



Home Office

Annual Statistics of Scientific Procedures on Living Animals Great Britain 2023

HC 222





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Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023

Presented to Parliament pursuant to section 21A(1) of the Animals
(Scientific Procedures) Act 1986.

Ordered by the House of Commons to be printed on 11 September 2024.



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ISBN 978-1-5286-5151-6

E03187253 09/24

Printed on paper containing 40% recycled fibre content minimum.
Printed in the UK by HH Associates Ltd. on behalf of the Controller of His Majesty's Stationery Office.



Home Office



Annual Statistics of Scientific Procedures on Living Animals, Great Britain, 2023

This report details information on the regulated scientific procedures involving living animals carried out in the calendar year, including number of procedures, species and genetic status of animals, and purpose and severity of procedures.

This report is available as a PDF and on [GOV.UK](https://www.gov.uk) in HTML format.

Please see the accompanying [User Guide](#) for information on data collection, methodology, data quality, uses of the statistics, glossary and links to related statistics.

Protected animals: Any living vertebrate, other than man, and any living cephalopod. The Animals (Scientific Procedures) Act 1986 also counts embryos after two-thirds of gestation, and fish and amphibian larvae after they become capable of free feeding as protected animals, however these are not included in this publication.

Regulated procedures: Any procedure applied to a protected animal for an experimental or other scientific purpose, or for an educational purpose, that may have the effect of causing an animal 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.

'Number of procedures' is not 'number of animals': The number of procedures carried out in a year does not equal the number of animals that have been used in procedures that year. This is because some animals may be used more than once, 're-used', in certain circumstances. These instances are counted as separate, additional, procedures. As a result, the number of procedures is usually slightly higher than the number of animals used.

Key results

- 2.68 million scientific procedures involving living animals were carried out in Great Britain in 2023. This is a decrease of 3% on last year and lowest number since 2001
- experimental procedures have decreased by 3% and procedures for creation and breeding have decreased by 3% since 2022
- experimental procedures made up 55% of all procedures in 2023
- the majority (95%) of procedures (both for experimental and breeding purposes) used mice, fish, birds or rats; these species have been the most used for more than a decade
- procedures on specially protected species (cats, dogs, horses and non-human primates) accounted for use in 1.2% of experimental procedures in 2023; 21 dogs were used for the creation and breeding of genetically altered (GA) animals

Experimental procedures

These procedures involve using animals in scientific studies for purposes such as: basic research and the development of treatments, safety testing of pharmaceuticals and other substances, specific surgical training and education, environmental research and species protection.

- 1.47 million procedures carried out for experimental purposes (55% of all procedures in 2023)
- 60% of procedures used mice
- 14% of procedures used fish
- 9.8% of procedures used rats
- 7.8% of procedures used birds
- 1.2% of procedures used specially protected species (cats, dogs, horses and non-human primates)
- 7.0% of procedures used other species
- around half (52%) of experimental procedures were for basic research. The top three research areas were the nervous system, the immune system and cancer (oncology)
- 97% of all experimental procedures were assessed as non-recovery, sub-threshold, mild, or moderate in severity. The remaining 3% were assessed as severe

Creation and breeding of genetically altered animals

This refers to the breeding of animals whose genes have mutated or have been modified. These animals are used to produce GA offspring for use in experimental procedures but are not themselves used in experimental procedures.

- 1.21 million procedures carried out for the creation and breeding of GA animals (45% of all procedures in 2023)

- 86% were for the creation and breeding of mice
- 13% were for the creation and breeding of fish
- 0.44%, were for the creation and breeding of rats and birds
- the majority (89%) of procedures in this category were for maintenance of already established GA lines, with 11% of procedures for the creation of new lines
- 99% of all procedures for creation and breeding were assessed as non- recovery, sub-threshold, mild, or moderate in severity; 1% were assessed as severe

Introduction

Purpose of this release

This publication meets the requirements of section 21(A) of the 1986 Act to publish, and lay before Parliament, annual statistics on the use of protected animals in regulated procedures in Great Britain.

Coverage of this release

These statistics cover England, Scotland, and Wales. For Northern Ireland, the Department of Health separately collects and publishes [information on NI regulated procedures](#) under devolved arrangements.

'Number of procedures' is not 'number of animals'

The statistics in this release and the accompanying data tables relate to the number of procedures, not the number of animals used, unless specified (data tables 1.3, 2.1, 2.2 and 2.3 relate to the number of animals).

Severity of procedures

These statistics describe the nature and purpose of procedures including their actual severity. The experience of the animal at the time of death or killing is a factor in determining the actual severity and therefore the killing or death of animals is not reported separately. Further information regarding actual severity can be found here: [Advisory notes on actual severity reporting](#)

Accompanying data tables and user guide

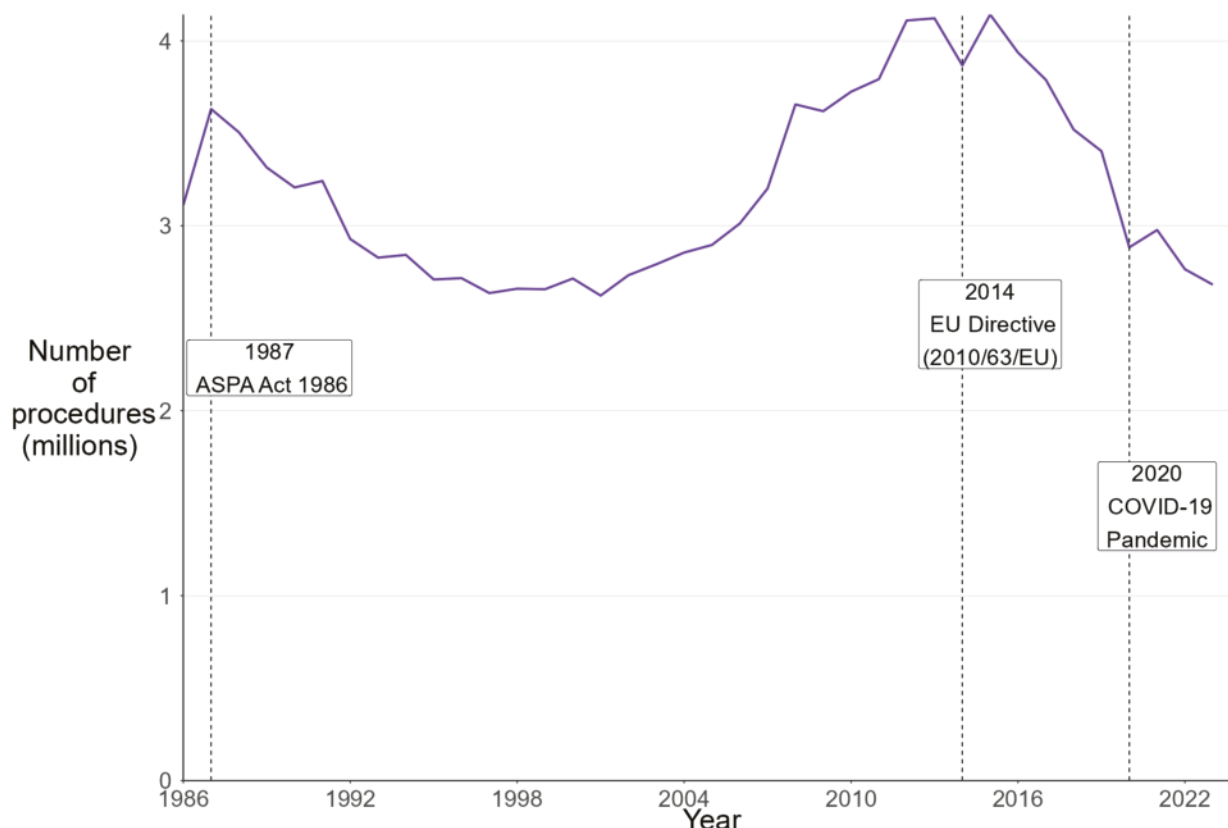
The accompanying data tables for this report are on the [statistics of scientific procedures webpage](#). Since the 2018 publication, the principal data tables have been expanded to include data from 2014 to allow users to view and extract the data as they wish. Since the 2021 publication, tables 1.1 and 1.2 have been expanded to include country data from 2014. Since the 2023 publication, Table 12 has been added to include the historic data from 1986 to 2013. The tables that have been expanded include data from 2014 as not all data pre-2014 is comparable. See the accompanying [user guide](#) for further information.

Glossary

A full glossary of terms is available within the [user guide](#).

Total procedures

Figure 1. Total scientific procedures in Great Britain, 1986 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 1.1 and Table 12.

In 2023 there was a decrease in procedures to 2.68 million - this is the lowest figure since 2001.

As shown in Figure 1, the number of procedures carried out decreased from 1987 until 2001, to a low of 2.62 million. This was mainly due to a reduction in the use of rodents, rabbits and birds (although there was an increase in procedures involving fish). After 2001, procedures increased, reaching a peak of 4.14 million in 2015 and then started to decrease again to 2.88 million in 2020. This may be partly explained by national lockdowns in response to the COVID-19 pandemic, which may have affected the activity of the establishments. In 2021, there was an increase to 2.98 million, falling to 2.76 million in 2022 and to 2.68 million in 2023.

The number of procedures in England and Scotland fell by 3% and 2% respectively in the last year. The number of procedures undertaken in establishments in Wales decreased by 19% compared with 2022. A similar trend to Great Britain is seen in the number of procedures for England and Scotland. England's number of procedures peaks at 3.51 million in 2015 and is lowest at 2.26 million in 2023. Scotland's peak was 573,000 in 2015 and low was 390,000 procedures in 2023. Whilst Wales also peaked in 2015 at 55,000 procedures, the number of procedures decreased to a low of 31,900 in 2023.

The number of procedures carried out on living animals is determined by several factors, including the focus of scientific and medical endeavours, the economic climate, and global trends in new technologies or fields of research.

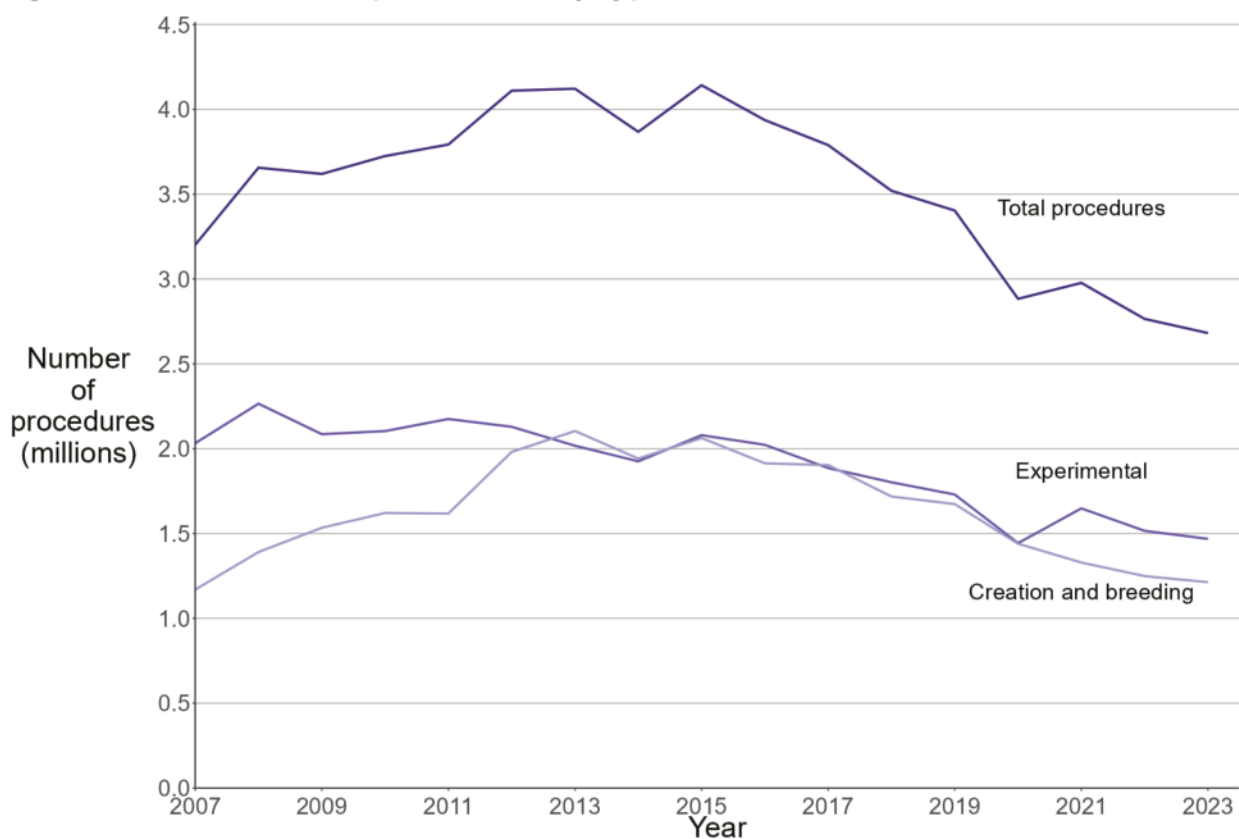
In 1986, the Animals (Scientific Procedures) Act was introduced, and required all 'scientific procedures' to be recorded. This new, broader term largely explains the initial increase in figures directly after 1986.

At the beginning of 2013, EU Directive 2010/63/EU came into effect, and, as a result, changed how the data was collected under UK law from 2014 onwards. All figures for procedures (1986 onwards) are comparable, as the definition of a procedure is unchanged. As a result of the change in methodology, the 2014 data is subject to data quality issues (see the [user guide](#) for further information).

Experimental procedures involve using animals in scientific studies for purposes such as: basic research and the development of treatments, safety testing of pharmaceuticals and other substances, education, specific surgical training and education, environmental research and species protection.

Procedures for creation and breeding involve the breeding of animals whose genes have mutated or have been modified. These animals are used to produce genetically altered offspring for use in experimental procedures but are not themselves used in experimental procedures.

Figure 2. Total scientific procedures by type, 2007 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 1.2 and [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2017](#): time series tables, Table 1

As shown in Figure 2, the total number of procedures broadly increased prior to 2013, mainly due to the increase in procedures for the creation and breeding of GA animals. This increase in the earlier part of the decade can mainly be attributed to the availability of new technology, which led to new research opportunities. However, more recently, the number of procedures for the creation and breeding of GA animals has been falling, with a decrease of 3% compared with last year.

In contrast, the number of experimental procedures remained relatively stable during the earlier part of the last decade but has decreased since 2015. There was a decrease of 3% in experimental procedures in 2023 compared with 2022.

Experimental procedures

The severity of a procedure is determined by the degree of pain, suffering, distress or lasting harm expected to be experienced by an individual animal during the course of a procedure. In 2023, 97% of the 1.47 million experimental procedures were assessed as non-recovery, sub-threshold, mild or moderate in severity, the remaining 3% were assessed as severe.

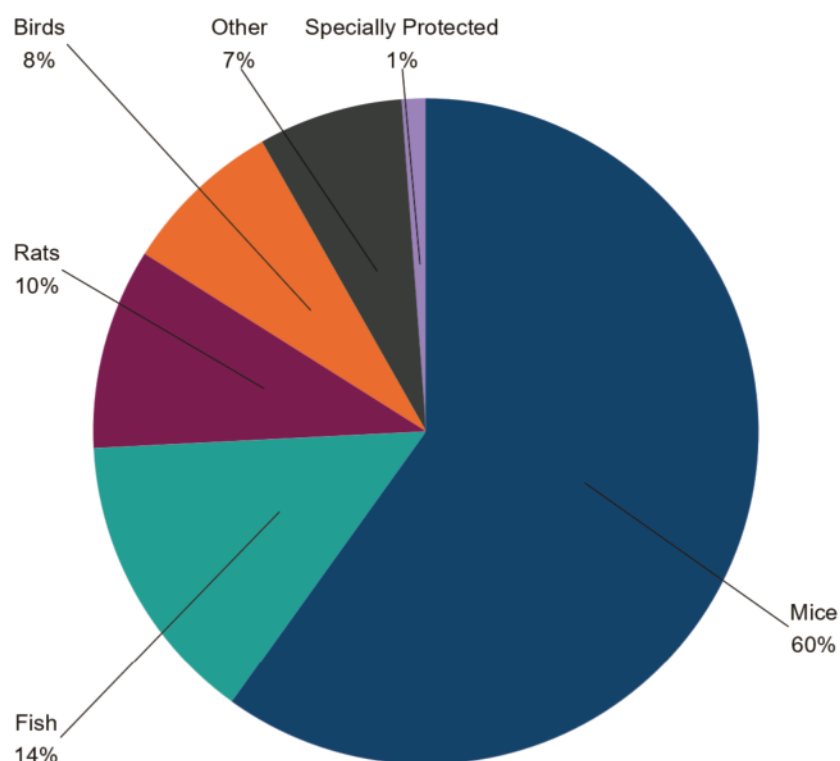
This section covers only experimental procedures. That is, procedures that involve using animals in scientific studies for purposes such as: basic biological research, medical studies and development of treatments, training and education, environmental research, preservation of species, and safety testing of pharmaceuticals and other substances. An experimental procedure may benefit people, animals or the environment for any of the purposes stated above. The animals used in experimental procedures may be genetically altered.

Species

The proportions of species used for experimental procedures, as shown in Figure 3, have remained similar from 2014 onwards. From 2022 to 2023, the proportion of other species has increased from 5% to 7% and rats has decreased from 12% to 10%. The proportion of fish has remained at 14% from 2022, while birds have decreased from 9% to 8% in 2023.

For most species, small year-on-year variations can be attributed to expected variation in procedure counts across project lifecycles.

Figure 3. Experimental procedures by species, 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 1.2

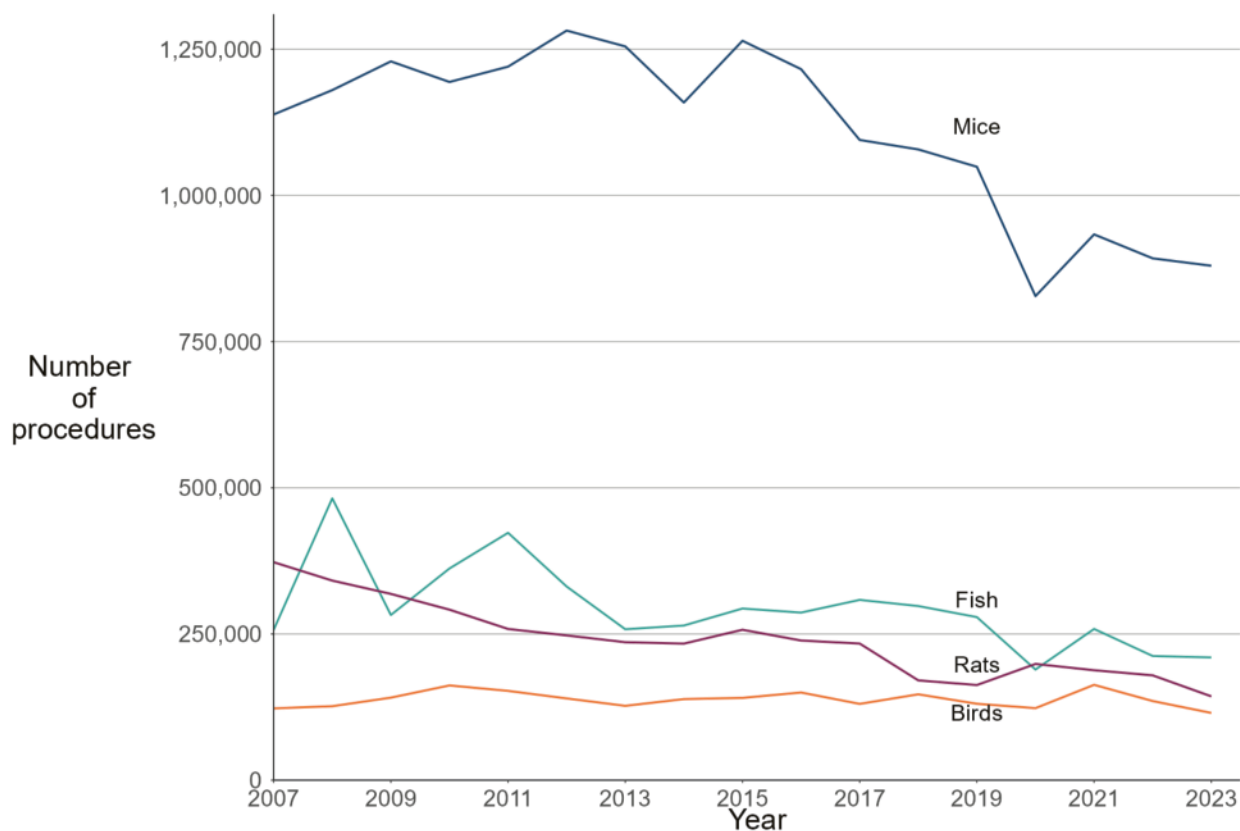
Notes: Specially protected species are cats, dogs, horses and primates.

Mice, fish, rats and birds in experimental procedures

The majority of experimental procedures used mice, fish, birds or rats; together, these species were used in 92% of experimental procedures in 2023.

The Other category contains all other protected animals, including amphibians, cattle and reptiles. Figures relating to individual species within this category are available in the data tables.

Figure 4. Experimental procedures using mice, fish, birds and rats, 2007 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#) data tables: Table 1.2 and [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2017](#): time series tables, Table 2.2

As shown in Figure 4, there were decreases in the number of procedures using mice, fish, rats and birds (decreasing by 1%, 1%, 20% and 15% respectively).

Around two-thirds (67%) of experimental procedures involving mice in 2023 were for basic research. The specific research areas that performed the greatest numbers of procedures using mice were immune system and nervous system research.

Of experimental procedures involving fish in 2023, 60% were for basic research. The specific basic research areas that performed the greatest numbers of procedures using fish were nervous system and developmental research.

In 2023, around two-thirds (65%) of experimental procedures involving rats were for regulatory testing (for example, tests evaluating the safety and efficacy of substances such as pharmaceuticals).

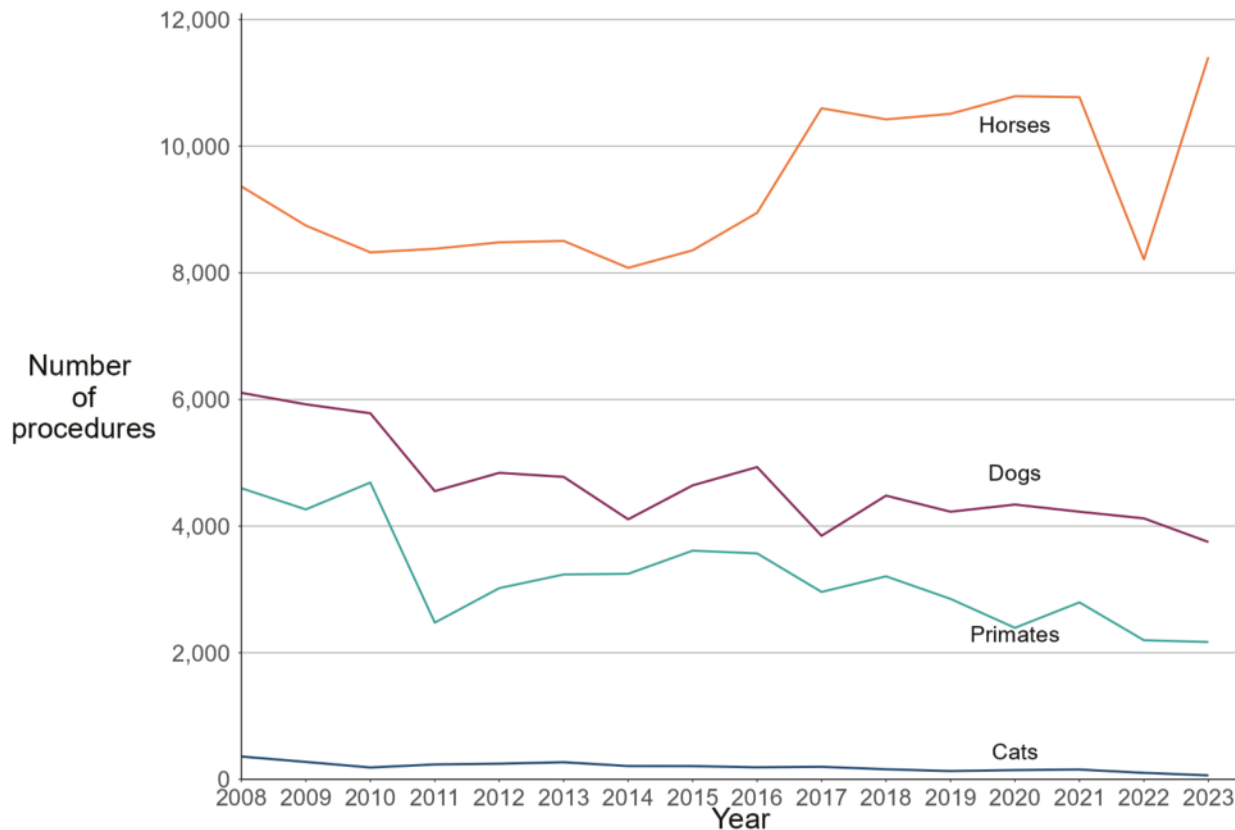
The majority (86%) of experimental procedures involving birds in 2023 were for applied research. The applied research area of animal diseases and disorders had the highest number of procedures using birds.

Specially protected species in experimental procedures

Specially protected species refers to cats, dogs, horses and non-human primates. These species were used in 1.2% of experimental procedures (~17,000) in 2023; this compares with 0.97% of experimental procedures (~15,000) in 2022.

Cats, dogs, horses and primates are subject to additional protection under Section 5C of the 1986 Act. Licence holders using specially protected species must demonstrate that no other species are suitable for the purposes of the licence and must adhere to additional licence conditions.

Figure 5. Experimental procedures involving specially protected species, 2008 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#) data tables: Table 1.2 and [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2017](#): time series tables, Table 2.2.

The total number of procedures involving specially protected species has increased to around 17,000 in 2023.

The number of procedures involving horses decreased from 2010 to 2014, with an increase in procedures between 2015 to 2017. From 2017 to 2021, the numbers remained relatively steady, followed by a notable decrease in 2022. In 2023, there was an increase of 38.9% in procedures compared with 2022. This increase in procedures involving horses has resulted in the rise in the overall number of procedures involving specially protected

species. Though the number of procedures increased, the numbers of horses and other equids being used in scientific procedures in 2023 was actually lower than in 2022 (64 compared with 74, see Table 1.3). In 2023, the majority (73%) of experimental procedures that used horses were for regulatory purposes. The main regulated procedure carried out on horses was for the routine production of blood-based products, which are used for a variety of laboratory uses.

The number of experimental procedures that used cats has decreased by 38% from 2022. There were 63 experimental procedures that used cats in 2023, all of which were for basic research.

The species of primates that were used in experimental procedures in 2023 were cynomolgus monkeys (2,032 procedures), rhesus monkeys (73 procedures), and marmosets and tamarins (64 procedures). The total number of procedures (2,169 procedures) has decreased by 1% from last year to the lowest level since 2008.

In 2023, the use of dogs in experimental procedures decreased by 9%. There were 3,749 procedures that used dogs in 2023, mainly for regulatory purposes. This is lower than the previous lowest year of 2017 (3,847).

In 2023, the majority of experimental procedures that used primates and dogs were for regulatory purposes (88% and 69% respectively). These were mainly for testing the safety of products and devices for human medicine, dentistry and veterinary medicine.

Note: the figures in this section do not follow the rounding conventions as stated in the [user guide](#).

Use of endangered species

Information was collected on whether any endangered species were used. Endangered species reported are those listed in [Annex A of Council Regulation \(EC\) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein](#) which were not bred in captivity.

Two endangered species were used in 2023, the Rock Dove (*Columba livia*) and the Common Kestrel (*Falco tinnunculus*), which were used for the purpose of preservation.

Place of birth of primates

Self-sustaining colony

Marmosets, tamarins, and other new-world primates: A self-sustaining colony is a colony that contains no wild caught animals, is kept in a way that ensures animals are used to humans and is sustained using animals from within or from other self-sustaining colonies.

Macaques and other old-world primates: A self-sustaining colony is a colony that no longer sources animals from the wild (it may contain some existing wild caught animals) and is sustained using only captive bred animals.

Generation

F0 – wild caught

F1 – progeny of wild caught females

F2 – progeny of captive bred females

Of the 1,815 primates used for the first time in experimental procedures in 2023, all marmosets, tamarins and rhesus monkeys were born in the UK at a licensed establishment, whereas 99% of cynomolgus monkeys were born in either Africa or Asia. All primates used for the first time in experimental procedures in 2023 were from self-sustaining colonies.

The place of birth of primates used in experimental procedures for the first time are in Table 2.2 of the [data tables](#). The place of birth of all other species used in experimental procedures for the first time in each year since 2014 are in Table 2.1 of the [data tables](#).

Of the 1,815 primates used for the first time in experimental procedures in 2023, 861 (47%) were F1 generation and 954 (53%) were F2 generation or greater. There were no F0 generation primates in 2023.

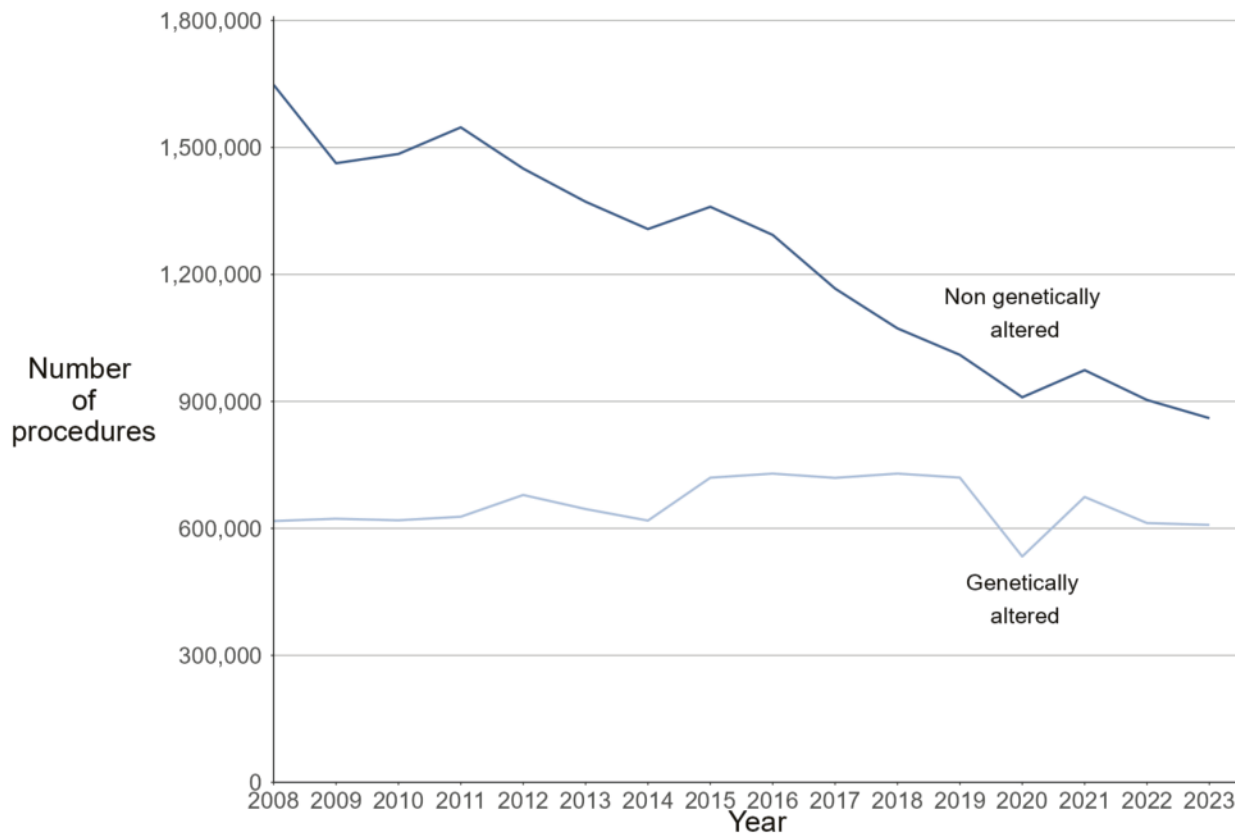
This publication uses definitions consistent with previous releases. In 2022, '[Ad hoc data on non-human primates used in experimental procedures for the first time](#)' was published to provide assurance on the data used for non-human primates. These ad hoc statistics were produced following the Animal in Science Committee's report on non-human primates bred for use in scientific purposes, which proposed alternate definitions for colony status and generation. These alternate definitions would classify some colonies as non self-sustaining due to containing old world primates originally sourced in the wild, even if new animals are no longer sourced from the wild and had not been for many years. Future change to the definitions used in annual data collection is under review.

Note: the figures on the place of birth of primates do not follow the rounding conventions as stated in the [user guide](#) to provide additional detail.

Genetic status

Of the 1.47 million experimental procedures completed in 2023, 59% used animals that were not genetically altered.

Figure 6. Experimental procedures by genetic status, 2008 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 4 and [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2017](#): time series tables, Table 3.2

As shown in Figure 6, and in line with the overall decrease in experimental procedures in 2023, the number of experimental procedures involving non-GA animals has decreased by 5% in the last year and decreased by 37% over the last decade.

The use of GA animals was relatively stable from 2015 until 2019, before a decrease of 26% in 2020, which may be related to national lockdowns in response to the COVID-19 pandemic. There was an increase in 2021, though still below the number in the years 2015 to 2019, followed by a decrease in 2022 and 2023.

Further information regarding the genetic status of GA animals used in experimental procedures in 2023 are in Table 4 of the [data tables](#).

Purpose

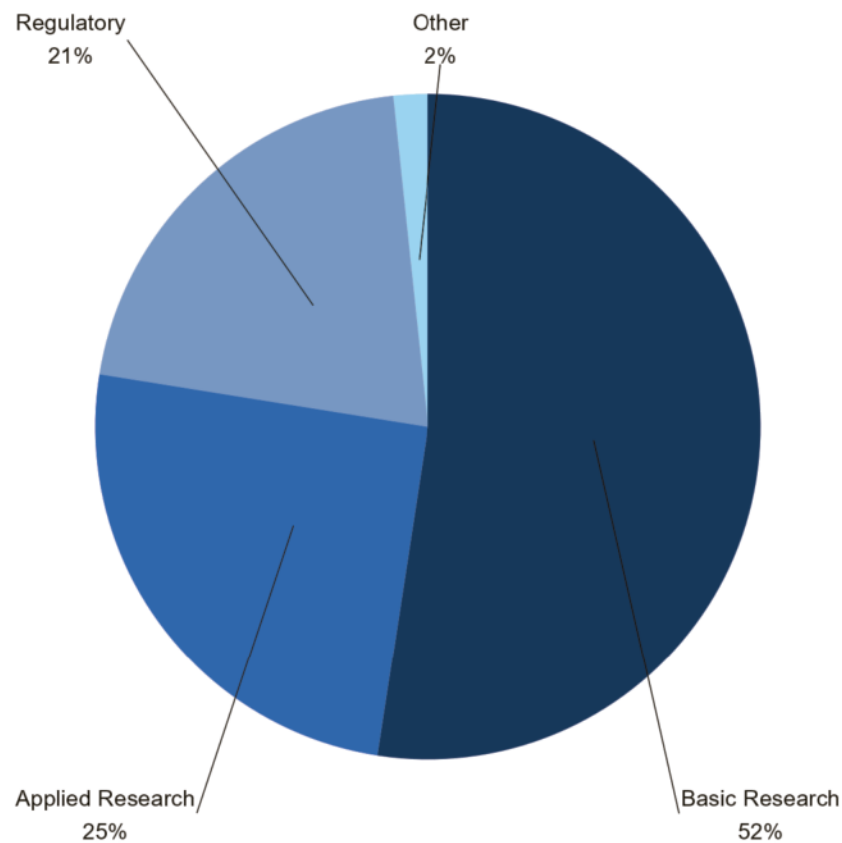
Basic research: aims to expand our knowledge of the structure, functioning and behaviour of living organisms and the environment.

Applied research: attempts to address diseases through prevention and development of treatments. Within the data tables, this is shown as 'Translational/Applied research'.

Regulatory testing: procedures carried out to satisfy legal requirements, including: ensuring substances are produced to legal specification; evaluating the safety or effectiveness of pharmaceuticals and other substances.

As shown in Figure 7, around half (52%) of the experimental procedures carried out in 2023 were for basic research; a further 25% for applied research; and 21% conducted for regulatory testing purposes. Other (2%) includes experimental procedures carried out for higher education or training, preservation of species and for the protection of the natural environment.

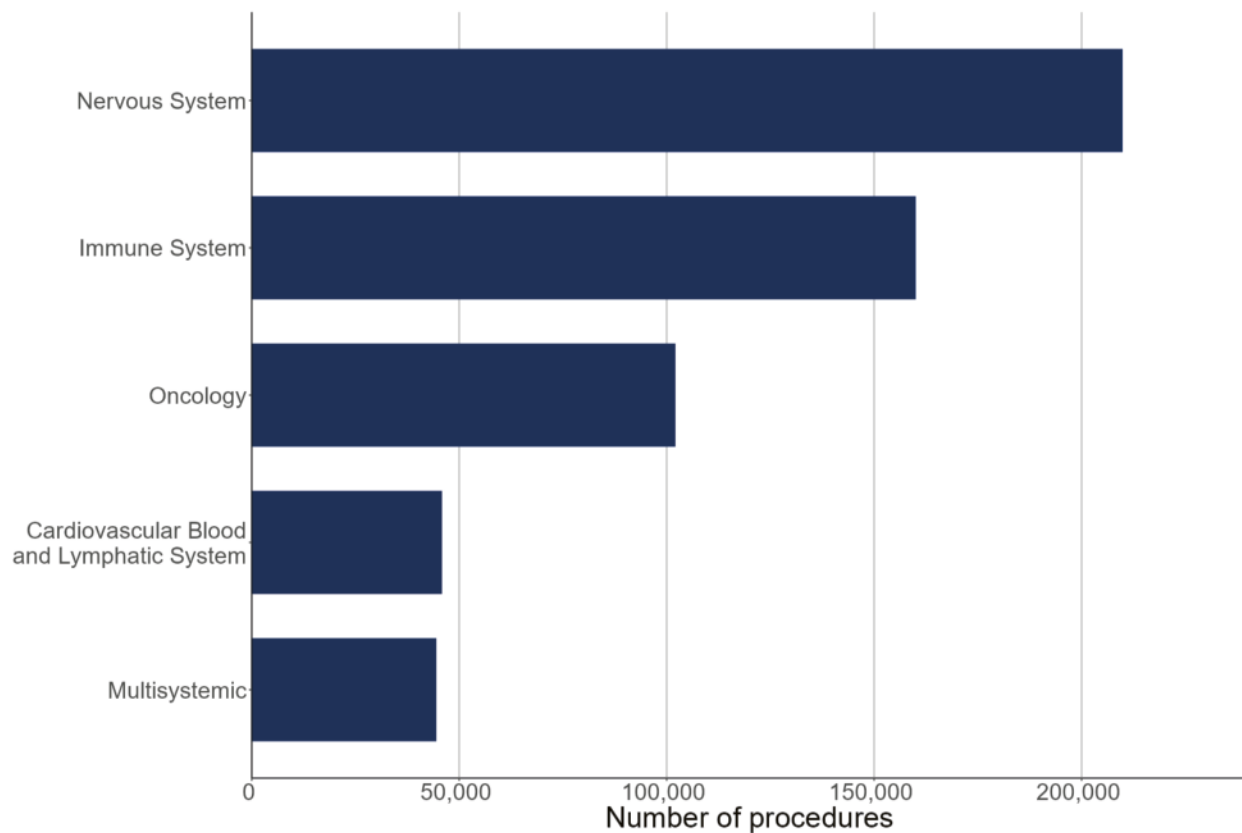
Figure 7. Experimental procedures by purpose, 2023



Basic research

In 2023, ~770,000 experimental procedures were carried out for basic research purposes. The most common research areas, as shown in Figure 8, were the nervous system (27%), immune system (21%) and oncology (13%).

Figure 8. Most common areas of focus in basic research in experimental procedures, 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 5

Notes: Research is classified as multisystemic when numerous body organs and systems are targeted.

The distribution of purposes for basic research has remained mostly similar since 2014. Studies into the immune system, the functioning and disease of the nervous system and cancer, including its development and control mechanisms (oncology) have been reported within the top 5 most common areas for basic research in each year since 2014.

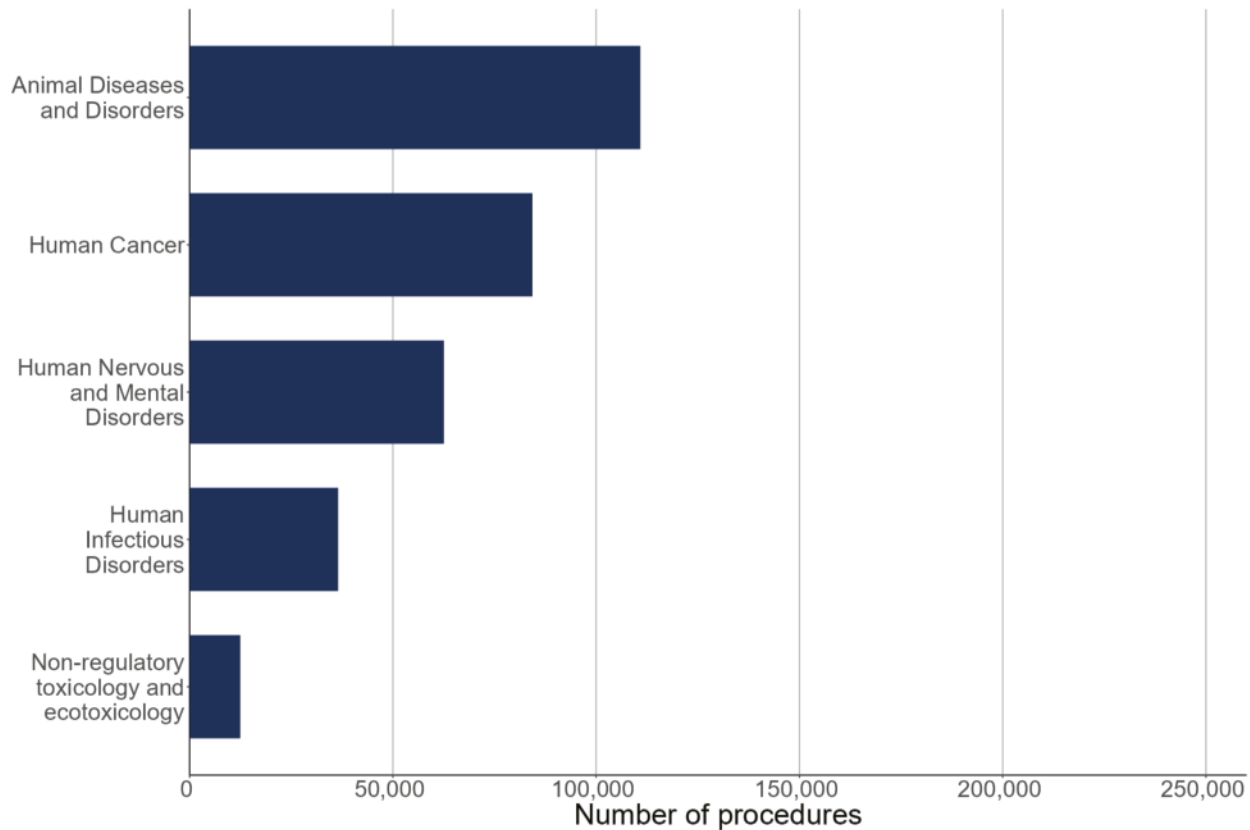
For data on all purposes for basic research by species, see Table 5 of the [data tables](#).

Applied research

There were around 369,000 experimental procedures for applied research (25% of all experimental procedures) in 2023. Applied research attempts to address diseases through prevention and development of treatments, as shown in Figure 9. The most common areas of research were animal diseases and disorders (30%), human cancer (23%), and human nervous and mental disorders (17%).

The majority of procedures for animal diseases and disorders (89%) are conducted on fowl. Almost all (99%) experimental procedures for applied research focusing on human cancer used mice; the remaining 1% of procedures involved rats and pigs.

Figure 9. Most common areas focused upon in experimental procedures for applied research, 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 6

Since 2014, human cancer, infectious disorders, and nervous and mental disorders have consistently been within the top 5 most common areas of applied research in each year.

For data on all purposes for applied research by species, see Table 6 of the [data tables](#).

Regulatory

There were around 305,000 procedures carried out for regulatory purposes in 2023 (21% of all experimental procedures). Regulatory procedures are carried out to satisfy the legal requirements necessary to enable materials, products and devices to be licensed for use. Regulatory procedures are usually carried out during the final stages of research and development and focus on safety and efficacy. The most common procedure in 2023 was toxicity and other safety testing (47%).

Of the ~305,000 regulatory procedures in 2023, the most common legislative requirements were legislation on medicinal products for human use (50%) and medicinal products for veterinary use and their residues (26%). No procedures were carried out for cosmetics testing.

The majority (88%) of regulatory procedures were undertaken to satisfy UK and/or EU legislation.

Routine production: covers studies carried out for manufacturing processes requiring regulatory approval.

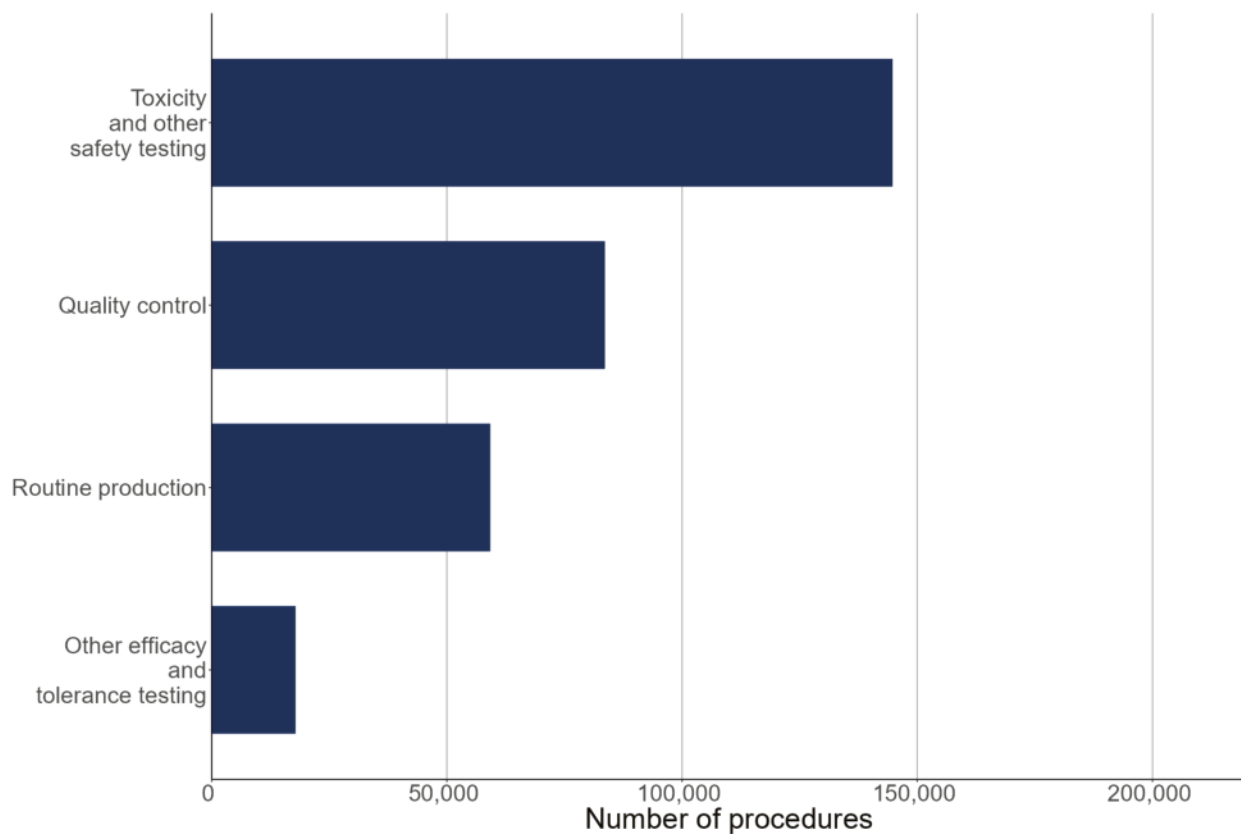
Toxicity and other safety testing: studies for safety evaluation of products and devices for human medicine, dentistry, veterinary medicine and other chemicals.

Quality control: the testing of quality control parameters of a product, and any controls carried out during the manufacturing process for registration purposes, to satisfy any other national or international requirements or to satisfy the in-house policy of the manufacturer.

Other efficacy and tolerance testing: efficacy testing of biocides and pesticides is covered under this category as well as the tolerance testing of additives in animal nutrition.

Figure 10 shows the proportion of each purpose of regulatory procedures carried out in 2023. With **toxicity and other safety testing**, **quality control** and **routine production** accounting for 47%, 27% and 19% respectively.

Figure 10. Experimental procedures for regulatory purposes by sub-purpose, 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 7.1

The most common species used for regulatory purposes were mice (37%; ~112,000). Of which, 73% were for quality control. The second most common species for regulatory purposes were rats (30%, ~93,000), of which 97% were for toxicity and other safety testing including pharmacology.

Toxicity and safety testing – cosmetic

Animal testing for consumer safety of cosmetics and their ingredients have been banned in the UK since 1998. Under the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) legislation, regulated procedures on animals to test chemicals that may be used as ingredients in cosmetics has been required as a last resort for worker and environmental safety. These procedures are recorded under the purpose of “Toxicity and other safety testing”, which also includes safety evaluation of products and devices for human medicine, dentistry, veterinary medicine and other chemicals.

The Government does not issue licences for animal testing of chemicals that are used exclusively as cosmetics ingredients carried out under chemicals (REACH) regulations for the purpose of worker and environmental safety, following the Government’s ban in May 2023.

In 2023, no procedures were conducted on chemicals that are exclusively intended to be used as ingredients in cosmetic products.

Techniques of special interest

Information was collected on whether any procedures were related to techniques of interest to the Home Office (areas related to significant public interest, or related to changes in policies). The areas of interest include testing of alcohol, tobacco, household products and testing of chemicals exclusively used in cosmetics.

In 2023, there were no experimental procedures involving the testing of household product ingredients.

There were no experimental procedures which involved the testing of products containing alcohol or tobacco. Alcohol or tobacco may still be used in experimental procedures, for example to develop models for conducting further research.

An additional area of interest is ascites methods of monoclonal antibody production because a non-animal alternative exists. No ascites methods of monoclonal antibody production were used in 2023.

Note: these figures do not follow the rounding conventions as stated in the [user guide](#).

Rodenticide trials

Rodenticides are a category of pest control chemicals intended to kill rodents. Rodenticide trials are field trials of such chemicals and are occasionally undertaken by commercial companies that produce them to assess how safe and effective they are when used.

Of the 2,247 returns, none reported that rodenticide trials occurred in 2023.

Severity

The severity (pain, distress or suffering) experienced by animals in procedures has been recorded since 2014. There are 5 severity assessments:

Sub-threshold: When a procedure was authorised under a project licence but did not actually cause suffering above the threshold of regulation, that is, it was less than the level of pain, suffering, distress or lasting harm that is caused by inserting a hypodermic needle according to good veterinary practice.

Non-recovery (under general anaesthesia): When the entire procedure was carried out under general anaesthesia from which the animal shall not recover consciousness. It includes unintended death of animals on recovery protocols while under anaesthesia, provided that no regulated procedure had been carried out prior to the induction of anaesthesia.

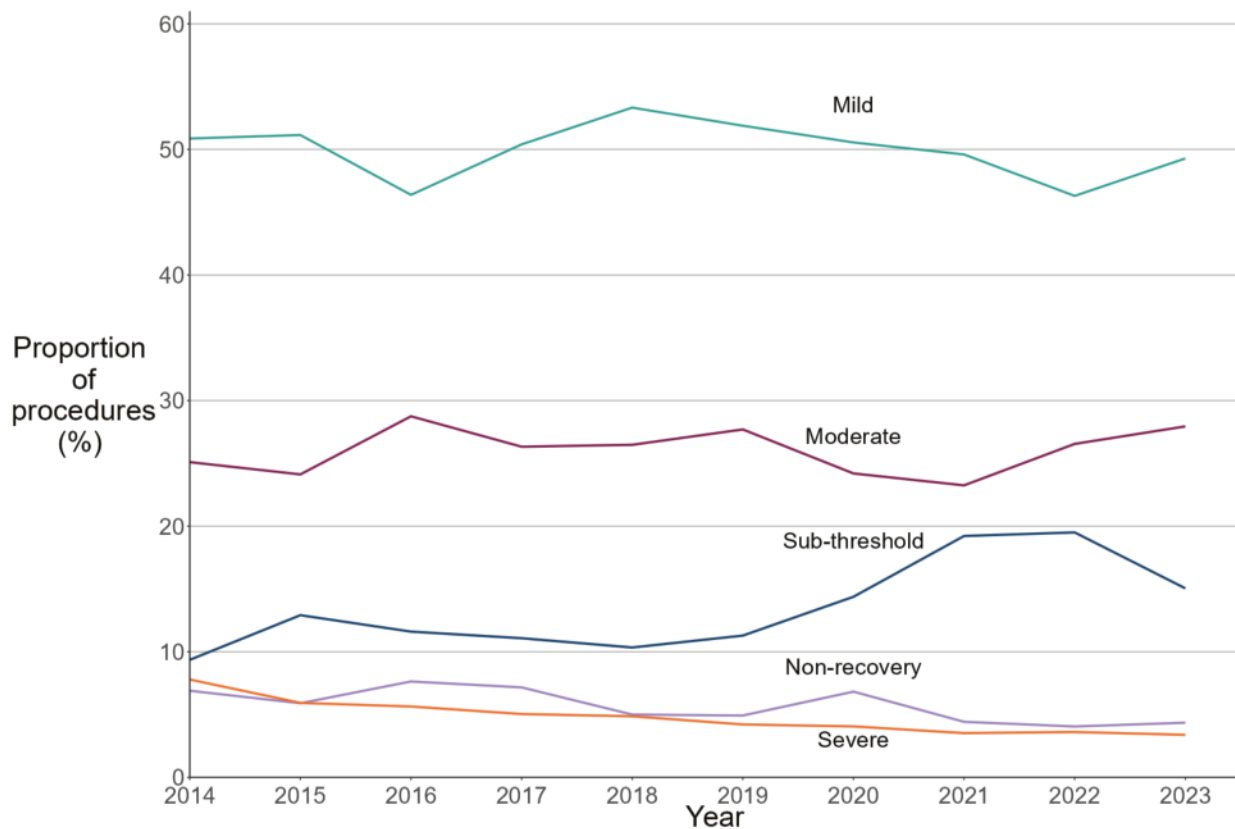
Mild: Any pain or suffering experienced by an animal was, at worst, only slight or transitory and minor so that the animal returns to its normal state within a short period of time.

Moderate: The procedure caused a significant and easily detectable disturbance to an animal's normal state, but this was not life threatening. Most surgical procedures carried out under general anaesthesia and with good post-operative analgesia (pain relief) would be classed as moderate.

Severe: The procedure caused a major departure from the animal's usual state of health and well-being. This would usually include long-term disease processes where assistance with normal activities such as feeding and drinking were required, or where significant deficits in behaviours/activities persist. It includes animals found dead unless an informed decision can be made that the animal did not suffer severely prior to death.

Severity assessments measure harms to an animal during a procedure and generally reflect the peak or cumulative severity of the entire procedure; they do not include harms caused to animals as a result of non-procedural events such as transport and housing.

Figure 11. Experimental procedures by severity, 2014 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 3.1

The proportions of severity assessments for procedures reported were relatively similar from 2014 to 2019, as shown in Figure 11. From 2019 to 2021, the proportion of procedures with a moderate severity decreased to 23%, before increasing in 2022 to 27% and continuing to increase in 2023 to 28%. The proportion of sub-threshold procedures decreased from 20% to 15%. Almost half (49%) of the experimental procedures in 2023 were mild, an increase from 46% in 2022. The proportion of non-recovery assessments for procedures has increased slightly from 4.0% to 4.3% since 2022. The proportion of severe decreased slightly from 3.6% to 3.4% in 2023.

The total number of mild procedures increased to around 724,000 in 2023 from 702,000 in 2022.

The total number of moderate procedures increased to around 410,000 in 2023 from 402,000 in 2022.

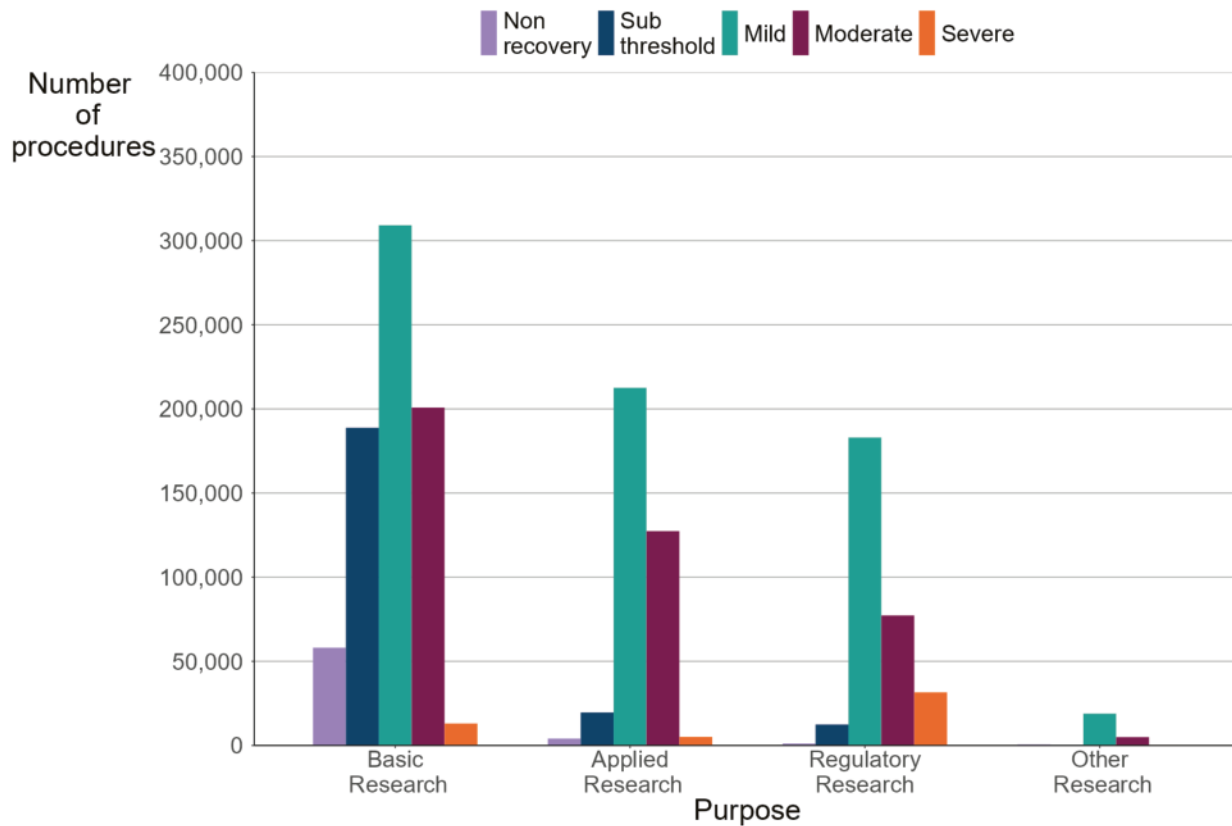
The total number of sub-threshold procedures decreased from around 296,000 in 2022 to 221,000 in 2023.

The total number of non-recovery procedures increased to around 64,000 in 2023 from 61,000 in 2022.

The total number of severe procedures decreased from around 55,000 in 2022 to 50,000 in 2023.

The severity assessment of experimental procedures varies according to the purpose. However, as shown in Figure 12, the most common severity assessment was mild for each purpose of experimental procedure.

Figure 12. Experimental procedures by severity and purpose, 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 3.1

Neuromuscular blocking agents and anaesthesia

Neuromuscular blocking agents (NMBA) are used for muscle relaxation during some types of experimental procedure such as nerve stimulation under anaesthesia. NMBAs may be used only when given the authority to do so and with an appropriate level of anaesthesia and/or analgesia as determined in the project license.

The use of NMBA was recorded in 15 of the 2,247 returns. Of these, 12 returns reported that the use of NMBA was whilst the animal was under general anaesthesia. The returns that reported the use of NMBA whilst the animal was not under general anaesthesia involved fish larvae.

Creation and breeding of genetically altered animals

This section covers only procedures performed for the purpose of creation and breeding of GA animals. That is, the breeding of animals whose genes have mutated or have been modified and have not been subsequently used in other procedures.

Species

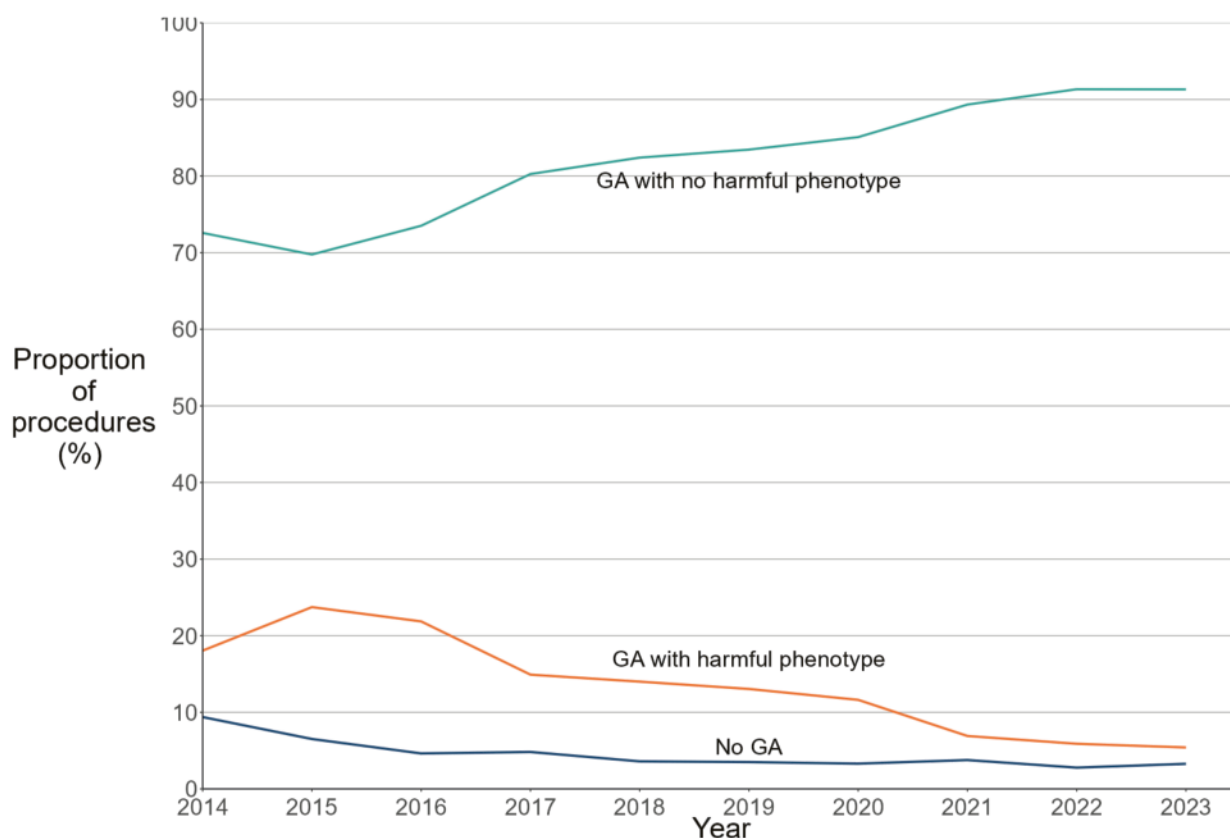
Almost all (over 99%) of the procedures for the creation and breeding of GA animals involved mice (86%), fish (13%) or rats (0.4%). The remaining 0.6% of procedures used domestic fowl, amphibians, sheep, pigs, opossums (recorded as “Other mammal”) and dogs.

There were 21 dogs, a specially protected species, used in 21 procedures for the creation and breeding of GA animals. These procedures were to maintain an established line of GA animals. These animals had the genetic status of GA with a harmful phenotype (the animals did appear or behave differently from non-GA animals). Of these procedures, 15 were mild severity, and 6 were moderate.

Genetic status

Of the 1.21 million procedures for creation and breeding that used GA animals in 2023, 1.11 million (91%) used GA animals with no harmful phenotype (the animals did not appear or behave any differently from non-GA animals).

Figure 13. Creation and breeding of GA animals by type of genetic alteration, 2014 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 8

As shown in Figure 13, there has been an increase in the proportion of animals used for creation and breeding that are genetically altered without a harmful phenotype (increasing from 73% in 2014 to 91% in 2023).

There were some animals that were bred with the intention of producing GA animals, but resulted in non-GA animals being born. In addition, some animals used for the creation of a new genetic line will also have been genetically normal animals (for example, those used for superovulation). In 2023, 3% of procedures for creation and breeding involved non-GA animals.

Purpose

Of the total 1.21 million procedures for the creation and breeding of GA animals, 89% were for the maintenance of already established GA lines, with the remainder for the creation of new lines.

Of the ~136,000 procedures that were for the creation of new GA lines, the majority (81%) were to create new GA lines to be used in basic research. The most common areas within basic research were oncology research (~22,000 breeding procedures), the multisystemic (~21,000 breeding procedures) and immune system (~18,000 breeding procedures).

For data on all purposes for applied research by species, see Tables 8 to 10 of the [data tables](#).

Creation: includes the natural breeding of different strains to produce a new strain and procedures that use standard techniques, such as vasectomy for the generation of novel transgenic or mutant lines of GA animals. The birth of a GA animal counts as creation when the line is new and before it 'established' (stable and characterised).

Breeding: the production of GA animals of an established line that has been bred for at least two generations. Breeding procedures also include other techniques applied to the animal after birth, for example, genotyping but not any techniques applied as part of an experiment or study.

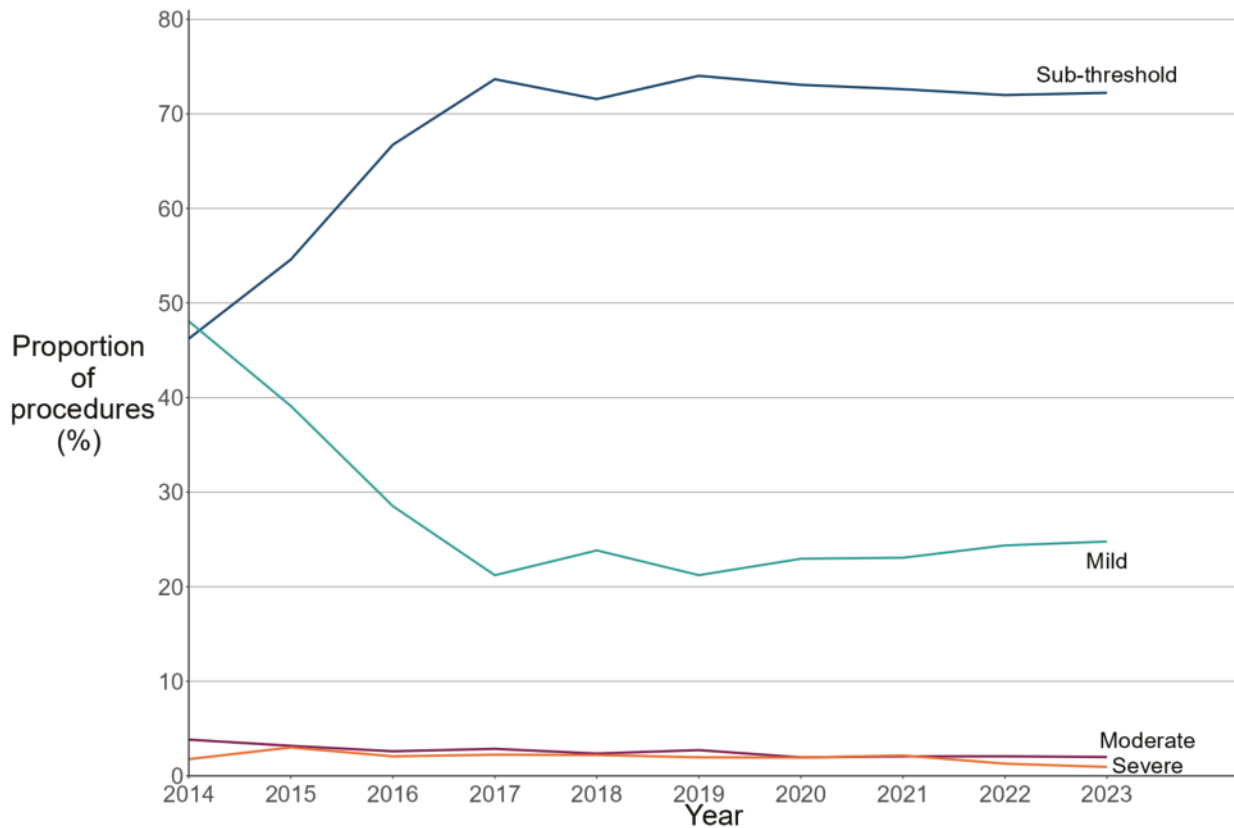
Severity

Animals in this type of procedure were not used in regulated experimental procedures. As such, the severity experienced by GA animals created and bred are assessed as follows:

- the observable characteristics (phenotype) of the animals, for example development of congenital disease (diseases present at birth) or tumours
- in the case of animals that have no harmful phenotype but that have been biopsied (taking a sample of tissue) specifically for genotyping to determine the genetic make-up of an animal, the biopsy procedures will generally be assessed as mild
- the animals assessed as severe in this category are largely animals within breeding colonies that were found dead and where the death of the animal was either a result of its phenotype or, more commonly, unexplained (all animals found dead are reported as severe unless an informed decision can be made that the animal did not suffer severely prior to death)
- a small number of the animals used to create new lines of GA animals will have been subjected to surgical procedures (classed as moderate) or the injection of drugs

(classed as mild)

Figure 14. Creation and breeding of GA animals by severity, 2014 to 2023



Source: Home Office, [Annual Statistics of Scientific Procedures on Living Animals, Great Britain 2023](#): data tables, Table 8

Note: non-recovery values are close to 0% and therefore are not visible in Figure 14.

The severity assessments for creation and breeding in 2023 have remained stable since 2017, where sub-threshold procedures make up the majority (72%) and only 1% of creation and breeding procedures were assessed as severe. Mild procedures account for 25%, followed by moderate (2%) and non-recovery (0.07%).

As shown in Figure 14, up until 2017, there was an increase in the proportion of sub-threshold and a decrease in the proportion of mild procedures.

This change does not reflect a true change in the severity of creation/breeding procedures from 2014 to 2017. Home Office Inspectors believe that many creation/breeding procedures initially reported as 'mild' should have been reported as 'sub-threshold'. Therefore, the changing severity assessment profile reflects data suppliers improved familiarity and understanding of severity assessments. Since 2017, the proportions of sub-threshold and mild have remained stable.

Establishment and project licences

All projects and establishments seeking to conduct regulated procedures on living animals must be licensed under [Animals \(Scientific Procedures\) Act 1986 \(ASPA\)](#).

During 2023, there were 147 establishment licences, 8 of which did not have any active project licences and 2,247 active project licences.

Information regarding establishment type is not collected as part of the return of procedures data used in this publication. Establishment type was previously reported as the result of a separate data collection exercise. The reported establishment type was not an indicator of the type of procedures carried out, and often establishments could be categorised as more than one type.

Further information

The data used in this release was extracted on 31 July 2024.

Frequency of release: Annual

Forthcoming release: [Home Office statistics release calendar](#)

Home Office responsible statistician: Amy Baxter

This report contains statistics on regulated scientific procedures performed using living animals under the [Animals \(Scientific Procedures\) Act 1986 \(ASPA\)](#).

Accompanying user guide

See the accompanying [user guide](#) for information including:

- background information on the data collection
- uses of the statistics, and links to related statistics
- details on methodology and data quality issues

Data quality

The UK Statistics Authority has designated these statistics as Accredited Official Statistics, in accordance with the Statistics and Registration Service Act 2007, signifying compliance with the [Code of Practice for Statistics](#).

Accredited Official Statistics status

Accredited Official Statistics means that our statistics meet the highest standards of trustworthiness, quality and public value, and it is our responsibility to maintain compliance with these standards.

The designation of these statistics as Accredited Official Statistics was confirmed in 2023, following a compliance check by the [Office for Statistics Regulation](#). The statistics last underwent a full assessment of compliance against the Code of Practice in 2012. More information is available in the [user guide](#).

Revisions

It is standard practice across all Home Office statistical releases to incorporate revisions to previous years' data in the latest release. Corrections and revisions follow the [Home Office's Statement of Compliance](#) with the Code of Practice.

The following table shows the net changes for any revisions or corrections since the previous publication:

What has changed	Number of procedures affected
2022	
Increase in total procedures	3,620
Increase in Experimental procedures	3,635
Reduction in Creation/breeding of GA animals	15
Increase in Xenopus (<i>laevis</i> and <i>tropicalis</i>)	2,870
Increase in Domestic fowl (<i>Gallus domesticus</i>)	596
Increase in Mouse (<i>Mus musculus</i>)	501
Increase in Hamster (Syrian) (<i>Mesocricetus auratus</i>)	6
Increase in Other amphibian (<i>other Amphibia</i>)	5
Reduction in Rat (<i>Rattus norvegicus</i>)	358
2021	
Reduction in total procedures	77,864
Reduction in Experimental procedures	77,975
Increase in Creation/breeding of GA animals	111
Increase in Rabbit (<i>Oryctolagus cuniculus</i>)	347
Increase in Zebrafish (<i>Danio rerio</i>)	311
Increase in Rat (<i>Rattus norvegicus</i>)	140
Increase in Goat (<i>Capra aegagrus hircus</i>)	22
Increase in Sheep (<i>Ovis aries</i>)	5
Reduction in Domestic fowl (<i>Gallus domesticus</i>)	78,534
Reduction in Mouse (<i>Mus musculus</i>)	155
2020	
Increase in Other Fish	1
2019	
Increase in Other Fish	1
Other Fish change severity from 'Moderate' to 'Mild'	6
2018	
Other Fish change severity from 'Moderate' to 'Mild'	37

There are a several reasons why counts of procedures may change between year, including amendments following a retrospective assessment or other intervention by an inspector, or self-reported corrections by project licence holders. It is an offence for a project licence holder to provide information they know to be false or misleading. Some changes summarised above will be a combination of small increases and/or decreases across multiple projects.

Further information on the data source used for this publication, and the revisions and corrections policy, are available in the [user guide](#). Notable changes are detailed below.

The 2022 increase in *Xenopus* procedures was due to an issue in the data extracted from the Animals in Scientific Procedures e-Licensing system, which resulted in the submitted data being excluded. The issue was caused by the data being subject to amendment when the extract was taken for last year's publication. This error was identified during the most recent publication development and so was not corrected separately and instead included within these revisions.

The 2021 decrease of 78,534 Domestic Fowl occurred due to the project licence holder identifying an error in their original submission which led to some birds being counted twice, which was identified and corrected by the project licence holder. This error was identified during the most recent publication development and so was not corrected separately and instead included within these revisions.

The 2021 increase of 311 Zebrafish was because an error was made in the original submission which led to these fish not being recorded, these have now been included.

The 2021 increase of 140 rats was identified during an establishment's internal retrospective review which identified discrepancies in the reporting of the annual returns. The totals have now been adjusted to report the correct numbers.

The changes to "Other Fish" and severity between 2018 to 2020 were identified following review of the establishment by an Animal Welfare Review Body (AWERB) and project licence holders.

Changes in legislation and definitions

Prior to 1986, figures were recorded for the number of 'experiments' on living animals, under the Cruelty to Animals Act 1876. In 1986, the Animals (Scientific Procedures) Act was introduced, and required all 'scientific procedures' to be recorded. This new, broader term largely explains the increase in figures directly after 1986 (see Figure 1).

At the beginning of 2013, an EU Directive (2010/63/EU) came into effect, and as a result changed the way in which the data was collected under UK law from 2014 onwards. All figures for procedures (1986 onwards) are comparable as the definition of a procedure is unchanged. As a result of the change in methodology, the 2014 data is subject to data quality issues (see the [user guide](#) for further information).

Additional statistics for animal use in Great Britain

The annual statistics release covers regulated procedures on living animals, under the Animals (Scientific Procedures) Act (ASPA) 1986. This comprises of procedures carried out using animals for experimental purposes, and procedures counted under creation/breeding of genetically altered (GA) animals (that is, the use of GA animals to create offspring for use in experimental procedures). The use of non-GA animals for breeding, to produce non-GA offspring for use in experimental procedures, is covered under the 1986 Act but is not included in the annual statistics. The annual statistics also do not include the use of other animals 'used' specifically in the support of the production and use of animals in experimental procedures or, for example, sentinel animals for the monitoring of disease within the facilities. This data on [breeding and genotyping of animals for 2017](#) was published by the Home Office in November 2018 on GOV.UK.

Other information on animal use

The Animals in Science Regulation Unit (ASRU) releases an annual report describing their role and performance in regulating work under the Animals (Scientific Procedures) Act 1986.

ASRU also publishes non-technical summaries of projects granted under the Animals (Scientific Procedures) Act 1986. Publication of non-technical summaries is a legal requirement under ASPA. They are a statement, in non-technical language of the proposed programme of work and state the objectives, predicted harm, benefits of the programme and the number and types of animals to be used in the programme. They also demonstrate that the proposed programme of work will be carried out in compliance with the principles of replacement, reduction and refinement. The non-technical summaries of projects granted by ASRU includes those that should be retrospectively assessed.

ASRU's publications are available on [GOV.UK](https://www.gov.uk).

Figures for Northern Ireland are reported annually in the [Statistics of Scientific Procedures on Living Animals, Northern Ireland](#).

Cross-Government ownership of animals in scientific procedures policy

The annual statistics on regulated procedures on living animals are released by the Home Office; however, policies and legislation that influence the number and type of procedures are the responsibility of different government departments. The table below outlines organisations are their areas of responsibility.

Department	Areas of responsibility
Home Office	Policy and regulation of the use of animals in science under ASPA, including licensing and compliance
Department for Science, Innovation and Technology	Policy on the development and validation of alternatives that cause less harm or do not use animals (under ASPA Section 20B), Government funding for alternatives (through UK Research and Innovation (UKRI) and the National Centre for the 3Rs (NC3Rs)), Basic research, Applied research, Strategic support to the life sciences sector to promote research
Department for Environment, Food & Rural Affairs	Protection of the natural environment, Chemical regulation (REACH), Precision breeding, Animal welfare (excluding ASPA) and sentience, health and preservation of species, Veterinary medicine
Department for Health and Social Care	Medicines and healthcare products policy and regulation, Higher education or training (primarily training for surgeons)
Department for Business and Trade	Consumer product safety including regulation of cosmetics
Food Standards Agency	Food safety regulation

Feedback and enquiries

Home Office statisticians welcome feedback on the annual statistics release. If you have any feedback or enquiries about this publication, please contact the Statistical Transformation Team, the Home Office Unit which produced the statistics.

Public enquiries: HOAISTatisticalTransformation@homeoffice.gov.uk

Press enquiries: 0300 123 3535

Telephone: 020 7035 3535

E03187253
978-1-5286-5151-6

