



# 2022

## CCAC Animal Data Report

## ACKNOWLEDGMENTS

The Canadian Council on Animal Care (CCAC) extends its sincere thanks to all those responsible for submitting annual animal data for 2022. Without the work and dedication of animal care committee members, investigators, and teachers, this report would not be possible. We also acknowledge our funders, the Canadian Institutes of Health Research and the Natural Sciences and Engineering Research Council of Canada. The CCAC could not continue to deliver on its mandate without their support.

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# CCAC ANNUAL DATA REPORT 2022

## INTRODUCTION

As part of its accountability to the Canadian public and commitment to transparency, the Canadian Council on Animal Care (CCAC) publishes an annual report on the number of animals used in Canadian science for the purposes of research, teaching, and testing.

CCAC certification is a condition for Canadian institutions to receive research funding from Canada's major national funding agencies (Canadian Institutes of Health Research and the Natural Sciences and Engineering Research Council of Canada) and other research funding bodies. Other CCAC-certified institutions may not receive this funding but choose to participate in the CCAC program to ensure they meet national standards of ethical care and use of animals and for public accountability.

CCAC-certified institutions are required to report annually on metrics related to animal research, teaching, and testing conducted at their institutions, and provide specific information regarding the types of animal-based science conducted, and the invasiveness of the procedures undertaken. Among other things, these data help the CCAC, CCAC-certified institutions, and their animal care committees make informed decisions on the allocation of additional care to animals in procedures where there is the potential for pain and distress.

For more detailed data, a comprehensive breakdown of the 2022 animal data is available on the CCAC website in sortable and downloadable [Excel files](#).

## SUMMARY OF ANIMAL DATA FOR 2022

In 2022, there were 3,521,143 animals used in research, teaching, and testing reported to the CCAC (see Figure 1 and Table 1).

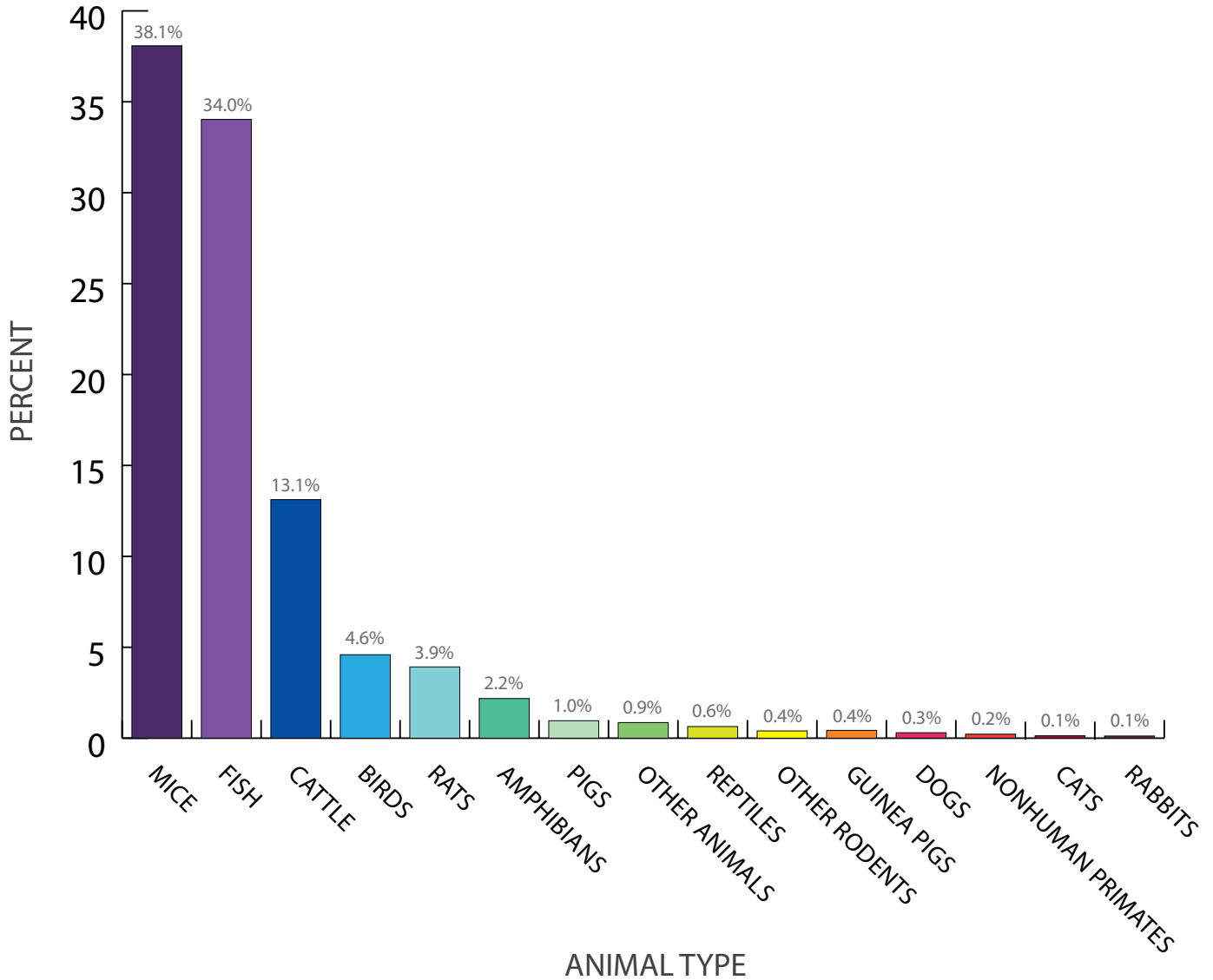
The three animal types most often used in 2022 were mice (38.1%; 1,340,916), fish (34.0%; 1,198,299), and cattle (13.1%; 462,025) (see Figure 1).

The largest proportion of animals (58.0%) were used in studies of a fundamental nature in science relating to essential structures or functions, or Purpose of Animal Use 1, representing 2,196,099 animals (see Table 2).

The benefit of assigning a category of invasiveness to protocols prospectively is that it allows animal care committees to signal to the scientific staff, veterinarians, and animal care staff the type of care a cohort of animals should receive. In the highest category of invasiveness, E, 105,253 (2.8%) animals were counted (see Table 3). The three types of animals most frequently used in Category of Invasiveness E were fish (73.1%; 76,909), mice (17.1%; 17,995), and guinea pigs (5.4%; 5,690).

## NUMBER AND TYPE OF ANIMALS IN SCIENCE

**Figure 1 Percentage of Animals Used in Science at CCAC-Certified Institutions by Animal Type in 2022**



**Note:** The percentages in this graph may not total 100% due to rounding.

**Source:** The data for this figure were derived from [Excel File 1](#). These represent the number of animals used for research, teaching, and testing in 2022.

**Table 1** Number of Animals Used in Science at CCAC-Certified Institutions by Animal Type in 2022

ANIMAL TYPE	NUMBER OF ANIMALS
Mice	1,340,916
Fish	1,198,299
Cattle	462,025
Birds	161,669
Rats	138,329
Amphibians	76,613
Pigs	33,863
Other animals	30,336
Reptiles	22,606
Other rodents	15,205
Guinea pigs	14,131
Dogs	10,417
Nonhuman primates	7,848
Cats	4,488
Rabbits	4,398
<b>TOTAL</b>	<b>3,521,143</b>

**Source:** The data for this table were derived from [Excel File 1](#). These represent the number of animals used for research, teaching, and testing in 2022.

## PURPOSE OF ANIMAL USE

Purpose of animal use refers to the reason why an animal was included in a scientific study. Each animal used in an animal-based protocol at a CCAC-certified institution is prospectively assigned to a single purpose of animal use. The CCAC collects and publishes data for Purpose of Animal Use 1 through 5. For more information on purposes of animal use, refer to the [Instructions for Completion of the CCAC Animal Use Data Form](#).

The purposes of animal use are:

- 1 Studies of a fundamental nature in science relating to essential structures or functions
- 2 Studies for medical purposes, including veterinary medicine, that relate to human or animal diseases or disorders
- 3 Studies for regulatory testing of products for the protection of humans, animals, or the environment
- 4 Studies for the development of products or appliances for human or veterinary medicine
- 5 Education and training of individuals in post-secondary institutions or facilities

**Table 2 Number of Animals Used in Science at CCAC-Certified Institutions by Purpose of Animal Use in 2022**

PURPOSE OF ANIMAL USE	NUMBER OF ANIMALS
1	2,196,099
2	534,040
3	174,849
4	577,956
5	302,369
<b>TOTAL</b>	<b>3,785,313</b>

**Note:** Animals should be subjected to only one severe or high welfare impact experience in their lifetime (a Category of Welfare Impact D or E); see [CCAC guidelines: Identification of scientific endpoints, humane intervention points, and cumulative endpoints](#). These data cannot be compared to animal data reports prior to 2012.

**Source:** The data for this table were derived from [Excel File 2](#).

## CATEGORY OF INVASIVENESS

Category of invasiveness describes the level of pain and/or distress that an animal could potentially be exposed to while in a scientific study. In Canada, categories of invasiveness are assigned prospectively to animal-based protocols for scientific purposes. A precautionary approach is taken by animal care committees in assigning the highest category of invasiveness indicative of the potential level of pain and distress to be experienced by any of the animals within the protocol.

The benefit of assigning categories of invasiveness prospectively is that it allows animal care committees to signal to the scientific staff, veterinarians, and animal care staff the type of care a cohort of animals should receive. Staff place more emphasis on animals used in protocols with higher categories of invasiveness to ensure that these animals receive appropriate care to mitigate (as much as possible) any pain or distress they might experience. Examples of enhanced care could include analgesia, more bedding, increased warmth, or softer food.

In 2022, 2.8% of animals (105,253) were assigned to the most invasive category of protocols, Category of Invasiveness E. Of these, 30.0% (31,603) were used for studies of a fundamental nature in science relating to essential structures or functions (Purpose of Animal Use 1), 11.8% (12,402) were used for studies for medical purposes, including veterinary medicine, that relate to human or animal diseases or disorders (Purpose of Animal Use 2), 50.1% (52,748) were used for studies for regulatory testing of products for the protection of humans, animals, or the environment (Purpose of Animal Use 3), 7.8% (8,188) were used for studies for the development of products or appliances for human or veterinary medicine (Purpose of Animal Use 4), and 0.3% (312) were used for studies for education and training of individuals in post-secondary institutions or facilities (Purpose of Animal Use 5).

The categories of invasiveness are:

- A** Experiments on most invertebrates or on live isolates
- B** Experiments which cause little or no discomfort or stress
- C** Experiments which cause minor stress or pain of short duration
- D** Experiments which cause moderate to severe distress or discomfort
- E** Procedures which cause severe pain near, at, or above the pain tolerance threshold of unanesthetized conscious animals

The CCAC collects and publishes data for Category of Invasiveness B through E. For more information about categories of invasiveness, refer to the [CCAC categories of invasiveness in animal experiments](#).



**Table 3** Number of Animals Used in Science at CCAC-Certified Institutions by Category of Invasiveness in 2022

CATEGORY OF INVASIVENESS	NUMBER OF ANIMALS
B	1,144,532
C	1,028,347
D	1,507,181
E	105,253
<b>TOTAL</b>	<b>3,785,313</b>

**Note:** Animals should be subjected to only one severe or high welfare impact experience in their lifetime (a Category of Welfare Impact D or E); see [CCAC guidelines: Identification of scientific endpoints, humane intervention points, and cumulative endpoints](#). These data cannot be compared to animal data reports prior to 2012.

**Source:** The data for this table were derived from [Excel File 2](#).

## DATA LIMITATIONS

In reviewing the information in this report, it is important to note the following:

- The CCAC only collects animal use data from CCAC-certified institutions. As such, some animals studied in Canadian science will not be accounted for in the CCAC's annual animal use data report. Furthermore, these numbers reflect all animals that were involved in research, teaching, and testing conducted by people working at CCAC-certified institutions, regardless of where the research activities take place. Therefore, these numbers include animals that live outside of Canada, and are also comprised of animals that live in laboratories, on farms, or in the wild.
- There are many external factors that may influence the numbers of animals from year to year, and therefore caution should be used when comparing numbers of animals over time or when tracking progress towards the Three Rs. Factors that may affect animal numbers include changes in government funding priorities; regulatory changes; development and implementation of new technologies; changes in scientific interests; numbers and types of institutions certified by the CCAC; etc.

## CHANGES TO THE REPORT AND DATA MANAGEMENT

CCAC-certified institutions are required to report annually on metrics related to animal research, teaching, and testing conducted at their institutions, including the number of animals in the studies, the purpose of those studies, and the categories of invasiveness. Annual animal data reports have been published by the CCAC since 1975.

The process for data collection and publication has undergone several major reviews, most notably in 1996 and in 2011, when the process and tools used to collect the data were refined. Notable changes to the process include improvements to data management, collection, and validation; revisions to the publication format; and publication of sortable, Excel spreadsheet files of the data. CCAC-certified institutions are now asked to submit animal data using an [Excel spreadsheet template](#) and to follow the revised [Instructions for Completion of the CCAC Animal Use Data Form](#). Due to these differences in data management and reporting, however, it is not possible to make accurate comparisons with purpose of animal use and category of invasiveness data prior to 2012.

The CCAC is working on a new process for animal use data collection and reporting that will help certified institutions provide more accurate information on the use of animals in their studies. To fully understand the challenges faced by institutions in the implementation of the proposed changes, and to find appropriate ways of implementing the Animal Data Working Group's approved recommendations, the CCAC formed the Animal Use Data Consultative Working Group. Made up of knowledgeable individuals from institutions where concerns have been expressed as well as from institutions ready to collect data according to the new requirements, this working group is tasked with understanding and providing advice on overcoming the challenges to implementation of the revised collection and submission of animal use data.

## GLOSSARY

**Animals:** All vertebrates and cephalopods used for research, teaching, or testing, or for eventual use in research, teaching, or testing, that are subjects of a written animal use protocol. Not all animals are included in the annual animal data reports (for example, breeding colony animals). Refer to the [Instructions for Completion of the CCAC Animal Use Data Form](#) for the full list of animals that are included.

**Animal types:** The labels used to describe broad categories of animals. It includes common animal names such as cats, dogs, guinea pigs, pigs, mice, and rats as well as broader labels such as amphibians, birds, fish, reptiles, other rodents, and other animals.

**Animal use:** The use of an animal in research, teaching, or testing, or for eventual use in research, teaching, or testing, as described in a written animal protocol and approved by the institutional animal care committee.

**CCAC-certified institution:** A Canadian institution conducting animal-based science that earns a CCAC Certificate of GAP – Good Animal Practice®. The CCAC only collects animal data from institutions that participate in this program.

**Category of invasiveness:** The level of pain and/or distress that an animal could potentially be exposed to while undergoing a scientific study. Each animal used in science at a CCAC-certified institution will be assigned prospectively to one category of invasiveness (there are five levels). For more information about categories of invasiveness, refer to the [CCAC categories of invasiveness in animal experiments](#).

**Number of animals used:** The number of animals used for research, teaching and testing during a calendar year (reported by species).

**Other animals:** An animal type category used to describe animal species that do not fit under any other animal type heading (for example, ferrets).

**Other rodents:** An animal type category used to describe rodent animal species that are not mice, rats or guinea pigs (for example, hamsters).

**Protocol:** A written description of a scientific study using animals. At CCAC-certified institutions, protocols must be reviewed and approved by the institutional animal care committee before animal use can occur.

**Purpose of animal use:** A category used to describe the reason why an animal was used in science. Each animal used in scientific studies at CCAC-certified institutions is assigned prospectively to a single purpose of animal use (there are six categories). For more information on purposes of animal use, refer to the [Instructions for Completion of the CCAC Animal Use Data Form](#).