maintenance of colonies of established genetically altered animal lines by species, severity and genetic status (2020)

	Severity	Genetically altered with a harmful phenotype	Genetically altered without a harmful phenotype	Not genetically altered	Total	%
Mice	Non-recovery	0	1,690	462	2,152	0.7
	Mild	53,109	166,032	34,921	254,062	86.9
	Moderate	16,033	2,960	7,546	26,539	9.1
	Severe	8,949	799	12	9,760	3.3
	Total	**78,091**	**171,481**	**42,941**	**292,513**	**100.0**
Rats	Non-recovery	0	0	0	0	0.0
	Mild	558	2,989	1,276	4,823	58.7
	Moderate	2,325	20	718	3,063	37.3
	Severe	320	8	0	328	4.0
	Total	**3,203**	**3,017**	**1,994**	**8,214**	**100.0**
Dogs	Non-recovery	0	0	0	0	0.0
	Mild	0	0	0	0	0.0
	Moderate	0	0	0	0	0.0
	Severe	14	0	0	14	100.0
	Total	**14**	**0**	**0**	**14**	**100.0**
Pigs	Non-recovery	0	0	0	0	0.0
	Mild	0	0	0	0	0.0
	Moderate	0	79	0	79	85.9
	Severe	0	13	0	13	14.1
	Total	**0**	**92**	**0**	**92**	**100.0**
Zebra fish	Non-recovery	0	0	0	0	0.0
	Mild	470	1,471	60	2,001	100.0
	Moderate	0	0	0	0	0.0
	Severe	0	0	0	0	0.0
	Total	**470**	**1,471**	**60**	**2,001**	**100.0**
Other fish	Non-recovery	0	0	0	0	0.0
	Mild	1,400	394	0	1,794	100.0
	Moderate	0	0	0	0	0.0
	Severe	0	0	0	0	0.0

	Severity	Genetically altered with a harmful phenotype	Genetically altered without a harmful phenotype	Not genetically altered	Total	%
	Total	1,400	394	0	1,794	100.0
All Species	Non-recovery	0	1,690	462	2,152	0.7
	Mild	55,537	170,886	36,257	262,680	86.2
	Moderate	18,358	3,059	8,264	29,681	9.7
	Severe	9,283	820	12	10,115	3.3
	Total	83,178	176,455	44,995	304,628	100.0

Table 21: Uses of animals for the maintenance of colonies of established genetically altered animal lines by species, reuse and genetic status (2020)

	Reuse	Not genetically altered	Genetically altered without a harmful phenotype	Genetically altered with a harmful phenotype	Total	%
Mice	Yes	0	6,327	0	6,327	2.2
	No	42,941	165,154	78,091	286,186	97.8
	Total	**42,941**	**171,481**	**78,091**	**292,513**	**100.0**
Rats	Yes	0	2	0	2	0.0
	No	1,994	3,015	3,203	8,212	100.0
	Total	**1,994**	**3,017**	**3,203**	**8,214**	**100.0**
Dogs	Yes	0	0	0	0	0.0
	No	0	0	14	14	100.0
	Total	**0**	**0**	**14**	**14**	**100.0**
Pigs	Yes	0	0	0	0	0.0
	No	0	92	0	92	100.0
	Total	**0**	**92**	**0**	**92**	**100.0**
Zebra fish	Yes	0	0	400	400	20.0
	No	60	1,471	70	1,601	80.0
	Total	**60**	**1,471**	**470**	**2,001**	**100.0**
Other fish	Yes	0	0	0	0	0.0
	No	0	394	1,400	1,794	100.0
	Total	**0**	**394**	**1,400**	**1,794**	**100.0**
All Species	**Yes**	**0**	**6,329**	**400**	**6,729**	**2.2**
	No	**44,995**	**170,126**	**82,778**	**297,899**	**97.8**
	Total	**44,995**	**176,455**	**83,178**	**304,628**	**100.0**

Corrected EU DATA IN 2019

Detailed EU tables 2019 (corrected)

This section presents the corrected consolidated EU tables for the year 2019. Due to an error, the Polish data were duplicated for 2019, and as a result the 2019 EU data had to be revised. The duplicate records have been removed resulting in a -1.4% reduction compared to the previously reported 2019 EU totals. The Public ALURES Statistical EU database has also been updated with the corrected data[20].

[20] The Public ALURES Statistical EU database 2019 data was corrected on the date of publication of this report.

Part 1: Numbers of animals used for research, testing, routine production and educational purposes in the EU

Table 1: Numbers of animals used for the first time by species (2019)

		Number of animals	%
Mammals			
	Rodents		
	Mice	5,385,326	**52.5**
	Rats	954,971	**9.3**
	Guinea-Pigs	118,586	**1.2**
	Hamsters (Syrian)	12,010	**0.1**
	Hamsters (Chinese)	17	**0**
	Mongolian gerbil	3,943	**0**
	Other rodents	29,177	**0.3**
	Rabbits		
	Rabbits	352,777	**3.4**
	Carnivores		
	Cats	2,168	**0**
	Dogs	13,067	**0.1**
	Ferrets	1,883	**0**
	Other carnivores	4,668	**0**
	Farm animals		
	Horses, donkeys and cross-breeds	1,431	**0**
	Pigs	81,795	**0.8**
	Goats	1,202	**0**
	Sheep	21,355	**0.2**
	Cattle	25,109	**0.2**
	Non-human primates		
	Prosimians	194	**0**
	Marmoset and tamarins	222	**0**
	Cynomolgus monkey	6,748	**0.1**
	Rhesus monkey	251	**0**
	Vervets Chlorocebus spp.	25	**0**
	Baboons	33	**0**
	Other species of old world monkeys (Cercopithecoidea)	2	**0**
	Other mammals		
	Other mammals	4,835	**0**
Birds			
	Domestic fowl	513,021	**5**
	Other birds	116,256	**1.1**
Reptiles			
	Reptiles	1,972	**0**
Amphibians			
	Rana	6,317	**0.1**
	Xenopus	19,798	**0.2**
	Other amphibians	20,293	**0.2**
Fish			
	Zebra fish	505,760	**4.9**
	Other fish	2,038,642	**19.9**
Cephalopods			
	Cephalopods	16,968	**0.2**
Totals			
	Total	**10,260,822**	**100**
	%	**100**	

Table 2: Place of birth by species (other than non-human primates) (2019)

	Animals born in the EU at a registered breeder	Animals born in the EU but not at a registered breeder	Animals born in rest of Europe	Animals born in rest of world	Total	%
Mammals						
Rodents						
Mice	5,157,609	170,682	11,969	45,066	**5,385,326**	**52.5**
Rats	929,927	19,316	937	4,791	**954,971**	**9.3**
Guinea-Pigs	115,484	3,102	0	0	**118,586**	**1.2**
Hamsters (Syrian)	9,996	27	0	1,987	**12,010**	**0.1**
Hamsters (Chinese)	17	0	0	0	**17**	**0**
Mongolian gerbil	3,691	252	0	0	**3,943**	**0**
Other rodents	6,789	22,233	66	89	**29,177**	**0.3**
Rabbits						
Rabbits	345,444	5,290	32	2,011	**352,777**	**3.4**
Carnivores						
Cats	809	1,098	17	244	**2,168**	**0**
Dogs	4,869	3,577	185	4,436	**13,067**	**0.1**
Ferrets	1,611	98	0	174	**1,883**	**0**
Other carnivores	468	4,187	2	11	**4,668**	**0**
Farm animals						
Horses, donkeys and cross-breeds	451	980	0	0	**1,431**	**0**
Pigs	36,629	45,133	0	33	**81,795**	**0.8**
Goats	710	492	0	0	**1,202**	**0**
Sheep	13,045	8,296	14	0	**21,355**	**0.2**
Cattle	9,780	15,176	153	0	**25,109**	**0.2**
Other mammals						
Other mammals	449	4,129	78	179	**4,835**	**0**
Birds						
Domestic fowl	366,820	146,201	0	0	**513,021**	**5**
Other birds	45,487	68,098	751	1,920	**116,256**	**1.1**
Reptiles						
Reptiles	74	1,685	162	51	**1,972**	**0**
Amphibians						
Rana	5,080	1,237	0	0	**6,317**	**0.1**
Xenopus	9,111	8,426	0	2,261	**19,798**	**0.2**
Other amphibians	7,230	13,053	0	10	**20,293**	**0.2**
Fish						
Zebra fish	482,158	22,017	0	1,585	**505,760**	**4.9**
Other fish	1,296,455	680,614	53,242	8,331	**2,038,642**	**19.9**
Cephalopods						
Cephalopods	15,917	1,051	0	0	**16,968**	**0.2**
Totals						
Total	**8,866,110**	**1,246,450**	**67,608**	**73,179**	**10,253,347**	**100**
%	**86.5**	**12.2**	**0.7**	**0.7**	**100**	

Table 3: Source of non-human primates by species (2019)

	Animals born at a registered breeder within EU	Animals born in Asia	Animals born in America	Animals born in Africa	Animals born elsewhere	Total	%
Non-human primates							
New World Monkeys							
Prosimians	194	0	0	0	0	**194**	**2.6**
Marmoset and tamarins	222	0	0	0	0	**222**	**3**
Old World Monkeys							
Cynomolgus monkey	226	3,175	0	3,071	276	**6,748**	**90.3**
Rhesus monkey	222	23	0	0	6	**251**	**3.4**
Vervets Chlorocebus spp.	7	0	18	0	0	**25**	**0.3**
Baboons	33	0	0	0	0	**33**	**0.4**
Other species of old world monkeys (Cercopithecoidea)	0	2	0	0	0	**2**	**0**
Totals							
Total	**904**	**3,200**	**18**	**3,071**	**282**	7,475	**100**
%	**12.1**	**42.8**	**0.2**	**41.1**	**3.8**	**100**	

Table 4: Generation of non-human primates by species (2019)

	F1	F2 or greater	Self-sustaining colony	Total	%
Non-human primates					
New World Monkeys					
Prosimians	0	11	183	**194**	**2.6**
Marmoset and tamarins	4	86	132	**222**	**3**
Old World Monkeys					
Cynomolgus monkey	1,054	3,323	2,371	**6,748**	**90.3**
Rhesus monkey	10	44	197	**251**	**3.4**
Vervets Chlorocebus spp.	7	18	0	**25**	**0.3**
Baboons	0	33	0	**33**	**0.4**
Other species of old world monkeys (Cercopithecoidea)	2	0	0	**2**	**0**
Totals					
Total	**1,077**	**3,515**	**2,883**	7,475	**100**
%	**14.4**	**47**	**38.6**	**100**	

Part 2: Details of all uses of animals for research, testing, routine production and educational purposes in the EU

Table 5: Uses of animals by species, main categories of scientific purposes and severities (2019)

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Mice	Non-recovery	252,113	43,428	3,707	18,250	0	151	13,691	0	331,340	6.1
	Mild	1,361,539	460,016	411,004	4,781	766	2,422	41,374	280	2,282,182	41.9
	Moderate	1,185,049	755,344	177,751	66,936	68	4,672	21,242	0	2,211,062	40.6
	Severe	232,308	154,644	194,431	34,648	29	78	239	0	616,377	11.3
	Total	**3,031,009**	**1,413,432**	**786,893**	**124,615**	**863**	**7,323**	**76,546**	**280**	**5,440,961**	**100.0**
Rats	Non-recovery	46,380	13,981	15,163	2,269	35	0	23,087	0	100,915	10.4
	Mild	69,613	71,126	330,596	4,794	268	16	12,905	73	489,391	50.5
	Moderate	106,523	95,952	110,699	86	138	667	5,143	0	319,208	32.9
	Severe	33,232	17,616	8,499	115	169	0	44	0	59,675	6.2
	Total	**255,748**	**198,675**	**464,957**	**7,264**	**610**	**683**	**41,179**	**73**	**969,189**	**100.0**
Guinea-Pigs	Non-recovery	845	793	297	8,222	0	0	256	0	10,413	8.7
	Mild	1,236	4,983	40,272	776	11	0	917	0	48,195	40.4
	Moderate	1,836	1,502	42,374	53	0	0	980	0	46,745	39.2
	Severe	7	880	13,154	0	0	0	0	0	14,041	11.8
	Total	**3,924**	**8,158**	**96,097**	**9,051**	**11**	**0**	**2,153**	**0**	**119,394**	**100.0**
Hamsters (Syrian)	Non-recovery	372	30	0	0	0	0	6	0	408	3.4
	Mild	466	406	3,099	0	0	0	116	0	4,087	34.0
	Moderate	877	2,645	1,786	0	0	0	35	0	5,343	44.5
	Severe	14	352	1,675	136	0	0	0	0	2,177	18.1
	Total	**1,729**	**3,433**	**6,560**	**136**	**0**	**0**	**157**	**0**	**12,015**	**100.0**
Hamsters (Chinese)	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	0	0	0	0	0	0	0	0	0	0.0
	Moderate	17	0	0	0	0	0	0	0	17	100.0
	Severe	0	0	0	0	0	0	0	0	0	0.0
	Total	**17**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**100.0**
Mongolian gerbil	Non-recovery	394	16	0	0	0	0	4	0	414	10.5
	Mild	574	674	47	59	0	0	41	0	1,395	35.3
	Moderate	792	1,153	100	24	0	0	6	0	2,075	52.5
	Severe	10	33	24	0	0	0	0	0	67	1.7
	Total	**1,770**	**1,876**	**171**	**83**	**0**	**0**	**51**	**0**	**3,951**	**100.0**
Other rodents	Non-recovery	690	0	36	0	590	0	0	0	1,316	4.5
	Mild	11,512	658	9,856	20	380	202	337	0	22,965	78.1
	Moderate	3,732	439	59	0	528	80	0	0	4,838	16.5
	Severe	119	34	24	0	103	0	0	0	280	1.0
	Total	**16,053**	**1,131**	**9,975**	**20**	**1,601**	**282**	**337**	**0**	**29,399**	**100.0**
Rabbits	Non-recovery	2,062	1,104	6,139	27,721	0	0	660	0	37,686	10.4
	Mild	9,188	2,411	50,896	129,121	0	0	939	0	192,555	53.0
	Moderate	5,406	5,593	29,216	86,331	0	0	61	0	126,607	34.9
	Severe	798	660	1,345	3,525	0	0	2	0	6,330	1.7
	Total	**17,454**	**9,768**	**87,596**	**246,698**	**0**	**0**	**1,662**	**0**	**363,178**	**100.0**
Cats	Non-recovery	33	0	13	0	0	0	0	0	46	1.2
	Mild	1,003	1,172	845	40	0	0	64	0	3,124	84.5
	Moderate	74	63	375	0	0	0	0	0	512	13.9
	Severe	5	4	5	0	0	0	0	0	14	0.4
	Total	**1,115**	**1,239**	**1,238**	**40**	**0**	**0**	**64**	**0**	**3,696**	**100.0**
Dogs	Non-recovery	18	49	96	18	0	0	112	0	293	1.4
	Mild	1,669	5,716	6,287	385	82	0	968	0	15,107	73.2
	Moderate	201	921	3,848	19	0	0	9	0	4,998	24.2
	Severe	2	60	167	3	0	0	0	0	232	1.1
	Total	**1,890**	**6,746**	**10,398**	**425**	**82**	**0**	**1,089**	**0**	**20,630**	**100.0**
Ferrets	Non-recovery	70	2	0	1	0	0	9	0	82	4.3
	Mild	78	448	235	48	0	0	35	0	844	43.8
	Moderate	100	566	182	10	0	0	17	0	875	45.4
	Severe	2	126	0	0	0	0	0	0	128	6.6
	Total	**250**	**1,142**	**417**	**59**	**0**	**0**	**61**	**0**	**1,929**	**100.0**
Other carnivores	Non-recovery	6	3	0	0	0	9	0	0	18	0.4
	Mild	3,912	111	50	0	227	69	20	0	4,389	87.8
	Moderate	70	115	283	0	65	33	0	0	566	11.3
	Severe	0	0	0	0	25	0	0	0	25	0.5

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Total	**3,988**	**229**	**333**	**0**	**317**	**111**	**20**	**0**	**4,998**	**100.0**
Horses, donkeys and cross-breeds	Non-recovery	0	16	0	0	0	0	49	0	65	0.5
	Mild	1,550	765	149	8,187	1,647	54	403	0	12,755	95.3
	Moderate	254	202	12	38	0	0	37	0	543	4.1
	Severe	0	3	10	2	0	0	0	0	15	0.1
	Total	**1,804**	**986**	**171**	**8,227**	**1,647**	**54**	**489**	**0**	**13,378**	**100.0**
Pigs	Non-recovery	1,573	3,008	319	36	40	0	8,955	0	13,931	16.2
	Mild	12,903	25,048	7,382	222	719	9	2,081	2	48,366	56.2
	Moderate	4,765	9,972	3,453	31	176	0	2,583	0	20,980	24.4
	Severe	588	1,640	585	0	0	0	0	0	2,813	3.3
	Total	**19,829**	**39,668**	**11,739**	**289**	**935**	**9**	**13,619**	**2**	**86,090**	**100.0**
Goats	Non-recovery	0	2	0	0	0	0	6	0	8	0.3
	Mild	1,097	190	50	145	0	0	286	0	1,768	74.9
	Moderate	346	183	15	5	2	0	3	0	554	23.5
	Severe	0	26	3	0	0	0	0	0	29	1.2
	Total	**1,443**	**401**	**68**	**150**	**2**	**0**	**295**	**0**	**2,359**	**100.0**
Sheep	Non-recovery	177	251	0	2	0	0	561	0	991	1.4
	Mild	9,948	4,319	988	47,109	3,415	0	660	33	66,472	91.7
	Moderate	1,299	2,271	134	278	27	0	169	0	4,178	5.8
	Severe	463	263	133	0	21	0	0	0	880	1.2
	Total	**11,887**	**7,104**	**1,255**	**47,389**	**3,463**	**0**	**1,390**	**33**	**72,521**	**100.0**
Cattle	Non-recovery	1	7	0	0	0	0	7	0	15	0.0
	Mild	8,542	12,924	2,385	102	1,726	0	4,388	2	30,069	85.4
	Moderate	1,171	1,250	547	4	24	0	1,984	0	4,980	14.1
	Severe	23	57	67	0	5	0	0	0	152	0.4
	Total	**9,737**	**14,238**	**2,999**	**106**	**1,755**	**0**	**6,379**	**2**	**35,216**	**100.0**
Prosimians	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	151	0	0	0	0	0	0	0	151	60.6
	Moderate	92	0	0	0	0	0	0	0	92	36.9
	Severe	6	0	0	0	0	0	0	0	6	2.4
	Total	**249**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**249**	**100.0**
Marmoset and tamarins	Non-recovery	6	4	0	0	0	0	0	0	10	2.6
	Mild	59	54	36	85	0	0	0	0	234	61.3
	Moderate	50	37	40	0	0	0	0	0	127	33.2
	Severe	1	6	4	0	0	0	0	0	11	2.9
	Total	**116**	**101**	**80**	**85**	**0**	**0**	**0**	**0**	**382**	**100.0**
Cynomolgus monkey	Non-recovery	3	44	4	0	0	0	0	0	51	0.6
	Mild	222	623	3,913	831	0	0	0	0	5,589	61.9
	Moderate	80	383	2,814	0	0	0	0	0	3,277	36.3
	Severe	1	71	41	0	0	0	0	0	113	1.3
	Total	**306**	**1,121**	**6,772**	**831**	**0**	**0**	**0**	**0**	**9,030**	**100.0**
Rhesus monkey	Non-recovery	6	6	0	0	0	0	0	0	12	2.7
	Mild	75	101	0	29	0	0	0	0	205	46.6
	Moderate	109	107	0	0	0	0	0	0	216	49.1
	Severe	5	2	0	0	0	0	0	0	7	1.6
	Total	**195**	**216**	**0**	**29**	**0**	**0**	**0**	**0**	**440**	**100.0**
Vervets Chlorocebus spp	Non-recovery	0	0	0	8	0	0	0	0	8	22.2
	Mild	0	12	0	3	0	0	0	0	15	41.7
	Moderate	0	3	0	0	0	0	0	0	3	8.3
	Severe	0	10	0	0	0	0	0	0	10	27.8
	Total	**0**	**25**	**0**	**11**	**0**	**0**	**0**	**0**	**36**	**100.0**
Baboons	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	0	8	0	0	0	0	0	0	8	24.2
	Moderate	0	19	0	0	0	0	0	0	19	57.6
	Severe	0	6	0	0	0	0	0	0	6	18.2
	Total	**0**	**33**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**100.0**
Other species of old world monkeys (Cercopithecoidea)	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	18	13	0	0	0	0	0	0	31	93.9
	Moderate	2	0	0	0	0	0	0	0	2	6.1
	Severe	0	0	0	0	0	0	0	0	0	0.0
	Total	**20**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**100.0**
Other mammals	Non-recovery	12	12	0	0	0	3	0	0	27	0.5
	Mild	3,121	480	0	15	166	207	185	0	4,174	80.0
	Moderate	869	71	0	12	0	6	0	0	958	18.4
	Severe	26	26	0	4	2	0	0	0	58	1.1
	Total	**4,028**	**589**	**0**	**31**	**168**	**216**	**185**	**0**	**5,217**	**100.0**
Domestic fowl	Non-recovery	439	597	710	1,252	384	0	186	0	3,568	0.7
	Mild	94,902	78,013	93,615	99,228	3,352	439	1,781	0	371,330	71.9
	Moderate	42,554	39,130	25,619	15,094	572	0	385	0	123,354	23.9
	Severe	1,094	9,188	7,494	432	65	0	0	0	18,273	3.5

	Severity	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Total	**138,989**	**126,928**	**127,438**	**116,006**	**4,373**	**439**	**2,352**	**0**	**516,525**	**100.0**
	Non-recovery	2,419	3,080	0	341	288	0	121	0	6,249	5.3
	Mild	54,735	1,839	3,733	261	2,138	1,732	710	0	65,148	55.3
Other birds	Moderate	11,996	651	2,598	27,399	1,082	68	64	0	43,858	37.2
	Severe	271	1,030	1,197	0	0	0	3	0	2,501	2.1
	Total	**69,421**	**6,600**	**7,528**	**28,001**	**3,508**	**1,800**	**898**	**0**	**117,756**	**100.0**
	Non-recovery	0	0	0	0	0	0	0	0	0	0.0
	Mild	3,908	8	0	0	0	624	36	0	4,576	55.7
Reptiles	Moderate	3,631	0	0	0	0	0	0	0	3,631	44.2
	Severe	2	0	0	0	0	0	0	0	2	0.0
	Total	**7,541**	**8**	**0**	**0**	**0**	**624**	**36**	**0**	**8,209**	**100.0**
	Non-recovery	0	0	0	0	0	0	930	0	930	14.7
	Mild	803	0	0	0	0	0	3,840	0	4,643	73.5
Rana	Moderate	0	0	0	0	0	0	600	0	600	9.5
	Severe	148	0	0	0	0	0	0	0	148	2.3
	Total	**951**	**0**	**0**	**0**	**0**	**0**	**5,370**	**0**	**6,321**	**100.0**
	Non-recovery	589	0	0	0	0	0	50	0	639	2.4
	Mild	12,753	2,702	1,300	0	137	0	225	0	17,117	64.4
Xenopus	Moderate	1,177	9	40	0	200	0	29	0	1,455	5.5
	Severe	562	0	6,820	0	0	0	0	0	7,382	27.8
	Total	**15,081**	**2,711**	**8,160**	**0**	**337**	**0**	**304**	**0**	**26,593**	**100.0**
	Non-recovery	112	0	0	0	2,400	55	86	0	2,653	12.7
	Mild	3,882	6	0	0	212	6,585	1,395	0	12,080	57.8
Other amphibians	Moderate	2,872	0	0	0	0	0	3	0	2,875	13.8
	Severe	3,282	0	0	0	0	4	0	0	3,286	15.7
	Total	**10,148**	**6**	**0**	**0**	**2,612**	**6,644**	**1,484**	**0**	**20,894**	**100.0**
	Non-recovery	26,396	0	184	0	0	0	268	0	26,848	5.2
	Mild	255,015	73,562	13,965	0	5,572	0	1,806	0	349,920	68.1
Zebra fish	Moderate	71,043	31,627	11,169	0	1,294	0	0	0	115,133	22.4
	Severe	9,891	3,069	8,874	0	2	0	0	0	21,836	4.3
	Total	**362,345**	**108,258**	**34,192**	**0**	**6,868**	**0**	**2,074**	**0**	**513,737**	**100.0**
	Non-recovery	16,401	3,440	0	0	1,463	2,091	1,457	0	24,852	1.2
	Mild	480,430	660,815	43,713	1,400	51,254	183,021	1,832	0	1,422,465	69.5
Other fish	Moderate	147,222	66,194	23,355	0	139,363	21,729	303	0	398,166	19.5
	Severe	33,674	118,137	35,249	0	13,237	210	0	0	200,507	9.8
	Total	**677,727**	**848,586**	**102,317**	**1,400**	**205,317**	**207,051**	**3,592**	**0**	**2,045,990**	**100.0**
	Non-recovery	806	15,100	0	0	0	0	2	0	15,908	93.6
	Mild	207	628	0	0	41	0	5	0	881	5.2
Cephalopods	Moderate	10	0	0	0	121	0	0	0	131	0.8
	Severe	24	0	0	0	46	0	0	0	70	0.4
	Total	**1,047**	**15,728**	**0**	**0**	**208**	**0**	**7**	**0**	**16,990**	**100.0**
	Non-recovery	**351,923**	**84,973**	**26,668**	**58,120**	**5,200**	**2,309**	**50,503**	**0**	**579,696**	**5.5**
	Mild	**2,405,111**	**1,409,831**	**1,024,416**	**297,641**	**72,113**	**195,380**	**77,349**	**390**	**5,482,231**	**52.4**
All Species	**Moderate**	**1,594,219**	**1,016,402**	**436,469**	**196,320**	**143,660**	**27,255**	**33,653**	**0**	**3,447,978**	**32.9**
	Severe	**316,558**	**307,943**	**279,801**	**38,865**	**13,704**	**292**	**288**	**0**	**957,451**	**9.1**
	Total	**4,667,811**	**2,819,149**	**1,767,354**	**590,946**	**234,677**	**225,236**	**161,793**	**390**	**10,467,356**	**100.0**

Table 6: Uses of animals in all sub-categories of research and testing by severities (2019)

	Non-recovery	Mild [up to and including]	Moderate	Severe	Total	%
Basic research						
Oncology	12,042	207,900	331,005	49,276	**600,223**	**5.7**
Cardiovascular Blood and Lymphatic System	50,546	141,718	100,018	16,103	**308,385**	**2.9**
Nervous System	109,403	377,059	372,321	84,951	**943,734**	**9**
Respiratory System	8,228	25,235	24,978	5,956	**64,397**	**0.6**
Gastrointestinal System including Liver	14,432	65,745	64,506	13,355	**158,038**	**1.5**
Musculoskeletal System	8,305	54,790	30,961	20,108	**114,164**	**1.1**
Immune System	39,976	371,564	250,368	77,106	**739,014**	**7.1**
Urogenital/Reproductive System	11,001	69,009	26,828	1,294	**108,132**	**1**
Sensory Organs (skin, eyes and ears)	14,964	36,209	19,435	5,818	**76,426**	**0.7**
Endocrine System/Metabolism	11,143	100,083	94,263	9,115	**214,604**	**2.1**
Multisystemic	10,408	191,694	53,791	9,181	**265,074**	**2.5**
Ethology / Animal Behaviour /Animal Biology	13,490	577,611	175,607	10,096	**776,804**	**7.4**
Other basic research	47,985	186,494	50,138	14,199	**298,816**	**2.9**
Translational and applied research						
Human Cancer	5,868	123,491	351,631	40,596	**521,586**	**5**
Human Infectious Disorders	7,356	144,945	100,199	39,710	**292,210**	**2.8**
Human Cardiovascular Disorders	11,895	19,767	25,569	7,364	**64,595**	**0.6**
Human Nervous and Mental Disorders	14,955	115,273	145,555	29,150	**304,933**	**2.9**
Human Respiratory Disorders	3,574	21,432	25,030	5,595	**55,631**	**0.5**
Human Gastrointestinal Disorders including Liver	2,046	14,286	24,262	4,885	**45,479**	**0.4**
Human Musculoskeletal Disorders	740	11,940	16,385	7,425	**36,490**	**0.3**
Human Immune Disorders	2,577	26,006	35,361	9,824	**73,768**	**0.7**
Human Urogenital/Reproductive Disorders	1,214	6,219	9,972	1,959	**19,364**	**0.2**
Human Sensory Organ Disorders (skin, eyes and ears)	779	20,345	21,715	2,006	**44,845**	**0.4**
Human Endocrine/Metabolism Disorders	4,575	39,648	84,208	2,601	**131,032**	**1.3**
Other Human Disorders	2,397	11,950	14,688	2,504	**31,539**	**0.3**
Animal Diseases and Disorders	3,715	631,721	94,722	132,665	**862,823**	**8.2**
Animal Welfare	19,429	163,107	21,360	6,031	**209,927**	**2**
Diagnosis of diseases	1,632	21,188	13,670	12,757	**49,247**	**0.5**
Plant diseases	0	108	0	0	**108**	**0**
Non-regulatory toxicology and ecotoxicology	2,221	38,405	32,075	2,871	**75,572**	**0.7**
Regulatory use						
Quality control (incl batch safety and potency testing)						
Batch safety testing	1,331	124,985	17,624	3,276	**147,216**	**1.4**
Pyrogenicity testing	30	10,318	20,071	268	**30,687**	**0.3**
Batch potency testing	18,022	345,523	162,769	205,662	**731,976**	**7**
Other quality controls	452	17,977	12,020	3,060	**33,509**	**0.3**
Toxicity and other safety testing including pharmacology						
Acute and sub-acute toxicity testing methods						
LD50, LC50	0	21,211	1,177	9,214	**31,602**	**0.3**
Other lethal methods	0	118	191	285	**594**	**0**
Non lethal methods	3	12,477	10,905	947	**24,332**	**0.2**
Skin irritation/corrosion	0	1,592	1,330	110	**3,032**	**0**
Skin sensitisation	0	14,112	23,046	1,791	**38,949**	**0.4**
Eye irritation/corrosion	0	119	261	88	**468**	**0**
Repeated dose toxicity						
up to 28 days	21	33,351	17,884	1,458	**52,714**	**0.5**
29 - 90 days	0	19,288	12,914	783	**32,985**	**0.3**
> 90 days	120	12,408	7,217	332	**20,077**	**0.2**
Carcinogenicity	20	4,274	3,293	446	**8,033**	**0.1**
Genotoxicity	6	7,936	1,488	377	**9,807**	**0.1**
Reproductive toxicity	169	71,115	24,594	1,255	**97,133**	**0.9**
Developmental toxicity	2	68,293	14,531	1,088	**83,914**	**0.8**
Neurotoxicity	0	999	219	4	**1,222**	**0**
Kinetics	900	36,178	21,496	552	**59,126**	**0.6**
Pharmaco-dynamics (incl safety pharmacology)	4,447	45,437	24,843	1,492	**76,219**	**0.7**
Phototoxicity	0	371	42	1	**414**	**0**
Ecotoxicity						
Acute toxicity	60	25,248	7,955	20,724	**53,987**	**0.5**
Chronic toxicity	0	16,352	14,681	5,843	**36,876**	**0.4**
Reproductive ecotoxicity	156	0	0	68	**224**	**0**
Endocrine activity	0	2,756	40	6,820	**9,616**	**0.1**
Bioaccumulation	0	4,157	661	0	**4,818**	**0**
Other ecotoxicity	0	3,431	14	321	**3,766**	**0**
Safety testing in food and feed area	0	30,353	877	6,545	**37,775**	**0.4**

		Non-recovery	Mild [up to and including]	Moderate	Severe	Total	%
	Target animal safety	0	4,588	731	19	**5,338**	**0.1**
	Other toxicity/safety testing	74	15,295	6,707	222	**22,298**	**0.2**
Other efficacy and tolerance testing							
	Other efficacy and tolerance testing	855	74,154	26,888	6,750	**108,647**	**1**
Routine production							
	Blood based products	29,980	168,057	86,091	389	**284,517**	**2.7**
	Monoclonal antibody by mouse ascites method	7	1,612	1,661	34,193	**37,473**	**0.4**
	Other product types	28,133	127,972	108,568	4,283	**268,956**	**2.6**
Other							
	Protection of the natural environment in the interests of the health or welfare of human beings or animals	5,200	72,113	143,660	13,704	**234,677**	**2.2**
	Preservation of species	2,309	195,380	27,255	292	**225,236**	**2.2**
	Higher education or training for the acquisition, maintenance or improvement of vocational skills	50,503	77,349	33,653	288	**161,793**	**1.5**
	Forensic enquiries	0	390	0	0	**390**	**0**
Total		**579,696**	**5,482,231**	**3,447,978**	**957,451**	**10,467,356**	**100**
%		**5.5**	**52.4**	**32.9**	**9.1**	**100**	

Table 7: Basic research related uses by species and type of research (2019)

		Oncology	Cardiovascular Blood and Lymphatic System	Nervous System	Respiratory System	Gastrointestinal System including Liver	Musculoskeletal System	Immune System	Urogenital/Reproductive System	Sensory Organs (skin, eyes and ears)	Endocrine System/Metabolism	Multisystemic	Ethology/ Animal Behaviour /Animal Biology	Other basic research	Total	%
Mammals																
	Rodents															
	Mice	565,267	231,201	668,750	55,805	121,064	80,930	661,429	77,358	59,503	150,861	192,955	15,474	150,412	**3,031,009**	**64.9**
	Rats	4,098	31,617	126,498	4,529	10,258	6,650	7,609	4,650	5,823	17,130	13,475	13,435	9,976	**255,748**	**5.5**
	Guinea-Pigs	34	217	105	1,168	32	0	214	18	686	561	292	109	488	**3,924**	**0.1**
	Hamsters (Syrian)	26	542	681	0	3	0	106	96	0	0	50	20	205	**1,729**	**0**
	Hamsters (Chinese)	0	0	0	0	0	0	0	0	0	0	0	17	0	**17**	**0**
	Mongolian gerbil	0	0	676	0	12	0	193	0	390	0	335	17	147	**1,770**	**0**
	Other rodents	61	0	635	0	524	4	887	108	234	27	298	11,377	1,898	**16,053**	**0.3**
	Rabbits															
	Rabbits	104	1,227	641	929	673	422	493	398	449	53	160	6,260	5,645	**17,454**	**0.4**
	Carnivores															
	Cats	4	0	77	0	40	27	109	31	13	344	176	11	283	**1,115**	**0**
	Dogs	55	131	40	86	203	115	186	83	10	63	126	102	690	**1,890**	**0**
	Ferrets	0	0	152	65	0	0	0	0	0	0	12	4	17	**250**	**0**
	Other carnivores	0	0	0	0	666	0	0	0	0	0	0	3,288	34	**3,988**	**0.1**
	Farm animals															
	Horses, donkeys and cross-breeds	0	30	0	21	10	38	659	215	29	404	184	59	155	**1,804**	**0**
	Pigs	166	1,710	348	366	2,670	653	1,205	630	93	2,292	3,478	2,818	3,400	**19,829**	**0.4**
	Goats	0	0	5	0	71	0	151	83	0	114	58	718	243	**1,443**	**0**
	Sheep	6	825	193	8	311	1,018	989	586	21	1,196	3,477	2,537	720	**11,887**	**0.3**
	Cattle	6	15	0	37	897	0	803	719	0	905	432	4,634	1,289	**9,737**	**0.2**
	Non-human primates															
	Prosimians	0	0	61	0	0	0	0	0	0	48	0	140	0	**249**	**0**
	Marmoset and tamarins	0	0	58	0	0	0	0	4	0	9	4	41	0	**116**	**0**
	Cynomolgus monkey	0	3	45	0	0	0	39	0	0	7	0	7	205	**306**	**0**
	Rhesus monkey	0	55	140	0	0	0	0	0	0	0	0	0	0	**195**	**0**
	Other species of old world monkeys (Cercopithecoidea)	0	2	0	0	0	0	0	0	0	0	0	18	0	**20**	**0**
	Other mammals															
	Other mammals	0	186	77	0	0	0	3	18	11	10	28	3,213	482	**4,028**	**0.1**
Birds																
	Domestic fowl	0	94	4,874	0	11,792	348	1,641	1	204	14,179	1,234	93,133	11,489	**138,989**	**3**
	Other birds	5,232	142	391	0	200	33	1,188	145	36	1,248	144	56,727	3,935	**69,421**	**1.5**
Reptiles																
	Reptiles	0	19	116	36	0	19	0	0	14	110	235	6,972	20	**7,541**	**0.2**
Amphibians																
	Rana	0	0	0	0	0	0	0	0	4	448	0	408	91	**951**	**0**
	Xenopus	913	101	3,300	20	0	547	0	1,103	57	562	1,648	502	6,328	**15,081**	**0.3**
	Other amphibians	0	354	1,028	0	0	3,858	0	0	10	6	347	3,777	768	**10,148**	**0.2**
Fish																
	Zebra fish	23,928	38,822	128,794	0	5,680	17,713	23,228	7,476	7,434	11,777	35,064	21,258	41,171	**362,345**	**7.8**
	Other fish	323	1,092	6,022	1,327	2,932	1,765	37,882	14,404	1,405	12,250	10,862	528,818	58,645	**677,727**	**14.5**
Cephalopods																
	Cephalopods	0	0	27	0	0	24	0	6	0	0	0	910	80	**1,047**	**0**
Totals																
	Total	**600,223**	**308,385**	**943,734**	**64,397**	**158,038**	**114,164**	**739,014**	**108,132**	**76,426**	**214,604**	**265,074**	**776,804**	**298,816**	**4,667,811**	**100**
	%	**12.9**	**6.6**	**20.2**	**1.4**	**3.4**	**2.4**	**15.8**	**2.3**	**1.6**	**4.6**	**5.7**	**16.6**	**6.4**	**100**	

Table 8.1: Translational and applied research related uses by species and type of research (Part 1) (2019)

	Human Cancer	Human Infectious Disorders	Human Cardiovascular Disorders	Human Nervous and Mental Disorders	Human Respiratory Disorders	Human Gastrointestinal Disorders including Liver	Human Musculoskeletal Disorders	Human Immune Disorders	Human Urogenital/Reproductive Disorders
Mammals									
Rodents									
Mice	513,527	246,448	44,613	190,262	43,787	31,694	25,403	68,027	12,250
Rats	5,553	4,990	14,680	80,875	6,178	9,105	8,699	4,804	6,502
Guinea-Pigs	20	1,175	479	335	4,097	34	2	191	0
Hamsters (Syrian)	180	1,584	99	399	0	122	0	12	0
Mongolian gerbil	0	1,115	0	0	0	0	0	0	0
Other rodents	0	265	0	120	4	0	0	0	0
Rabbits									
Rabbits	1,859	629	970	369	857	22	972	409	82
Carnivores									
Cats	0	0	0	0	0	0	0	0	0
Dogs	49	23	172	123	74	80	50	48	9
Ferrets	0	915	0	2	0	59	0	0	0
Other carnivores	0	6	0	0	0	0	0	0	0
Farm animals									
Horses, donkeys and cross-breeds	0	0	0	0	0	0	0	2	0
Pigs	304	275	2,884	373	532	757	523	90	427
Goats	0	14	45	0	0	0	42	0	5
Sheep	24	434	471	107	62	0	418	2	70
Cattle	0	62	7	0	0	0	0	0	18
Non-human primates									
Marmoset and tamarins	0	58	0	35	0	0	0	0	0
Cynomolgus monkey	9	375	23	143	32	0	0	118	1
Rhesus monkey	4	159	9	12	0	0	0	15	0
Vervets Chlorocebus spp.	0	25	0	0	0	0	0	0	0
Baboons	0	24	6	3	0	0	0	0	0
Other species of old world monkeys (Cercopithecoidea)	0	13	0	0	0	0	0	0	0
Other mammals									
Other mammals	57	28	2	0	8	0	0	4	0
Birds									
Domestic fowl	0	128	0	0	0	0	0	40	0
Other birds	0	276	0	0	0	0	0	6	0
Reptiles									
Reptiles	0	0	0	0	0	0	0	0	0
Amphibians									
Xenopus	0	0	0	0	0	0	0	0	0
Other amphibians	0	0	0	0	0	0	0	0	0
Fish									
Zebra fish	0	33,189	135	31,775	0	3,506	381	0	0
Other fish	0	0	0	0	0	100	0	0	0
Cephalopods									
Cephalopods	0	0	0	0	0	0	0	0	0
Totals									
Total	**521,586**	**292,210**	**64,595**	**304,933**	**55,631**	**45,479**	**36,490**	**73,768**	**19,364**
%	**18.5**	**10.4**	**2.3**	**10.8**	**2**	**1.6**	**1.3**	**2.6**	**0.7**

Table 8.2: Translational and applied research related uses by species and type of research (Part 2) (2019)

	Human Sensory Organ Disorders (skin, eyes and ears)	Human Endocrine/Metabolism Disorders	Other Human Disorders	Animal Diseases and Disorders	Animal Welfare	Diagnosis of diseases	Plant diseases	Non-regulatory toxicology and ecotoxicology	Total	%
Mammals										
Rodents										
Mice	32,013	102,465	21,587	29,876	1,388	36,300	66	13,726	**1,413,432**	**50.1**
Rats	6,213	20,425	6,742	1,972	219	4,555	0	17,163	**198,675**	**7**
Guinea-Pigs	254	3	65	667	0	226	0	610	**8,158**	**0.3**
Hamsters (Syrian)	0	699	0	338	0	0	0	0	**3,433**	**0.1**
Mongolian gerbil	113	0	0	648	0	0	0	0	**1,876**	**0.1**
Other rodents	0	0	0	417	10	220	0	95	**1,131**	**0**
Rabbits										
Rabbits	706	194	214	1,277	121	582	39	466	**9,768**	**0.3**
Carnivores										
Cats	0	0	0	1,208	16	15	0	0	**1,239**	**0**
Dogs	20	37	18	4,701	37	29	0	1,276	**6,746**	**0.2**
Ferrets	0	0	0	95	0	27	0	44	**1,142**	**0**
Other carnivores	0	0	0	81	142	0	0	0	**229**	**0**
Farm animals										
Horses, donkeys and cross-breeds	10	0	0	797	110	67	0	0	**986**	**0**
Pigs	169	932	238	19,968	11,398	487	0	311	**39,668**	**1.4**
Goats	0	0	0	240	10	32	0	13	**401**	**0**
Sheep	31	52	6	3,211	1,103	1,109	0	4	**7,104**	**0.3**
Cattle	0	194	0	7,031	6,416	502	0	8	**14,238**	**0.5**
Non-human primates										
Marmoset and tamarins	8	0	0	0	0	0	0	0	**101**	**0**
Cynomolgus monkey	56	24	98	0	3	0	0	239	**1,121**	**0**
Rhesus monkey	1	0	16	0	0	0	0	0	**216**	**0**
Vervets Chlorocebus spp.	0	0	0	0	0	0	0	0	**25**	**0**
Baboons	0	0	0	0	0	0	0	0	**33**	**0**
Other species of old world monkeys (Cercopithecoidea)	0	0	0	0	0	0	0	0	**13**	**0**
Other mammals										
Other mammals	0	4	0	374	93	19	0	0	**589**	**0**
Birds										
Domestic fowl	0	0	3	77,186	42,861	3,720	3	2,987	**126,928**	**4.5**
Other birds	0	0	2	2,274	3,581	263	0	198	**6,600**	**0.2**
Reptiles										
Reptiles	0	0	0	0	8	0	0	0	**8**	**0**
Amphibians										
Xenopus	0	29	0	0	0	9	0	2,673	**2,711**	**0.1**
Other amphibians	0	0	6	0	0	0	0	0	**6**	**0**
Fish										
Zebra fish	5,251	5,830	2,544	636	1,858	760	0	22,393	**108,258**	**3.8**
Other fish	0	144	0	709,198	125,453	325	0	13,366	**848,586**	**30.1**
Cephalopods										
Cephalopods	0	0	0	628	15,100	0	0	0	**15,728**	**0.6**
Totals										
Total	**44,845**	**131,032**	**31,539**	**862,823**	**209,927**	**49,247**	**108**	**75,572**	**2,819,149**	**100**
%	**1.6**	**4.6**	**1.1**	**30.6**	**7.4**	**1.7**	**0**	**2.7**	**100**	

Table 9: Regulatory uses by species and type of use (2019)

	Quality				Toxicity	Other		
	Quality: Batch safety testing	Quality: Pyrogenicity testing	Quality: Batch potency testing	Quality: Other quality controls	Toxicity and other safety testing including pharmacology	Other efficacy and tolerance testing	Total	%
Mammals								
Rodents								
Mice	78,786	270	412,504	26,316	211,362	57,655	**786,893**	**44.5**
Rats	11,504	0	156,557	1,009	290,493	5,394	**464,957**	**26.3**
Guinea-Pigs	13,039	140	51,677	588	28,942	1,711	**96,097**	**5.4**
Hamsters (Syrian)	52	0	3,888	448	1,573	599	**6,560**	**0.4**
Mongolian gerbil	0	0	121	0	50	0	**171**	**0**
Other rodents	0	0	0	0	9,895	80	**9,975**	**0.6**
Rabbits								
Rabbits	1,177	30,277	18,476	96	34,794	2,776	**87,596**	**5**
Carnivores								
Cats	174	0	23	67	613	361	**1,238**	**0.1**
Dogs	543	0	18	61	8,988	788	**10,398**	**0.6**
Ferrets	225	0	146	0	10	36	**417**	**0**
Other carnivores	42	0	151	0	0	140	**333**	**0**
Farm animals								
Horses, donkeys and cross-breeds	0	0	23	0	74	74	**171**	**0**
Pigs	2,101	0	859	302	4,402	4,075	**11,739**	**0.7**
Goats	0	0	8	0	57	3	**68**	**0**
Sheep	258	0	492	19	359	127	**1,255**	**0.1**
Cattle	333	0	1,031	0	783	852	**2,999**	**0.2**
Non-human primates								
Marmoset and tamarins	0	0	0	0	80	0	**80**	**0**
Cynomolgus monkey	0	0	0	0	6,695	77	**6,772**	**0.4**
Birds								
Domestic fowl	37,821	0	46,687	4,125	10,832	27,973	**127,438**	**7.2**
Other birds	542	0	258	0	802	5,926	**7,528**	**0.4**
Amphibians								
Xenopus	0	0	0	0	8,160	0	**8,160**	**0.5**
Fish								
Zebra fish	0	0	0	84	34,108	0	**34,192**	**1.9**
Other fish	619	0	39,057	394	62,247	0	**102,317**	**5.8**
Totals								
Total	**147,216**	**30,687**	**731,976**	**33,509**	**715,319**	**108,647**	**1,767,354**	**100**
%	**8.3**	**1.7**	**41.4**	**1.9**	**40.5**	**6.1**	**100**	

Table 10.1: Toxicity and other safety testing including pharmacology by species and type of use (Part 1) (2019)

	Acute						Repeated Dose							
	LD50, LC50	Other lethal methods	Non lethal methods	Skin irritation / corrosion	Skin sensitisation	Eye irritation / corrosion	up to 28 days	29 - 90 days	> 90 days	Carcinogenicity	Reproductive toxicity	Genotoxicity	Developmental toxicity	Safety testing in food and feed area
Mammals														
Rodents														
Mice	25,252	84	12,812	0	12,045	0	13,191	6,302	3,603	3,855	1,704	2,895	2,039	31,911
Rats	2,340	510	9,343	44	10	0	33,024	22,927	13,240	3,437	92,905	6,890	58,529	17
Guinea-Pigs	1,155	0	511	0	26,680	0	10	0	0	0	0	0	0	0
Hamsters (Syrian)	0	0	298	111	18	0	0	0	0	741	0	0	0	0
Mongolian gerbil	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other rodents	0	0	0	0	0	0	32	0	0	0	0	0	0	0
Rabbits														
Rabbits	0	0	379	2,871	160	468	1,075	632	310	0	2,423	12	22,754	0
Carnivores														
Cats	0	0	0	0	0	0	36	0	0	0	0	0	0	0
Dogs	0	0	465	0	36	0	2,646	1,341	1,378	0	66	10	12	0
Ferrets	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Farm animals														
Horses, donkeys and cross-breeds	0	0	0	0	0	0	0	0	0	0	0	0	0	32
Pigs	0	0	156	6	0	0	778	263	295	0	35	0	0	570
Goats	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sheep	0	0	0	0	0	0	0	0	0	0	0	0	0	62
Cattle	0	0	0	0	0	0	0	0	0	0	0	0	0	82
Non-human primates														
Marmoset and tamarins	0	0	0	0	0	0	36	0	32	0	0	0	0	0
Cynomolgus monkey	0	0	116	0	0	0	1,886	1,520	1,219	0	0	0	260	0
Birds														
Domestic fowl	558	0	0	0	0	0	0	0	0	0	0	0	0	4,650
Other birds	94	0	10	0	0	0	0	0	0	0	0	0	0	0
Amphibians														
Xenopus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fish														
Zebra fish	1,292	0	242	0	0	0	0	0	0	0	0	0	0	0
Other fish	911	0	0	0	0	0	0	0	0	0	0	0	320	450
Totals														
Total	**31,602**	**594**	**24,332**	**3,032**	**38,949**	**468**	**52,714**	**32,985**	**20,077**	**8,033**	**97,133**	**9,807**	**83,914**	**37,775**
%	**4.4**	**0.1**	**3.4**	**0.4**	**5.4**	**0.1**	**7.4**	**4.6**	**2.8**	**1.1**	**13.6**	**1.4**	**11.7**	**5.3**

Table 10.2: Toxicity and other safety testing including pharmacology by species and type of use (Part 2) (2019)

						EcoToxicity									
		Target animal safety	Neurotoxicity	Kineties	Pharmaco - dynamics (incl safety pharmacology)	Phototoxicity	Acute toxicity	Chronic toxicity	Reproductive ecotoxicity	Endocrine activity	Bioaccumulation	Other ecotoxicity	Other toxicity / safety testing	Total	%
Mammals															
	Rodents														
	Mice	380	214	38,120	46,506	396	5,837	20	0	0	0	0	4,196	**211,362**	**29.5**
	Rats	24	1,008	15,256	26,421	0	861	1,056	0	0	0	0	2,651	**290,493**	**40.6**
	Guinea-Pigs	0	0	49	507	18	0	0	0	0	0	0	12	**28,942**	**4**
	Hamsters (Syrian)	0	0	0	9	0	0	0	0	0	0	0	396	**1,573**	**0.2**
	Mongolian gerbil	0	0	0	50	0	0	0	0	0	0	0	0	**50**	**0**
	Other rodents	767	0	0	0	0	0	0	0	0	0	0	9,096	**9,895**	**1.4**
	Rabbits														
	Rabbits	161	0	199	889	0	40	98	0	0	0	6	2,317	**34,794**	**4.9**
	Carnivores														
	Cats	83	0	427	67	0	0	0	0	0	0	0	0	**613**	**0.1**
	Dogs	268	0	1,711	883	0	0	0	0	0	0	0	172	**8,988**	**1.3**
	Ferrets	10	0	0	0	0	0	0	0	0	0	0	0	**10**	**0**
	Farm animals														
	Horses, donkeys and cross-breeds	4	0	38	0	0	0	0	0	0	0	0	0	**74**	**0**
	Pigs	930	0	829	447	0	0	0	0	0	12	20	61	**4,402**	**0.6**
	Goats	0	0	56	0	0	0	0	0	0	0	0	0	**57**	**0**
	Sheep	74	0	214	0	0	0	3	0	0	0	0	6	**359**	**0.1**
	Cattle	93	0	499	61	0	0	0	0	0	22	12	14	**783**	**0.1**
	Non-human primates														
	Marmoset and tamarins	0	0	4	0	0	0	0	0	0	0	0	8	**80**	**0**
	Cynomolgus monkey	0	0	878	132	0	0	0	0	0	0	0	684	**6,695**	**0.9**
Birds															
	Domestic fowl	2,026	0	807	247	0	0	0	0	0	0	0	2,544	**10,832**	**1.5**
	Other birds	105	0	39	0	0	400	10	0	0	0	54	90	**802**	**0.1**
Amphibians															
	Xenopus	0	0	0	0	0	0	0	0	8,160	0	0	0	**8,160**	**1.1**
Fish															
	Zebra fish	0	0	0	0	0	12,735	15,893	224	312	1,409	1,950	51	**34,108**	**4.8**
	Other fish	413	0	0	0	0	34,114	19,796	0	1,144	3,375	1,724	0	**62,247**	**8.7**
Totals															
	Total	**5,338**	**1,222**	**59,126**	**76,219**	**414**	**53,987**	**36,876**	**224**	**9,616**	**4,818**	**3,766**	**22,298**	**715,319**	**100**
	%	**0.7**	**0.2**	**8.3**	**10.7**	**0.1**	**7.5**	**5.2**	**0**	**1.3**	**0.7**	**0.5**	**3.1**	**100**	

Table 11: Regulatory uses by species and type of legislation (2019)

	Legislation on medicinal products for human use	Legislation on medicinal products for veterinary use and their residues	Medical devices legislation	Industrial chemicals legislation	Plant protection product legislation	Biocides legislation	Food legislation including food contact material	Feed legislation including legislation for the safety of target animals, workers and environment	Other legislation	Total	%
Mammals											
Rodents											
Mice	628,481	98,040	15,345	5,490	5,232	962	32,331	145	867	**786,893**	**44.5**
Rats	307,604	8,951	3,864	110,461	28,708	814	4,038	0	517	**464,957**	**26.3**
Guinea-Pigs	53,885	16,832	24,143	1,036	24	102	0	0	75	**96,097**	**5.4**
Hamsters (Syrian)	1,572	4,466	522	0	0	0	0	0	0	**6,560**	**0.4**
Mongolian gerbil	121	50	0	0	0	0	0	0	0	**171**	**0**
Other rodents	32	0	0	0	9,863	0	0	0	80	**9,975**	**0.6**
Rabbits											
Rabbits	50,438	12,190	5,867	14,304	2,471	460	6	298	1,562	**87,596**	**5**
Carnivores											
Cats	13	1,158	0	0	0	0	67	0	0	**1,238**	**0.1**
Dogs	8,122	2,032	23	0	160	0	61	0	0	**10,398**	**0.6**
Ferrets	407	10	0	0	0	0	0	0	0	**417**	**0**
Other carnivores	0	333	0	0	0	0	0	0	0	**333**	**0**
Farm animals											
Horses, donkeys and cross-breeds	56	83	0	0	0	0	0	32	0	**171**	**0**
Pigs	2,481	8,001	187	0	0	0	13	984	73	**11,739**	**0.7**
Goats	8	42	3	0	15	0	0	0	0	**68**	**0**
Sheep	14	1,006	156	0	0	0	52	27	0	**1,255**	**0.1**
Cattle	0	2,926	0	0	44	0	0	17	12	**2,999**	**0.2**
Non-human primates											
Marmoset and tamarins	80	0	0	0	0	0	0	0	0	**80**	**0**
Cynomolgus monkey	6,772	0	0	0	0	0	0	0	0	**6,772**	**0.4**
Birds											
Domestic fowl	2,419	110,459	0	0	223	0	0	14,317	20	**127,438**	**7.2**
Other birds	20	6,952	0	0	548	0	8	0	0	**7,528**	**0.4**
Amphibians											
Xenopus	0	0	0	50	8,110	0	0	0	0	**8,160**	**0.5**
Fish											
Zebra fish	6,541	88	931	10,399	5,528	119	0	0	10,586	**34,192**	**1.9**
Other fish	8,644	41,206	240	12,467	7,128	0	0	450	32,182	**102,317**	**5.8**
Totals											
Total	**1,077,710**	**314,825**	**51,281**	**154,207**	**68,054**	**2,457**	**36,576**	**16,270**	**45,974**	**1,767,354**	**100**
%	**61**	**17.8**	**2.9**	**8.7**	**3.9**	**0.1**	**2.1**	**0.9**	**2.6**	**100**	

Table 12: Regulatory uses by species and origin of regulatory requirement (2019)

	Legislation satisfying EU requirements	Legislation satisfying national requirements only [within EU]	Legislation satisfying Non-EU requirements only	Total	%
Mammals					
Rodents					
Mice	732,222	8,428	46,243	**786,893**	**44.5**
Rats	462,021	717	2,219	**464,957**	**26.3**
Guinea-Pigs	89,039	1,396	5,662	**96,097**	**5.4**
Hamsters (Syrian)	5,878	298	384	**6,560**	**0.4**
Mongolian gerbil	171	0	0	**171**	**0**
Other rodents	9,895	80	0	**9,975**	**0.6**
Rabbits					
Rabbits	84,013	134	3,449	**87,596**	**5**
Carnivores					
Cats	1,234	0	4	**1,238**	**0.1**
Dogs	10,339	10	49	**10,398**	**0.6**
Ferrets	417	0	0	**417**	**0**
Other carnivores	333	0	0	**333**	**0**
Farm animals					
Horses, donkeys and cross-breeds	171	0	0	**171**	**0**
Pigs	9,963	5	1,771	**11,739**	**0.7**
Goats	68	0	0	**68**	**0**
Sheep	1,107	106	42	**1,255**	**0.1**
Cattle	2,976	17	6	**2,999**	**0.2**
Non-human primates					
Marmoset and tamarins	80	0	0	**80**	**0**
Cynomolgus monkey	6,761	0	11	**6,772**	**0.4**
Birds					
Domestic fowl	118,438	0	9,000	**127,438**	**7.2**
Other birds	7,527	1	0	**7,528**	**0.4**
Amphibians					
Xenopus	8,160	0	0	**8,160**	**0.5**
Fish					
Zebra fish	32,692	1,270	230	**34,192**	**1.9**
Other fish	73,775	26,892	1,650	**102,317**	**5.8**
Totals					
Total	**1,657,280**	**39,354**	**70,720**	**1,767,354**	**100**
%	**93.8**	**2.2**	**4**	**100**	

Table 13: Routine production uses by species and product type (2019)

		Blood based products	Other product types	Monoclonal antibody by mouse ascites method	Total	%
Mammals						
	Rodents					
	Mice	2,800	85,090	36,725	**124,615**	**21.1**
	Rats	1,169	6,093	2	**7,264**	**1.2**
	Guinea-Pigs	1,306	7,745	0	**9,051**	**1.5**
	Hamsters (Syrian)	136	0	0	**136**	**0**
	Mongolian gerbil	0	83	0	**83**	**0**
	Other rodents	0	20	0	**20**	**0**
	Rabbits					
	Rabbits	219,231	26,738	729	**246,698**	**41.7**
	Carnivores					
	Cats	25	15	0	**40**	**0**
	Dogs	405	20	0	**425**	**0.1**
	Ferrets	59	0	0	**59**	**0**
	Farm animals					
	Horses, donkeys and cross-breeds	8,227	0	0	**8,227**	**1.4**
	Pigs	237	52	0	**289**	**0**
	Goats	61	89	0	**150**	**0**
	Sheep	47,349	40	0	**47,389**	**8**
	Cattle	71	35	0	**106**	**0**
	Non-human primates					
	Marmoset and tamarins	85	0	0	**85**	**0**
	Cynomolgus monkey	614	217	0	**831**	**0.1**
	Rhesus monkey	29	0	0	**29**	**0**
	Vervets Chlorocebus spp.	3	8	0	**11**	**0**
	Other mammals					
	Other mammals	0	14	17	**31**	**0**
Birds						
	Domestic fowl	2,679	113,327	0	**116,006**	**19.6**
	Other birds	31	27,970	0	**28,001**	**4.7**
Fish						
	Other fish	0	1,400	0	**1,400**	**0.2**
Totals						
	Total	**284,517**	**268,956**	**37,473**	**590,946**	**100**
	%	**48.1**	**45.5**	**6.3**	**100**	

Table 14: Reuses of animals by species and main categories of scientific purposes in research, testing routine production and education (2019)

	Reuse	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Yes	19,420	10,486	18,249	570	0	249	6,661	0	55,635	1.0
Mice	No	3,011,589	1,402,946	768,644	124,045	863	7,074	69,885	280	5,385,326	99.0
	Total	**3,031,009**	**1,413,432**	**786,893**	**124,615**	**863**	**7,323**	**76,546**	**280**	**5,440,961**	**100.0**
	Yes	4,188	4,298	2,545	130	0	38	3,019	0	14,218	1.5
Rats	No	251,560	194,377	462,412	7,134	610	645	38,160	73	954,971	98.5
	Total	**255,748**	**198,675**	**464,957**	**7,264**	**610**	**683**	**41,179**	**73**	**969,189**	**100.0**
	Yes	8	68	364	168	11	0	189	0	808	0.7
Guinea-Pigs	No	3,916	8,090	95,733	8,883	0	0	1,964	0	118,586	99.3
	Total	**3,924**	**8,158**	**96,097**	**9,051**	**11**	**0**	**2,153**	**0**	**119,394**	**100.0**
	Yes	0	0	0	0	0	0	5	0	5	0.0
Hamsters (Syrian)	No	1,729	3,433	6,560	136	0	0	152	0	12,010	100.0
	Total	**1,729**	**3,433**	**6,560**	**136**	**0**	**0**	**157**	**0**	**12,015**	**100.0**
	Yes	0	0	0	0	0	0	0	0	0	0.0
Hamsters (Chinese)	No	17	0	0	0	0	0	0	0	17	100.0
	Total	**17**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**100.0**
	Yes	4	4	0	0	0	0	0	0	8	0.2
Mongolian gerbil	No	1,766	1,872	171	83	0	0	51	0	3,943	99.8
	Total	**1,770**	**1,876**	**171**	**83**	**0**	**0**	**51**	**0**	**3,951**	**100.0**
	Yes	212	10	0	0	0	0	0	0	222	0.8
Other rodents	No	15,841	1,121	9,975	20	1,601	282	337	0	29,177	99.2
	Total	**16,053**	**1,131**	**9,975**	**20**	**1,601**	**282**	**337**	**0**	**29,399**	**100.0**
	Yes	39	348	8,887	818	0	0	309	0	10,401	2.9
Rabbits	No	17,415	9,420	78,709	245,880	0	0	1,353	0	352,777	97.1
	Total	**17,454**	**9,768**	**87,596**	**246,698**	**0**	**0**	**1,662**	**0**	**363,178**	**100.0**
	Yes	695	158	587	25	0	0	63	0	1,528	41.3
Cats	No	420	1,081	651	15	0	0	1	0	2,168	58.7
	Total	**1,115**	**1,239**	**1,238**	**40**	**0**	**0**	**64**	**0**	**3,696**	**100.0**
	Yes	1,136	2,051	3,156	366	0	0	854	0	7,563	36.7
Dogs	No	754	4,695	7,242	59	82	0	235	0	13,067	63.3
	Total	**1,890**	**6,746**	**10,398**	**425**	**82**	**0**	**1,089**	**0**	**20,630**	**100.0**
	Yes	0	22	0	0	0	0	24	0	46	2.4
Ferrets	No	250	1,120	417	59	0	0	37	0	1,883	97.6
	Total	**250**	**1,142**	**417**	**59**	**0**	**0**	**61**	**0**	**1,929**	**100.0**
	Yes	250	30	0	0	50	0	0	0	330	6.6
Other carnivores	No	3,738	199	333	0	267	111	20	0	4,668	93.4
	Total	**3,988**	**229**	**333**	**0**	**317**	**111**	**20**	**0**	**4,998**	**100.0**
	Yes	1,316	427	6	8,187	1,647	54	310	0	11,947	89.3
Horses, donkeys and cross-breeds	No	488	559	165	40	0	0	179	0	1,431	10.7
	Total	**1,804**	**986**	**171**	**8,227**	**1,647**	**54**	**489**	**0**	**13,378**	**100.0**
	Yes	652	1,882	446	10	0	0	1,305	0	4,295	5.0
Pigs	No	19,177	37,786	11,293	279	935	9	12,314	2	81,795	95.0
	Total	**19,829**	**39,668**	**11,739**	**289**	**935**	**9**	**13,619**	**2**	**86,090**	**100.0**
	Yes	795	14	5	109	0	0	234	0	1,157	49.0
Goats	No	648	387	63	41	2	0	61	0	1,202	51.0
	Total	**1,443**	**401**	**68**	**150**	**2**	**0**	**295**	**0**	**2,359**	**100.0**
	Yes	1,703	716	152	44,884	3,282	0	429	0	51,166	70.6
Sheep	No	10,184	6,388	1,103	2,505	181	0	961	33	21,355	29.4
	Total	**11,887**	**7,104**	**1,255**	**47,389**	**3,463**	**0**	**1,390**	**33**	**72,521**	**100.0**
	Yes	3,225	3,125	242	9	167	0	3,339	0	10,107	28.7
Cattle	No	6,512	11,113	2,757	97	1,588	0	3,040	2	25,109	71.3
	Total	**9,737**	**14,238**	**2,999**	**106**	**1,755**	**0**	**6,379**	**2**	**35,216**	**100.0**
Prosimians	Yes	55	0	0	0	0	0	0	0	55	22.1
	No	194	0	0	0	0	0	0	0	194	77.9

	Reuse	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
	Total	**249**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**249**	**100.0**
Marmoset and tamarins	Yes	48	19	8	85	0	0	0	0	160	41.9
	No	68	82	72	0	0	0	0	0	222	58.1
	Total	**116**	**101**	**80**	**85**	**0**	**0**	**0**	**0**	**382**	**100.0**
Cynomolgus monkey	Yes	29	416	1,122	715	0	0	0	0	2,282	25.3
	No	277	705	5,650	116	0	0	0	0	6,748	74.7
	Total	**306**	**1,121**	**6,772**	**831**	**0**	**0**	**0**	**0**	**9,030**	**100.0**
Rhesus monkey	Yes	134	26	0	29	0	0	0	0	189	43.0
	No	61	190	0	0	0	0	0	0	251	57.0
	Total	**195**	**216**	**0**	**29**	**0**	**0**	**0**	**0**	**440**	**100.0**
Vervets Chlorocebus spp	Yes	0	8	0	3	0	0	0	0	11	30.6
	No	0	17	0	8	0	0	0	0	25	69.4
	Total	**0**	**25**	**0**	**11**	**0**	**0**	**0**	**0**	**36**	**100.0**
Baboons	Yes	0	0	0	0	0	0	0	0	0	0.0
	No	0	33	0	0	0	0	0	0	33	100.0
	Total	**0**	**33**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**100.0**
Other species of old world monkeys (Cercopithecoidea)	Yes	18	13	0	0	0	0	0	0	31	93.9
	No	2	0	0	0	0	0	0	0	2	6.1
	Total	**20**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**100.0**
Other mammals	Yes	258	68	0	0	1	52	3	0	382	7.3
	No	3,770	521	0	31	167	164	182	0	4,835	92.7
	Total	**4,028**	**589**	**0**	**31**	**168**	**216**	**185**	**0**	**5,217**	**100.0**
Domestic fowl	Yes	731	176	2,312	71	0	0	214	0	3,504	0.7
	No	138,258	126,752	125,126	115,935	4,373	439	2,138	0	513,021	99.3
	Total	**138,989**	**126,928**	**127,438**	**116,006**	**4,373**	**439**	**2,352**	**0**	**516,525**	**100.0**
Other birds	Yes	895	176	202	6	0	0	221	0	1,500	1.3
	No	68,526	6,424	7,326	27,995	3,508	1,800	677	0	116,256	98.7
	Total	**69,421**	**6,600**	**7,528**	**28,001**	**3,508**	**1,800**	**898**	**0**	**117,756**	**100.0**
Reptiles	Yes	6,219	8	0	0	0	0	10	0	6,237	76.0
	No	1,322	0	0	0	0	624	26	0	1,972	24.0
	Total	**7,541**	**8**	**0**	**0**	**0**	**624**	**36**	**0**	**8,209**	**100.0**
Rana	Yes	4	0	0	0	0	0	0	0	4	0.1
	No	947	0	0	0	0	0	5,370	0	6,317	99.9
	Total	**951**	**0**	**0**	**0**	**0**	**0**	**5,370**	**0**	**6,321**	**100.0**
Xenopus	Yes	5,566	1,204	0	0	0	0	25	0	6,795	25.6
	No	9,515	1,507	8,160	0	337	0	279	0	19,798	74.4
	Total	**15,081**	**2,711**	**8,160**	**0**	**337**	**0**	**304**	**0**	**26,593**	**100.0**
Other amphibians	Yes	395	6	0	0	200	0	0	0	601	2.9
	No	9,753	0	0	0	2,412	6,644	1,484	0	20,293	97.1
	Total	**10,148**	**6**	**0**	**0**	**2,612**	**6,644**	**1,484**	**0**	**20,894**	**100.0**
Zebra fish	Yes	5,830	536	1,603	0	0	0	8	0	7,977	1.6
	No	356,515	107,722	32,589	0	6,868	0	2,066	0	505,760	98.4
	Total	**362,345**	**108,258**	**34,192**	**0**	**6,868**	**0**	**2,074**	**0**	**513,737**	**100.0**
Other fish	Yes	5,256	82	140	1,400	371	7	92	0	7,348	0.4
	No	672,471	848,504	102,177	0	204,946	207,044	3,500	0	2,038,642	99.6
	Total	**677,727**	**848,586**	**102,317**	**1,400**	**205,317**	**207,051**	**3,592**	**0**	**2,045,990**	**100.0**
Cephalopods	Yes	22	0	0	0	0	0	0	0	22	0.1
	No	**1,025**	**15,728**	**0**	**0**	**208**	**0**	**7**	**0**	**16,968**	**99.9**
	Total	**1,047**	**15,728**	**0**	**0**	**208**	**0**	**7**	**0**	**16,990**	**100.0**
All Species	**Yes**	**59,103**	**26,377**	**40,026**	**57,585**	**5,729**	**400**	**17,314**	**0**	**206,534**	**2.0**
	No	**4,608,708**	**2,792,772**	**1,727,328**	**533,361**	**228,948**	**224,836**	**144,479**	**390**	**10,260,822**	**98.0**
	Total	**4,667,811**	**2,819,149**	**1,767,354**	**590,946**	**234,677**	**225,236**	**161,793**	**390**	**10,467,356**	**100.0**

Table 15: Genetic status of animals used by species and main categories of scientific purposes (2019)

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Mice	Not altered	1,290,247	948,061	759,278	123,214	863	1,838	60,883	272	3,184,656	58.5
	Non harmful	1,448,510	345,867	26,162	1,401	0	5,347	15,103	0	1,842,390	33.9
	Harmful	292,252	119,504	1,453	0	0	138	560	8	413,915	7.6
	Total	**3,031,009**	**1,413,432**	**786,893**	**124,615**	**863**	**7,323**	**76,546**	**280**	**5,440,961**	**100.0**
Rats	Not altered	237,524	190,096	463,211	6,815	610	38	40,458	73	938,825	96.9
	Non harmful	14,350	5,189	1,527	449	0	0	692	0	22,207	2.3
	Harmful	3,874	3,390	219	0	0	645	29	0	8,157	0.8
	Total	**255,748**	**198,675**	**464,957**	**7,264**	**610**	**683**	**41,179**	**73**	**969,189**	**100.0**
Guinea-Pigs	Not altered	3,924	8,158	96,097	9,051	11	0	2,153	0	119,394	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**3,924**	**8,158**	**96,097**	**9,051**	**11**	**0**	**2,153**	**0**	**119,394**	**100.0**
Hamsters (Syrian)	Not altered	1,567	3,042	6,560	136	0	0	157	0	11,462	95.4
	Non harmful	162	0	0	0	0	0	0	0	162	1.3
	Harmful	0	391	0	0	0	0	0	0	391	3.3
	Total	**1,729**	**3,433**	**6,560**	**136**	**0**	**0**	**157**	**0**	**12,015**	**100.0**
Hamsters (Chinese)	Not altered	17	0	0	0	0	0	0	0	17	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**17**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**100.0**
Mongolian gerbil	Not altered	1,770	1,876	171	83	0	0	51	0	3,951	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,770**	**1,876**	**171**	**83**	**0**	**0**	**51**	**0**	**3,951**	**100.0**
Other rodents	Not altered	16,012	1,131	9,975	20	1,601	282	337	0	29,358	99.9
	Non harmful	41	0	0	0	0	0	0	0	41	0.1
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**16,053**	**1,131**	**9,975**	**20**	**1,601**	**282**	**337**	**0**	**29,399**	**100.0**
Rabbits	Not altered	17,324	9,665	87,596	225,049	0	0	1,662	0	341,296	94.0
	Non harmful	95	103	0	21,649	0	0	0	0	21,847	6.0
	Harmful	35	0	0	0	0	0	0	0	35	0.0
	Total	**17,454**	**9,768**	**87,596**	**246,698**	**0**	**0**	**1,662**	**0**	**363,178**	**100.0**
Cats	Not altered	1,115	1,239	1,238	40	0	0	64	0	3,696	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,115**	**1,239**	**1,238**	**40**	**0**	**0**	**64**	**0**	**3,696**	**100.0**
Dogs	Not altered	1,858	6,718	10,398	425	82	0	1,089	0	20,570	99.7
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	32	28	0	0	0	0	0	0	60	0.3
	Total	**1,890**	**6,746**	**10,398**	**425**	**82**	**0**	**1,089**	**0**	**20,630**	**100.0**
Ferrets	Not altered	240	1,142	417	59	0	0	61	0	1,919	99.5
	Non harmful	10	0	0	0	0	0	0	0	10	0.5
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**250**	**1,142**	**417**	**59**	**0**	**0**	**61**	**0**	**1,929**	**100.0**
Other carnivores	Not altered	3,988	229	333	0	317	111	20	0	4,998	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**3,988**	**229**	**333**	**0**	**317**	**111**	**20**	**0**	**4,998**	**100.0**
Horses, donkeys and cross-breeds	Not altered	1,804	986	171	8,227	1,647	54	489	0	13,378	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,804**	**986**	**171**	**8,227**	**1,647**	**54**	**489**	**0**	**13,378**	**100.0**
Pigs	Not altered	19,639	39,188	11,726	289	935	9	13,611	2	85,399	99.2
	Non harmful	165	334	13	0	0	0	6	0	518	0.6
	Harmful	25	146	0	0	0	0	2	0	173	0.2
	Total	**19,829**	**39,668**	**11,739**	**289**	**935**	**9**	**13,619**	**2**	**86,090**	**100.0**
Goats	Not altered	1,443	401	68	150	2	0	295	0	2,359	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,443**	**401**	**68**	**150**	**2**	**0**	**295**	**0**	**2,359**	**100.0**

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Sheep	Not altered	11,887	7,104	1,255	47,389	3,463	0	1,390	33	72,521	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**11,887**	**7,104**	**1,255**	**47,389**	**3,463**	**0**	**1,390**	**33**	**72,521**	**100.0**
Cattle	Not altered	9,737	14,238	2,999	106	1,755	0	6,379	2	35,216	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**9,737**	**14,238**	**2,999**	**106**	**1,755**	**0**	**6,379**	**2**	**35,216**	**100.0**
Prosimians	Not altered	249	0	0	0	0	0	0	0	249	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**249**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**249**	**100.0**
Marmoset and tamarins	Not altered	116	101	80	85	0	0	0	0	382	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**116**	**101**	**80**	**85**	**0**	**0**	**0**	**0**	**382**	**100.0**
Cynomolgus monkey	Not altered	306	1,121	6,772	831	0	0	0	0	9,030	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**306**	**1,121**	**6,772**	**831**	**0**	**0**	**0**	**0**	**9,030**	**100.0**
Rhesus monkey	Not altered	195	216	0	29	0	0	0	0	440	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**195**	**216**	**0**	**29**	**0**	**0**	**0**	**0**	**440**	**100.0**
Vervets Chlorocebus spp	Not altered	0	25	0	11	0	0	0	0	36	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**0**	**25**	**0**	**11**	**0**	**0**	**0**	**0**	**36**	**100.0**
Baboons	Not altered	0	33	0	0	0	0	0	0	33	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**0**	**33**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**100.0**
Other species of old world monkeys (Cercopithecoidea)	Not altered	20	13	0	0	0	0	0	0	33	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**20**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**100.0**
Other mammals	Not altered	4,028	589	0	31	168	216	185	0	5,217	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**4,028**	**589**	**0**	**31**	**168**	**216**	**185**	**0**	**5,217**	**100.0**
Domestic fowl	Not altered	138,572	126,928	127,438	116,006	4,373	439	2,352	0	516,108	99.9
	Non harmful	392	0	0	0	0	0	0	0	392	0.1
	Harmful	25	0	0	0	0	0	0	0	25	0.0
	Total	**138,989**	**126,928**	**127,438**	**116,006**	**4,373**	**439**	**2,352**	**0**	**516,525**	**100.0**
Other birds	Not altered	69,421	6,600	7,528	28,001	3,508	1,800	894	0	117,752	100.0
	Non harmful	0	0	0	0	0	0	4	0	4	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**69,421**	**6,600**	**7,528**	**28,001**	**3,508**	**1,800**	**898**	**0**	**117,756**	**100.0**
Reptiles	Not altered	7,541	8	0	0	0	624	36	0	8,209	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**7,541**	**8**	**0**	**0**	**0**	**624**	**36**	**0**	**8,209**	**100.0**
Rana	Not altered	951	0	0	0	0	0	5,370	0	6,321	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**951**	**0**	**0**	**0**	**0**	**0**	**5,370**	**0**	**6,321**	**100.0**
Xenopus	Not altered	12,038	2,205	8,160	0	337	0	304	0	23,044	86.7
	Non harmful	3,043	506	0	0	0	0	0	0	3,549	13.3
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**15,081**	**2,711**	**8,160**	**0**	**337**	**0**	**304**	**0**	**26,593**	**100.0**
Other amphibians	Not altered	6,625	6	0	0	2,612	6,644	1,273	0	17,160	82.1
	Non harmful	3,523	0	0	0	0	0	211	0	3,734	17.9
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**10,148**	**6**	**0**	**0**	**2,612**	**6,644**	**1,484**	**0**	**20,894**	**100.0**

	Genetic status	Basic research	Translational and applied research	Regulatory use	Routine production	Protection of the natural environment in the interests of the health or welfare of human beings or animals	Preservation of species	Higher education or training for the acquisition, maintenance or improvement of vocational skills	Forensic enquiries	Total	%
Zebra fish	Not altered	100,650	52,013	33,902	0	2,982	0	1,878	0	191,425	37.3
	Non harmful	246,964	44,075	0	0	3,886	0	188	0	295,113	57.4
	Harmful	14,731	12,170	290	0	0	0	8	0	27,199	5.3
	Total	**362,345**	**108,258**	**34,192**	**0**	**6,868**	**0**	**2,074**	**0**	**513,737**	**100.0**
Other fish	Not altered	674,312	848,586	102,317	1,400	205,317	207,051	3,592	0	2,042,575	99.8
	Non harmful	3,232	0	0	0	0	0	0	0	3,232	0.2
	Harmful	183	0	0	0	0	0	0	0	183	0.0
	Total	**677,727**	**848,586**	**102,317**	**1,400**	**205,317**	**207,051**	**3,592**	**0**	**2,045,990**	**100.0**
Cephalopods	Not altered	1,047	15,728	0	0	208	0	7	0	16,990	100.0
	Non harmful	0	0	0	0	0	0	0	0	0	0.0
	Harmful	0	0	0	0	0	0	0	0	0	0.0
	Total	**1,047**	**15,728**	**0**	**0**	**208**	**0**	**7**	**0**	**16,990**	**100.0**
All Species	**Harmful**	**311,157**	**135,629**	**1,962**	**0**	**0**	**783**	**599**	**8**	**450,138**	**4.3**
	Non harmful	**1,720,487**	**396,074**	**27,702**	**23,499**	**3,886**	**5,347**	**16,204**	**0**	**2,193,199**	**21.0**
	Not altered	**2,636,167**	**2,287,446**	**1,737,690**	**567,447**	**230,791**	**219,106**	**144,990**	**382**	**7,824,019**	**74.7**
	Total	**4,667,811**	**2,819,149**	**1,767,354**	**590,946**	**234,677**	**225,236**	**161,793**	**390**	**10,467,356**	**100.0**

Part 3: Numbers and uses of animals for the creation and maintenance of genetically altered animals in the EU

Table 16: Use of animals for the creation of new genetically altered animal lines by research type species and severity (2016)

	Severity	Basic research	Translational and applied research	Total	%
Mice	Non-recovery	15,878	1,384	17,262	4.6
	Mild	266,780	13,949	280,729	75.5
	Moderate	60,862	8,393	69,255	18.6
	Severe	4,275	236	4,511	1.2
	Total	**347,795**	**23,962**	**371,757**	**100.0**
Rats	Non-recovery	21	9	30	0.8
	Mild	1,094	40	1,134	31.0
	Moderate	2,031	39	2,070	56.6
	Severe	421	0	421	11.5
	Total	**3,567**	**88**	**3,655**	**100.0**
Hamsters (Syrian)	Non-recovery	36	0	36	31.0
	Mild	80	0	80	69.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**116**	**0**	**116**	**100.0**
Rabbits	Non-recovery	0	0	0	0.0
	Mild	21	168	189	62.0
	Moderate	16	100	116	38.0
	Severe	0	0	0	0.0
	Total	**37**	**268**	**305**	**100.0**
Pigs	Non-recovery	0	0	0	0.0
	Mild	145	34	179	66.5
	Moderate	19	60	79	29.4
	Severe	0	11	11	4.1
	Total	**164**	**105**	**269**	**100.0**
Sheep	Non-recovery	0	0	0	0.0
	Mild	32	0	32	78.0
	Moderate	9	0	9	22.0
	Severe	0	0	0	0.0
	Total	**41**	**0**	**41**	**100.0**
Cattle	Non-recovery	0	0	0	0.0
	Mild	1	0	1	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**1**	**0**	**1**	**100.0**
Marmoset and tamarins	Non-recovery	0	0	0	0.0
	Mild	47	0	47	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**47**	**0**	**47**	**100.0**
Other mammals	Non-recovery	4	0	4	57.1
	Mild	2	0	2	28.6
	Moderate	1	0	1	14.3
	Severe	0	0	0	0.0
	Total	**7**	**0**	**7**	**100.0**
Domestic fowl	Non-recovery	0	0	0	0.0
	Mild	1,000	54	1,054	90.4
	Moderate	67	45	112	9.6
	Severe	0	0	0	0.0
	Total	**1,067**	**99**	**1,166**	**100.0**
Other birds	Non-recovery	0	0	0	0.0
	Mild	10	0	10	100.0
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**10**	**0**	**10**	**100.0**
Xenopus	Non-recovery	0	0	0	0.0
	Mild	1,787	0	1,787	100.0

	Severity	Basic research	Translational and applied research	Total	%
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**1,787**	**0**	**1,787**	**100.0**
Other amphibians	Non-recovery	15	0	15	5.5
	Mild	256	0	256	94.5
	Moderate	0	0	0	0.0
	Severe	0	0	0	0.0
	Total	**271**	**0**	**271**	**100.0**
Zebra fish	Non-recovery	2,265	28	2,293	1.8
	Mild	101,478	2,821	104,299	81.2
	Moderate	21,606	0	21,606	16.8
	Severe	305	0	305	0.2
	Total	**125,654**	**2,849**	**128,503**	**100.0**
Other fish	Non-recovery	0	0	0	0.0
	Mild	3,163	0	3,163	99.8
	Moderate	1	0	1	0.0
	Severe	5	0	5	0.2
	Total	**3,169**	**0**	**3,169**	**100.0**
All Species	**Non-recovery**	**18,219**	**1,421**	**19,640**	**3.8**
	Mild	**375,896**	**17,066**	**392,962**	**76.9**
	Moderate	**84,612**	**8,637**	**93,249**	**18.2**
	Severe	**5,006**	**247**	**5,253**	**1.0**
	Total	**483,733**	**27,371**	**511,104**	**100.0**

Table 17: Use of animals for the creation of new genetically altered animal lines by research type species and severity (2019)

	Reuse	Basic research	Translational and applied research	Total	%
Mice	Yes	1,047	0	1,047	0.3
	No	346,748	23,962	370,710	99.7
	Total	**347,795**	**23,962**	**371,757**	**100.0**
Rats	Yes	0	0	0	0.0
	No	3,567	88	3,655	100.0
	Total	**3,567**	**88**	**3,655**	**100.0**
Hamsters (Syrian)	Yes	0	0	0	0.0
	No	116	0	116	100.0
	Total	**116**	**0**	**116**	**100.0**
Rabbits	Yes	0	0	0	0.0
	No	37	268	305	100.0
	Total	**37**	**268**	**305**	**100.0**
Pigs	Yes	0	4	4	1.5
	No	164	101	265	98.5
	Total	**164**	**105**	**269**	**100.0**
Sheep	Yes	0	0	0	0.0
	No	41	0	41	100.0
	Total	**41**	**0**	**41**	**100.0**
Cattle	Yes	0	0	0	0.0
	No	1	0	1	100.0
	Total	**1**	**0**	**1**	**100.0**
Marmoset and tamarins	Yes	4	0	4	8.5
	No	43	0	43	91.5
	Total	**47**	**0**	**47**	**100.0**
Other mammals	Yes	0	0	0	0.0
	No	7	0	7	100.0
	Total	**7**	**0**	**7**	**100.0**
Domestic fowl	Yes	0	0	0	0.0
	No	1,067	99	1,166	100.0
	Total	**1,067**	**99**	**1,166**	**100.0**
Other birds	Yes	0	0	0	0.0
	No	10	0	10	100.0
	Total	**10**	**0**	**10**	**100.0**
Xenopus	Yes	0	0	0	0.0
	No	1,787	0	1,787	100.0
	Total	**1,787**	**0**	**1,787**	**100.0**
Other amphibians	Yes	0	0	0	0.0
	No	271	0	271	100.0
	Total	**271**	**0**	**271**	**100.0**
Zebra fish	Yes	1,973	0	1,973	1.5
	No	123,681	2,849	126,530	98.5
	Total	**125,654**	**2,849**	**128,503**	**100.0**
Other fish	Yes	0	0	0	0.0
	No	3,169	0	3,169	100.0
	Total	**3,169**	**0**	**3,169**	**100.0**
All Species	**Yes**	**3,024**	**4**	**3,028**	**0.6**
	No	**480,709**	**27,367**	**508,076**	**99.4**
	Total	**483,733**	**27,371**	**511,104**	**100.0**

Table 18: Uses of animals for the creation of new genetically altered animal lines in basic research by species and type of research (2019)

	Oncology	Cardiovascular Blood and Lymphatic System	Nervous System	Respiratory System	Gastrointestinal System including Liver	Musculoskeletal System	Immune System	Urogenital/Reproductive System	Sensory Organs (skin, eyes and ears)	Endocrine System/Metabolism	Multisystemic	Ethology / Animal Behaviour /Animal Biology	Other basic research	Total	%
Mammals															
Rodents															
Mice	63,402	17,412	39,819	726	13,169	5,363	57,887	18,763	8,696	12,389	80,496	72	29,601	**347,795**	**71.9**
Rats	0	1,064	534	0	0	0	820	0	0	0	870	0	279	**3,567**	**0.7**
Hamsters (Syrian)	0	0	0	0	0	0	80	36	0	0	0	0	0	**116**	**0**
Rabbits															
Rabbits	0	16	0	0	0	0	0	21	0	0	0	0	0	**37**	**0**
Farm animals															
Pigs	0	19	0	38	0	0	107	0	0	0	0	0	0	**164**	**0**
Sheep	0	0	39	2	0	0	0	0	0	0	0	0	0	**41**	**0**
Cattle	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0**
Non-human primates															
Marmoset and tamarins	0	0	0	0	0	0	0	32	0	0	15	0	0	**47**	**0**
Other mammals															
Other mammals	0	0	0	0	0	0	0	1	0	0	6	0	0	**7**	**0**
Birds															
Domestic fowl	45	0	0	0	0	0	274	301	0	0	447	0	0	**1,067**	**0.2**
Other birds	0	0	0	0	0	0	0	0	0	0	0	10	0	**10**	**0**
Amphibians															
Xenopus	0	0	89	0	0	0	0	1,665	0	0	26	0	7	**1,787**	**0.4**
Other amphibians	0	0	0	0	0	0	0	0	0	0	0	0	271	**271**	**0.1**
Fish															
Zebra fish	5,381	32,067	44,464	0	3,129	3,892	6,917	2,253	3,901	2,982	11,477	1,792	7,399	**125,654**	**26**
Other fish	0	50	32	0	0	0	0	400	1,379	0	1,108	0	200	**3,169**	**0.7**
Totals															
Total	**68,828**	**50,629**	**84,977**	**766**	**16,298**	**9,255**	**66,085**	**23,472**	**13,976**	**15,371**	**94,445**	**1,874**	**37,757**	**483,733**	**100**
%	**14.2**	**10.5**	**17.6**	**0.2**	**3.4**	**1.9**	**13.7**	**4.9**	**2.9**	**3.2**	**19.5**	**0.4**	**7.8**	**100**	

Table 19.1: Uses of animals for the creation of new genetically altered animal lines in basic, translational and applied research by species and type of research (Part 1) (2019)

	Human Cancer	Human Infectious Disorders	Human Cardiovascular Disorders	Human Nervous and Mental Disorders	Human Respiratory Disorders	Human Gastrointestinal Disorders including Liver	Human Musculoskeletal Disorders	Human Immune Disorders
Mammals								
Rodents								
Mice	9,567	84	923	2,533	116	344	171	1,029
Rats	11	0	0	0	28	11	38	0
Rabbits								
Rabbits	0	0	0	0	0	0	0	0
Farm animals								
Pigs	39	0	21	0	0	0	8	0
Birds								
Domestic fowl	0	0	0	0	0	0	0	0
Fish								
Zebra fish	0	1,363	900	0	0	0	0	0
Totals								
Total	**9,617**	**1,447**	**1,844**	**2,533**	**144**	**355**	**217**	**1,029**
%	**35.2**	**5.3**	**6.7**	**9.3**	**0.5**	**1.3**	**0.8**	**3.8**

Table 19.2: Uses of animals for the creation of new genetically altered animal lines in basic translational and applied research by species and type of research (Part 2) (2019)

	Human Urogenital/Reproductive Disorders	Human Sensory Organ Disorders (skin, eyes and ears)	Human Endocrine/Metabolism Disorders	Other Human Disorders	Animal Diseases and Disorders	Diagnosis of diseases	Non-regulatory toxicology and ecotoxicology	Total	%
Mammals									
Rodents									
Mice	137	274	2,319	2,978	3,467	20	**0**	**23,962**	87.5
Rats	0	0	0	0	0	0	**0**	**88**	0.3
Rabbits									
Rabbits	0	0	268	0	0	0	**0**	**268**	1
Farm animals									
Pigs	0	17	20	0	0	0	**0**	**105**	0.4
Birds									
Domestic fowl	0	0	0	0	99	0	**0**	**99**	0.4
Fish									
Zebra fish	0	443	75	40	0	0	**28**	**2,849**	10.4
Totals									
Total	**137**	**734**	**2,682**	**3,018**	**3,566**	**20**	**28**	**27,371**	**100**
%	**0.5**	**2.7**	**9.8**	**11**	**13**	**0.1**	**0.1**	**100**	

Table 20: Uses of animals for the maintenance of colonies of established genetically altered animal lines by species, severity and genetic status (2019)

	Severity	Genetically altered with a harmful phenotype	Genetically altered without a harmful phenotype	Not genetically altered	Total	%
Mice	Non-recovery	133	417	178	728	0.1
	Mild	53,693	431,416	24,833	509,942	82.3
	Moderate	27,195	25,927	8,123	61,245	9.9
	Severe	24,463	23,229	87	47,779	7.7
	Total	**105,484**	**480,989**	**33,221**	**619,694**	**100.0**
Rats	Non-recovery	0	0	0	0	0.0
	Mild	1,201	5,196	285	6,682	69.4
	Moderate	583	830	732	2,145	22.3
	Severe	671	129	0	800	8.3
	Total	**2,455**	**6,155**	**1,017**	**9,627**	**100.0**
Dogs	Non-recovery	0	0	0	0	0.0
	Mild	0	0	0	0	0.0
	Moderate	0	0	0	0	0.0
	Severe	10	0	0	10	100.0
	Total	**10**	**0**	**0**	**10**	**100.0**
Domestic fowl	Non-recovery	0	0	0	0	0.0
	Mild	0	133	229	362	89.4
	Moderate	21	0	0	21	5.2
	Severe	22	0	0	22	5.4
	Total	**43**	**133**	**229**	**405**	**100.0**
Xenopus	Non-recovery	0	0	0	0	0.0
	Mild	0	212	143	355	98.6
	Moderate	0	0	3	3	0.8
	Severe	0	1	1	2	0.6
	Total	**0**	**213**	**147**	**360**	**100.0**
Zebra fish	Non-recovery	0	146	479	625	0.8
	Mild	2,973	56,425	2,794	62,192	82.6
	Moderate	3,539	7,501	0	11,040	14.7
	Severe	369	1,017	19	1,405	1.9
	Total	**6,881**	**65,089**	**3,292**	**75,262**	**100.0**
Other fish	Non-recovery	0	0	0	0	0.0
	Mild	0	1,140	0	1,140	62.9
	Moderate	0	671	0	671	37.1
	Severe	0	0	0	0	0.0
	Total	**0**	**1,811**	**0**	**1,811**	**100.0**
All Species	**Non-recovery**	**133**	**563**	**657**	**1,353**	**0.2**
	Mild	**57,867**	**494,522**	**28,284**	**580,673**	**82.1**
	Moderate	**31,338**	**34,929**	**8,858**	**75,125**	**10.6**
	Severe	**25,535**	**24,376**	**107**	**50,018**	**7.1**
	Total	**114,873**	**554,390**	**37,906**	**707,169**	**100.0**

Table 21: Uses of animals for the maintenance of colonies of established genetically altered animal lines by species, reuse and genetic status (2019)

	Reuse	Not genetically altered	Genetically altered without a harmful phenotype	Genetically altered with a harmful phenotype	Total	%
Mice	Yes	0	6,177	0	6,177	1.0
	No	33,221	474,812	105,484	613,517	99.0
	Total	**33,221**	**480,989**	**105,484**	**619,694**	**100.0**
Rats	Yes	0	0	0	0	0.0
	No	1,017	6,155	2,455	9,627	100.0
	Total	**1,017**	**6,155**	**2,455**	**9,627**	**100.0**
Dogs	Yes	0	0	0	0	0.0
	No	0	0	10	10	100.0
	Total	**0**	**0**	**10**	**10**	**100.0**
Domestic fowl	Yes	0	0	0	0	0.0
	No	229	133	43	405	100.0
	Total	**229**	**133**	**43**	**405**	**100.0**
Xenopus	Yes	136	35	0	171	47.5
	No	11	178	0	189	52.5
	Total	**147**	**213**	**0**	**360**	**100.0**
Zebra fish	Yes	132	1,081	28	1,241	1.6
	No	3,160	64,008	6,853	74,021	98.4
	Total	**3,292**	**65,089**	**6,881**	**75,262**	**100.0**
Other fish	Yes	0	0	0	0	0.0
	No	0	1,811	0	1,811	100.0
	Total	**0**	**1,811**	**0**	**1,811**	**100.0**
All All Species	**Yes**	**268**	**7,293**	**28**	**7,589**	**1.1**
	No	**37,638**	**547,097**	**114,845**	**699,580**	**98.9**
	Total	**37,906**	**554,390**	**114,873**	**707,169**	**100.0**