


# Statistics of animal use in research and teaching, Victoria

January 2018 – 31 December 2018

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## Executive Summary

In Victoria, the use of animals for scientific research, teaching and testing is regulated by the *Prevention of Cruelty to Animals Act 1986* (the Act). Organisations or individuals that conduct scientific procedures with animals must hold an authorising licence issued by Animal Welfare Victoria (AWV).

The Act also requires that the breeding of specified animals (guinea pigs, rabbits, rats, mice, and non-human primates) to be used in scientific procedures is authorised by a Specified Animals Breeding Licence. Licences are subject to conditions prescribed by the Prevention of Cruelty to Animals Regulations 2019.

Each year, licence holders are required to submit data on their use of animals. This report details the number and species of animals reported by licence holders for the period 1 January to 31 December 2018.

In this period, 2,310,553 animals were used under licence for scientific research, teaching and testing. This is a 47 per cent increase in animal use in 2018 compared to 2017, and 46 per cent above the 10-year average of 1,577,851 animals. Some of the increase can be explained by significantly larger numbers of poultry and birds reported to have been used in 2018.

AWV had previously identified differing levels of understanding amongst licence holders regarding which animals were to be reported in the annual returns. In response, AWV reviewed the advice issued to licence holders and targeted accurate reporting of annual returns in its audit schedule of 2018. This action improved reporting compliance resulting in relatively higher numbers of animals recorded than in previous years.

A large number of embryonated eggs were reported in 2018 as a result of an AWV direction to rectify non-compliance with reporting requirements identified in an audit. A licence holder used 100,193,732 embryonated eggs sourced from a commercial supplier in 2018 to generate vaccine. The scale of the use of embryonated eggs reflects the licence holder's role as the only onshore producer of influenza vaccines in Australia and as a significant supplier to the Northern Hemisphere.

In 2018, around 43 per cent of the non-specified animals reported as used for scientific purposes were sourced from commercial suppliers and 41 per cent from their natural habitat. For specified animals, 70 per cent were bred by the licence holders for their own supply, and 16 per cent were sourced from interstate licenced suppliers.

The most common impact on animals during research, teaching and testing was minor physiological challenge (37 per cent), followed by minor conscious intervention (34 per cent) and observational study involving minor interference (15 per cent). Less than one per cent of animals experienced death as an end point.

Following their use in research, teaching and testing, 47 per cent of animals were humanely euthanised. Poultry accounted for 50 per cent of animals euthanised.



## Introduction

Animals are used for research and discovery in many fields of science. *The Prevention of Cruelty to Animals Act 1986* (the Act) regulates their use in Victoria.

The use of animals for scientific research, teaching and testing is termed 'scientific procedures' by the Act and must only be conducted under a licence. Laboratory mice, rats, guinea pigs, rabbits and nonhuman primates are classed in the legislation as 'specified animals' and their commercial production and supply requires a separate licence (specified animal breeding licence).

AWV licences and monitors the scientific use of animals in Victoria. It safeguards the wellbeing of animals by assessing applications for licences to ensure they meet legislative requirements; monitoring compliance; providing advice on best practice procedures, housing and care; and providing training for Animal Ethics Committee (AEC) members. The Act requires animal use to be conducted under licence and overseen by an AEC.

The AEC is responsible for determining whether animal use is ethically justified and for ensuring that there are no available alternatives, prior to that use commencing. They weigh the predicted scientific or educational value of the projects against the potential effects on the welfare of the animals.

Each year, licence holders are required to submit data on their use of animals.

This report details the number and species of animals reported by licence holders for 2018. Research and teaching organisations report the number of animals they used for scientific procedures as well as any animals held in breeding colonies for in-house supply. Commercial producers of specified animals for the supply of research report the number of breeders and the number of stock animals produced.

This report includes information on where animals were sourced, the purpose and benefit of their use, the impact it had on their wellbeing, and whether or not they were killed at the conclusion of the project.

## Part 1: Guide to reading the report

### 1.1 The use of animals in research and teaching

#### 1.1.1 Why are animals still used for experiments?

Over time, many animal experiments have been replaced by valid alternative methods. The process of validation is complex and rigorous, to ensure reproducibility and accuracy. Unfortunately, not all research methods can be replaced at this time, but it is an ongoing endeavour. More information about replacement, reduction and refinement can be found at [www.nc3rs.org.uk](http://www.nc3rs.org.uk).

#### 1.1.2 What protections are in place?

Researchers and teachers must apply to an AEC for every project they conduct using animals. Before giving their approval, the AEC must be convinced that the animal use is justified. They weigh the predicted scientific or educational value of the projects against the potential effects on the welfare of the animals.

Applicants must demonstrate to the AEC that their project fulfils the principles of the three R's (Replacement, Reduction and Refinement):

1. Replacement: methods that either partially or completely replace the use of animals must be sought. The use of animals is prohibited if a valid, non-animal alternative exists.
2. Reduction: animal numbers must be statistically calculated to be the minimum necessary to achieve the results, and not so low as to render the exercise invalid.
3. Refinement: every effort must be made to minimise the impact on the animals involved, e.g. applying technology that allows an earlier conclusion to the study; ensuring best-practice anaesthesia and analgesia; by providing care and husbandry that meets the animal's psychological and physical needs.

AECs have a legal obligation to refuse to approve any project they consider unjustified or lacking scientific merit.

#### 1.1.3 Who is on an AEC?

There are four categories of membership on an AEC. At least one member of each category must be present to make a decision about a new project. The categories are:

- |            |   |
|------------|---|
| Category A | veterinarian.   |
| Category B | researcher or teacher with substantial and recent experience in the use of animals for scientific purposes relevant to the business of the AEC.   |
| Category C | person with demonstrable commitment to, and established experience in, furthering the welfare of animals, who is not employed by or otherwise associated with the institution, and who is not currently involved in the care and use of animals for scientific purposes.    |
| Category D | person not employed by or otherwise associated with the institution and who has never been involved in the use of animals in scientific or teaching activities, bringing a completely independent view to the AEC, and must not fit the requirements of any other category. |

## 1.2 Reporting process

### 1.2.1 How is the data collected?

Organisations and individuals licensed to use animals for research and teaching are responsible for providing the data to AWV by 31 March every year, for the previous calendar year.

### 1.2.2 Why is this data collected?

The reporting process collates data in the same areas that are the major considerations for the AEC when assessing an application. The broad outcomes of project purposes must be achieved by the more specific project benefits outlined in the application. The potential benefits are compared with the likely welfare impacts in a cost benefit analysis. Each member of the AEC must decide, according to their own judgement, if the project is justified in an ethical sense. This information informs policy decisions and is used to direct risk-based inspections and educational programs.

### 1.2.3 What types of animals are counted?

The types of animals counted in the statistics for research, testing or teaching projects are:

- mammals above the mid-point of gestation. This means that if research or teaching projects use a pregnant animal past the halfway point of gestation, she and all in utero offspring must be included in the statistics.
- birds and reptiles above the mid-point of incubation or gestation. This means eggs that are used for research or teaching must be reported in the statistics, if they are past the halfway point of incubation. For live bearing reptiles, the same rule applies as for mammals.
- fish and amphibians capable of independent feeding
- adult decapod crustaceans and cephalopods.

Reporting of breeding groups kept by scientific procedures and specified animal breeding licence holders is slightly different. The breeders, resting animals, and any offspring that have not been issued to a project must be reported.

### 1.2.4 Where are animals sourced from?

Specified animals must only be sourced from:

- Victorian suppliers holding a specified animals breeding licence
- an in-house breeding colony kept by a scientific procedures licence holder, or
- an interstate or overseas supplier who meets all relevant requirements of their local jurisdiction for the breeding of these animals

Other animals may be sourced from:

- an in-house breeding colony kept by a scientific procedures licence holder
- a commercial supplier
- private donation – this may include animals that continue to stay in the custody of the owners for the duration of the project (except farm animals)
- farms, where the animals do not leave the property
- their natural habitat – these animals may be sampled in the field and immediately released, or brought into captivity
- a captive colony or zoo



- a council pound – these animals must be treated in accordance with the Victorian code of practice for the use of animals from municipal pounds in scientific procedures, or
- another source, not specified above

### 1.2.5 What is meant by the project purpose?

Animals must only be used when there is no other alternative and only for a limited number of reasons. These are:

- to obtain and establish significant information relevant to the understanding of humans and/or animals, or
- to maintain and improve human and/or animal health and welfare, or
- to improve animal management or production, or
- to obtain and establish significant information relevant to the understanding, maintenance or improvement of the natural environment, or
- to achieve educational outcomes in science, as specified in the relevant curriculum or competency requirements

### 1.2.6 What is meant by the project benefit?

These categories refine and add definition to the broader project outcomes reported above. The reporting categories include:

- Fundamental biology/physiology
- Diseases-human
- Diseases-animal
- Diseases- zoonotic
- Environmental monitoring/ecology
- Domestic animal management/production
- Wildlife management/conservation
- Vertebrate pest management
- Production of biological products
- Development of techniques
- Education
- Training (student use of animals)
- Regulatory product testing

### 1.2.7 What is meant by the impact of activities?

These reporting categories represent the highest level of impact experienced by the animal during its involvement in research, teaching or testing. An AEC must consider the wellbeing of animals used for scientific purposes in terms of the cumulative effects of an animal's lifetime experience. The categories are defined in Appendix 1.

### 1.2.8 What is meant by the number of deaths?

The fate of the animals at the conclusion of a project depends on the aims of the project. Some projects require analysis of the animal's tissues to conclude the experiment, and they are humanely killed to obtain these results. Occasionally, an unexpected adverse event, for example an unexpected reaction, surgical complication or unrelated illness will require an animal to be euthanised. Animals must be monitored with enough frequency to promptly detect any pain or distress, whether anticipated as a result of the study or not.



Animals may be reported as used but not recorded as dead because they have been, for example:

- captured then released back to the wild
- recruited to a study while kept in the care of their owner, for example on a farm or through a vet clinic
- rehomed at the conclusion of the project

## 1.3 Understanding the 2018 statistics

### 1.3.1 Why is the number of animals so much higher in 2018?

There was a 47 per cent increase in animal use in 2018 compared to 2017. Some of the increase can be explained by significantly larger numbers of poultry and birds reported to have been used in 2018.

AWV identified varying levels of understanding amongst licence holders regarding which animals were to be reported in the annual returns. In response, AWV reviewed its advice to licence holders and targeted accurate reporting of annual returns in its audit schedule of 2018. Subsequently, a large proportion of licence holders reported relatively higher numbers of animals than in previous years.

### 1.3.2 Why are 100,193,732 embryonated eggs reported in 2018?

In mid-2018, AWV conducted an audit of a licence holder and found that they had not previously reported embryonated eggs used for influenza and other vaccine production in the annual returns.

To generate vaccine, early-stage embryonated chicken eggs are seeded with the current seasonal strain of the flu virus. Viral replication occurs in the embryonated eggs. The eggs are then harvested in the days following the midpoint of their incubation period.

AWV directed the licence holder to rectify these non-compliances, resulting in the reporting of embryonated eggs in a distinct category from chickens. The scale of the use of embryonated eggs reflect the licence holder's role as the only onshore producer of influenza vaccines in Australia and as a significant supplier to the northern hemisphere.

## Part 2: Number of animals reported as used in 2018

In 2018, a total of 2,310,553 animals were reported to be used for teaching, research, and testing (scientific procedures) in Victoria. The table below shows the number of animals used by type. There was a 47 per cent increase in animal use in 2018 compared to the reported 1,571,374 animals in 2017.

This total number of animals reported excludes the 100,193,732 embryonated eggs used in the production of influenza vaccines.

### 2.1 Reported by animal type

**Table 2.1 Number of animals reported as used by animal type**

Animal Type	Number of animals
*Guinea pig (lab)	4,934
*Macaques	110
*Marmosets	75
*Mouse (lab)	435,135
*Rabbit (lab)	1,582
*Rat (lab)	17,062
Amphibians	5,743
Bat	70
Bird exotic captive	96
Bird exotic wild	7,908
Bird native captive	772
Bird native wild	87,625
Bird other	4,366
Cats (non-wild)	962
Cats (wild)	540
Cattle (domestic)	17,414
Cephalopods	107
Crustaceans	15,316
Dasyurids	1,280
Dogs (non-wild)	2,474
Dogs, foxes (wild)	314
Exotic feral mammal other	996
Exotic Zoo mammal	3
Feral Animal-Other	4
Ferret (lab)	604
Fish	803,414
Goats (domestic)	1,347
Horses (domestic)	941
Horses (wild)	4
Koalas	366
Laboratory mammal other	2,726
Lizards	5,249

Animal Type	Number of animals
Macropods	4,598
Mice (wild)	730
Monotremes	115
Native mammal other	7,576
Native Rats, Mice	2,636
Other domestic mammals	150
Pigs (domestic)	679
Possums, Gliders	15,469
Poultry	790,546
Rabbits (wild)	276
Rats (wild)	1,213
Reptile other	359
Seals, Sealions	3,701
Sheep (domestic)	61,858
Snakes	134
Tortoises/ turtle	425
Whales, Dolphins	304
Wombats	245
<b>Total</b>	<b>2,310,553</b>

*\*Specified animals.*



**Table 2.2 Number of animals reported as used by animal type and project purpose**

Animal Type	Educational objectives	Environmental objectives	Improve animal management/ production	Maintenance/ improvement human/ animal health/ welfare	Understand human/animal biology	Total
*Guinea pig (lab)	82		48	4,617	187	<b>4,934</b>
*Macaques				51	59	<b>110</b>
*Marmosets					75	<b>75</b>
*Mouse (lab)	11,241		1,668	141,019	281,207	<b>435,135</b>
*Rabbit (lab)	90		20	998	474	<b>1,582</b>
*Rat (lab)	1,231	12	61	5,257	10,501	<b>17,062</b>
Amphibians	779	4,153	336	1	474	<b>5,743</b>
Bat		70				<b>70</b>
Bird exotic captive	48				48	<b>96</b>
Bird exotic wild	2	7,906				<b>7,908</b>
Bird native captive	90	76	20	6	580	<b>772</b>
Bird native wild	1,207	79,072	65	529	6,752	<b>87,625</b>
Bird other	1			3,912	453	<b>4,366</b>
Cats (non-wild)	425	17		504	16	<b>962</b>
Cats (wild)	3	537				<b>540</b>

Animal Type	Educational objectives	Environmental objectives	Improve animal management/ production	Maintenance/ improvement human/ animal health/ welfare	Understand human/animal biology	Total
Cattle (domestic)	3,055	36	8,450	5,873		<b>17,414</b>
Cephalopods	7	5	95			<b>107</b>
Crustaceans	641	2,326	12,334		15	<b>15,316</b>
Dasyurids	150	1,104			26	<b>1,280</b>
Dogs (non-wild)	2,079	36	21	260	78	<b>2,474</b>
Dogs, foxes (wild)	3	311				<b>314</b>
Exotic feral mammal other		996				<b>996</b>
Exotic Zoo mammal				3		<b>3</b>
Feral Animal-Other		4				<b>4</b>
Ferret (lab)	6		4	554	40	<b>604</b>
Fish	4,859	495,331	30,793	8,399	264,032	<b>803,414</b>
Goats (domestic)	11		30	1,306		<b>1,347</b>
Horses (domestic)	288		121	367	165	<b>941</b>
Horses (wild)				4		<b>4</b>
Koalas	39	288			39	<b>366</b>

Animal Type	Educational objectives	Environmental objectives	Improve animal management/ production	Maintenance/ improvement human/ animal health/ welfare	Understand human/animal biology	Total
Laboratory mammal other				24	2,702	<b>2,726</b>
Lizards	111	3,460	9		1,669	<b>5,249</b>
Macropods	155	4,019		3	421	<b>4,598</b>
Mice (wild)	24	594	110		2	<b>730</b>
Monotremes	6	100			9	<b>115</b>
Native mammal other	350	4,135		3,029	62	<b>7,576</b>
Native Rats, Mice	194	2,305			137	<b>2,636</b>
Other domestic mammals	145			5		<b>150</b>
Pigs (domestic)	164		161	76	278	<b>679</b>
Possums, Gliders	87	15,320		9	53	<b>15,469</b>
Poultry	420	504	733,927	52,986	2,709	<b>790,546</b>
Rabbits (wild)	40	236				<b>276</b>
Rats (wild)	81	1,129			3	<b>1,213</b>
Reptile other	54	305				<b>359</b>
Seals, Sealions		1,703		4	1,994	<b>3,701</b>
Sheep (domestic)	21,875		24,464	14,660	859	<b>61,858</b>

Animal Type	Educational objectives	Environmental objectives	Improve animal management/ production	Maintenance/ improvement human/ animal health/ welfare	Understand human/animal biology	Total
Snakes	3	131				134
Tortoises/ turtle		17		5	403	425
Whales, Dolphins		293			11	304
Wombats	3	227	15			245
<b>Total</b>	<b>50,049</b>	<b>626,758</b>	<b>812,752</b>	<b>244,461</b>	<b>576,533</b>	<b>2,310,553</b>

*\*Specified animals.*





**Table 2.3 Number of non-specified animals used by animal type by source**

Animal Type	Animals in their natural habitat	Australian captive colony/zoo	Commercial supplier	Municipal pound	Other source	Own Derivation	Private donation	Privately owned animals on a farm	Removed from Aust. natural habitat	Total
Amphibians	3,764		563		20	362			1,034	<b>5,743</b>
Bat	70									<b>70</b>
Bird exotic captive					46	48	2			<b>96</b>
Bird exotic wild	7,908									<b>7,908</b>
Bird native captive	11	89	58		83	516	15			<b>772</b>
Bird native wild	87,545	5							75	<b>87,625</b>
Bird other			4,365		1					<b>4,366</b>
Cats (non-wild)	13		1	24	623	204	90	7		<b>962</b>
Cats (wild)	467				73					<b>540</b>
Cattle (domestic)			3,458		146	5,520		8,290		<b>17,414</b>
Cephalopods	11								96	<b>107</b>
Crustaceans	2,684						5		12,627	<b>15,316</b>
Dasyurids	1,026	254								<b>1,280</b>

Animal Type	Animals in their natural habitat	Australian captive colony/zoo	Commercial supplier	Municipal pound	Other source	Own Derivation	Private donation	Privately owned animals on a farm	Removed from Aust. natural habitat	Total
Dogs (non-wild)	13		14	15	1,425	105	713	189		<b>2,474</b>
Dogs, foxes (wild)	314									<b>314</b>
Exotic feral mammal other	996									<b>996</b>
Exotic Zoo mammal		3								<b>3</b>
Feral Animal-Other	4									<b>4</b>
Ferret (lab)			602		2					<b>604</b>
Fish	617,988	27	7,173		881	166,019		44	11,282	<b>803,414</b>
Goats (domestic)					11			1,336		<b>1,347</b>
Horses (domestic)			73		267	170	51	380		<b>941</b>
Horses (wild)	4									<b>4</b>
Koalas	353								13	<b>366</b>
Laboratory mammal other						2,726				<b>2,726</b>

Animal Type	Animals in their natural habitat	Australian captive colony/zoo	Commercial supplier	Municipal pound	Other source	Own Derivation	Private donation	Privately owned animals on a farm	Removed from Aust. natural habitat	Total
Lizards	3,583	9	19		4	131			1,503	<b>5,249</b>
Macropods	4,386	62	9		3	138				<b>4,598</b>
Mice (wild)	730									<b>730</b>
Monotremes	115									<b>115</b>
Native mammal other	7,516	3							57	<b>7,576</b>
Native Rats, Mice	2,570	12			54					<b>2,636</b>
Other domestic mammals			5		145					<b>150</b>
Pigs (domestic)			267			263		149		<b>679</b>
Possums, Gliders	15,450				9				10	<b>15,469</b>
Poultry			781,223		63	9,092	6	162		<b>790,546</b>
Rabbits (wild)	238		38							<b>276</b>
Rats (wild)	1,195		18							<b>1,213</b>
Reptile other	308				51					<b>359</b>
Seals, Sealions	3,701									<b>3,701</b>
Sheep (domestic)			3,406		308	4,274		53,870		<b>61,858</b>

Animal Type	Animals in their natural habitat	Australian captive colony/zoo	Commercial supplier	Municipal pound	Other source	Own Derivation	Private donation	Privately owned animals on a farm	Removed from Aust. natural habitat	Total
Snakes	132				2					134
Tortoises/ turtle	135	5							285	425
Whales, Dolphins	304									304
Wombats	245									245
<b>Total</b>	<b>763,779</b>	<b>469</b>	<b>801,292</b>	<b>39</b>	<b>4,217</b>	<b>189,568</b>	<b>882</b>	<b>64,427</b>	<b>26,982</b>	<b>1,851,655</b>



**Table 2.4 Number of specified animals used by animal type by source**

Animal Type	*Interstate Licenced Supplier	*Other	*Overseas Supplier	*Own Derivation	*Vic SABL Supplier	<b>Total</b>
*Guinea pig (lab)	36	47		4,759	92	<b>4,934</b>
*Macaques				64	46	<b>110</b>
*Marmosets				9	66	<b>75</b>
*Mouse (lab)	66,852	3,636	3,293	310,584	50,770	<b>435,135</b>
*Rabbit (lab)	97	15	292	1,026	152	<b>1,582</b>
*Rat (lab)	5,046	214		5,670	6,132	<b>17,062</b>
<b>Total</b>	<b>72,031</b>	<b>3,912</b>	<b>3,585</b>	<b>322,112</b>	<b>57,258</b>	<b>458,898</b>

*\*Specified animals.*



**Table 2.5 Number of animals reported as used, by animal type and procedure type**

Animal Type	Attachment/insertion of devices for long-term monitoring	Aversive stimuli for behavioural training or stress integral to experiment	Gene manipulative technology	Immunomodulatory methods	In vivo production of monoclonal antibody	In vivo production of polyclonal antibody	Induction of infection	Induction of neoplasia	Induction of other disease model eg. diabetes, cardiac disease	Interference with the central nervous system or sensory capacity or controlling brain	Ionising radiation exposure	Neuromuscular blocking agents or electro-immobilisation	Other procedure	Skin irritancy test of chemical, cosmetic or other preparation	Toxicity testing	Total
*Guinea pig (lab)	198			227		4	979			80			3,212		234	<b>4,934</b>
*Macaques	7						27		34				42			<b>110</b>
*Marmosets	5									56			14			<b>75</b>
*Mouse (lab)	667	3,659	31,957	20,817	478	1,004	54,585	56,373	60,882	5,622	7,595		189,907	102	1,487	<b>435,135</b>
*Rabbit (lab)			16	763		155			75				573			<b>1,582</b>
*Rat (lab)	656	1,449	271		132	19	39		2,940	719			10,705		132	<b>17,062</b>
Amphibians	162		77										5,504			<b>5,743</b>
Bat													70			<b>70</b>
Bird exotic captive			48										48			<b>96</b>
Bird exotic wild	1												7,907			<b>7,908</b>

Animal Type	Attachment/insertion of devices for long-term monitoring	Aversive stimuli for behavioural training or stress integral to experiment	Gene manipulative technology	Immunomodulatory methods	In vivo production of monoclonal antibody	In vivo production of polyclonal antibody	Induction of infection	Induction of neoplasia	Induction of other disease model eg. diabetes, cardiac disease	Interference with the central nervous system or sensory capacity or controlling brain	Ionising radiation exposure	Neuromuscular blocking agents or electro-immobilisation	Other procedure	Skin irritancy test of chemical, cosmetic or other preparation	Toxicity testing	Total
Bird native captive													772			772
Bird native wild	6,186												81,439			87,625
Bird other			53										4,313			4,366
Cats (non-wild)	41									10		2	909			962
Cats (wild)													540			540
Cattle (domestic)	43			147	15		990						16,219			17,414
Cephalopods	6												101			107
Crustaceans	379												14,937			15,316
Dasyurids	11												1,269			1,280
Dogs (non-wild)	14			8									2,452			2,474
Dogs, foxes (wild)													314			314

Animal Type	Attachment/insertion of devices for long-term monitoring	Aversive stimuli for behavioural training or stress integral to experiment	Gene manipulative technology	Immunomodulatory methods	In vivo production of monoclonal antibody	In vivo production of polyclonal antibody	Induction of infection	Induction of neoplasia	Induction of other disease model eg. diabetes, cardiac disease	Interference with the central nervous system or sensory capacity or controlling brain	Ionising radiation exposure	Neuromuscular blocking agents or electro-immobilisation	Other procedure	Skin irritancy test of chemical, cosmetic or other preparation	Toxicity testing	Total
Exotic feral mammal other													996			996
Exotic Zoo mammal													3			3
Feral Animal-Other													4			4
Ferret (lab)	4						593						7			604
Fish	6,011	221	95,679				2,581	200	2,788			1,970	688,397		5,567	803,414
Goats (domestic)				254									1,093			1,347
Horses (domestic)				8		41					62		818		12	941
Horses (wild)													4			4
Koalas	47												319			366
Laboratory mammal other													2,726			2,726
Lizards													5,249			5,249



Animal Type	Attachment/insertion of devices for long-term monitoring	Aversive stimuli for behavioural training or stress integral to experiment	Gene manipulative technology	Immunomodulatory methods	In vivo production of monoclonal antibody	In vivo production of polyclonal antibody	Induction of infection	Induction of neoplasia	Induction of other disease model eg. diabetes, cardiac disease	Interference with the central nervous system or sensory capacity or controlling brain	Ionising radiation exposure	Neuromuscular blocking agents or electro-immobilisation	Other procedure	Skin irritancy test of chemical, cosmetic or other preparation	Toxicity testing	Total
Macropods	30												4,568			4,598
Mice (wild)	3												727			730
Monotremes	35												80			115
Native mammal other	3,280												4,296			7,576
Native rats, mice	131						12						2,493			2,636
Other domestic mammals					5								145			150
Pigs (domestic)		161	229	12					6		57		214			679
Possums, Gliders	46												15,423			15,469
Poultry			6,612	952		13	776,992		202				5,775			790,546
Rabbits (wild)													276			276

Animal Type	Attachment/insertion of devices for long-term monitoring	Aversive stimuli for behavioural training or stress integral to experiment	Gene manipulative technology	Immunomodulatory methods	In vivo production of monoclonal antibody	In vivo production of polyclonal antibody	Induction of infection	Induction of neoplasia	Induction of other disease model eg. diabetes, cardiac disease	Interference with the central nervous system or sensory capacity or controlling brain	Ionising radiation exposure	Neuromuscular blocking agents or electro-immobilisation	Other procedure	Skin irritancy test of chemical, cosmetic or other preparation	Toxicity testing	Total
Rats (wild)	6												1,207			1,213
Reptile other													359			359
Seals, sealions	12												3,689			3,701
Sheep (domestic)	1,232	90	32	52	57	283			571	27	17		59,473	24		61,858
Snakes													134			134
Tortoises/turtle	1												424			425
Whales, dolphins													304			304
Wombats													245			245
<b>Total</b>	<b>19,214</b>	<b>5,580</b>	<b>134,974</b>	<b>23,240</b>	<b>625</b>	<b>1,298</b>	<b>837,081</b>	<b>56,573</b>	<b>67,498</b>	<b>6,514</b>	<b>7,731</b>	<b>1,972</b>	<b>1,140,695</b>	<b>102</b>	<b>7,456</b>	<b>2,310,553</b>

\*Specified animals.



## 2.2 Reported by procedure type

**Table 2.6 Number of animals reported as used, by procedure and by project purpose**

Procedure Type	Educational objectives	Environmental objectives	Improve animal management/production	Maintenance/improvement human/animal health/welfare	Understand human/animal biology	Total
Attachment/insertion of devices for long-term monitoring	4,787	6,895	2,234	3,610	1,688	<b>19,214</b>
Aversive stimuli for behavioural training or stress integral to experiment			251	1,883	3,446	<b>5,580</b>
Gene manipulative technology		77	1,145	17,565	116,187	<b>134,974</b>
Immunomodulatory methods				7,207	16,033	<b>23,240</b>
In vivo production of monoclonal antibody				31	594	<b>625</b>
In vivo production of polyclonal antibody				1,161	137	<b>1,298</b>
Induction of infection		881	731,865	69,547	34,788	<b>837,081</b>
Induction of neoplasia				19,030	37,543	<b>56,573</b>
Induction of other disease model e.g. diabetes, cardiac disease	42			18,840	48,616	<b>67,498</b>
Interference with the central nervous system or sensory capacity or controlling brain centres	28			1,147	5,339	<b>6,514</b>
Ionising radiation exposure	72			706	6,953	<b>7,731</b>
Neuromuscular blocking agents or electro-immobilisation		1,970			2	<b>1,972</b>
Other procedure	45,120	616,719	76,906	102,271	299,679	<b>1,140,695</b>
Skin irritancy test of chemical, cosmetic or other preparation					102	<b>102</b>

Toxicity testing		216	351	1,463	5,426	<b>7,456</b>
<b>Total</b>	<b>50,049</b>	<b>626,758</b>	<b>812,752</b>	<b>244,461</b>	<b>576,533</b>	<b>2,310,553</b>

**Table 2.7 Number of animals reported as used, by procedure type and procedure impact**

Procedure impact	Attachment/insertion of devices for long-term monitoring	Aversive stimuli for behavioural training or stress integral to experiment	Gene manipulative technology	Immunomodulatory methods	In vivo production of monoclonal antibody	In vivo production of polyclonal antibody	Induction of infection	Induction of neoplasia	Induction of other disease model eg. diabetes, cardiac disease	Interference with the central nervous system or sensory capacity or controlling brain centres	Ionising radiation exposure	Neuromuscular blocking agents or electro-immobilisation	Other procedure	Skin irritancy test of chemical, cosmetic or other preparation	Toxicity testing	<b>Total</b>
Observational study involving minor interference	6,264	2,772	92,000	417	3	1,730	762	2,384	204				232,560		889	<b>339,985</b>
Animal unconscious without recovery	339		9,066	3,974	16		20,339	444	9,522	744	164	2	72,880		5,071	<b>122,561</b>
Minor conscious intervention	9,384	334	14,477	7,617	116	36	2,001	5,570	3,728	797	982	1,970	732,378		479	<b>779,869</b>
Minor operative procedures with recovery	1,635		1,231	3,405		797	1,231	4,997	5,233	488	80		34,523	102	56	<b>53,778</b>

Procedure impact	Attachment/insertion of devices for long-term monitoring	Aversive stimuli for behavioural training or stress integral to experiment	Gene manipulative technology	Immunomodulatory methods	In vivo production of monoclonal antibody	In vivo production of polyclonal antibody	Induction of infection	Induction of neoplasia	Induction of other disease model eg. diabetes, cardiac disease	Interference with the central nervous system or sensory capacity or controlling brain centres	Ionising radiation exposure	Neuromuscular blocking agents or electro-immobilisation	Other procedure	Skin irritancy test of chemical, cosmetic or other preparation	Toxicity testing	Total
Minor physiological challenge	60	1,114	1,253	5,562	140	243	779,111	8,649	8,600	190	417		48,831		631	<b>854,801</b>
Surgery with recovery	1,530	825	2,871	4			124	5,504	27,820	2,886	37		6,154			<b>47,755</b>
Moderate to major physiological challenge	2	535	14,076	2,261	353	219	26,996	30,647	10,007	1,205	6,051		10,227		330	<b>102,909</b>
Death as an end point							5,549		204				3,142			<b>8,895</b>
<b>Total</b>	<b>19,214</b>	<b>5,580</b>	<b>134,974</b>	<b>23,240</b>	<b>625</b>	<b>1,298</b>	<b>837,081</b>	<b>56,573</b>	<b>67,498</b>	<b>6,514</b>	<b>7,731</b>	<b>1,972</b>	<b>1,140,695</b>	<b>102</b>	<b>7,456</b>	<b>2,310,553</b>



**Table 2.8 Number of animals reported as used, by procedure type and procedure benefit**

Procedure Type	Development of techniques	Diseases - animal	Diseases - human	Diseases - zoonotic	Domestic animal management/production	Education	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/conservation	Total
Attachment/insertion of devices for long-term monitoring	4,221	3	645		1,143		1,966	1,125	8	42	35		10,026	<b>19,214</b>
Aversive stimuli for behavioural training or stress integral to experiment			2,259		251			3,070						<b>5,580</b>
Gene manipulative technology		3,960	21,005		30			108,389	1,513			77		<b>134,974</b>
Immunomodulatory methods	8	1,626	9,779					10,975		852				<b>23,240</b>
In vivo production of monoclonal antibody			16					256	353					<b>625</b>
In vivo production of polyclonal antibody		89	1,070	16					123					<b>1,298</b>

Procedure Type	Development of techniques	Diseases - animal	Diseases - human	Diseases - zoonotic	Domestic animal management/production	Education	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/conservation	Total
Induction of infection		12,673	43,548	11,358	1,010			19,159	13,161	735,291		881		<b>837,081</b>
Induction of neoplasia	16	516	44,001					12,040						<b>56,573</b>
Induction of other disease model e.g. diabetes, cardiac disease	499	539	60,497					5,572			391			<b>67,498</b>
Interference with the central nervous system or sensory capacity or controlling brain centres	14		3,403			28		3,069						<b>6,514</b>
Ionising radiation exposure	2	60	1,332					6,265			72			<b>7,731</b>
Neuromuscular blocking agents or electro-immobilisation							1970	2						<b>1,972</b>
Other procedure	5,348	8,553	83,899	1,680	80,051	22,965	688,877	125,891	2,016	20,329	17,637	208	83,241	<b>1,140,695</b>
Skin irritancy test of chemical, cosmetic or other preparation			102											<b>102</b>
Toxicity testing		713	386				216	5,614	10	166			351	<b>7,456</b>
<b>Total</b>	<b>10,108</b>	<b>28,732</b>	<b>271,942</b>	<b>13,054</b>	<b>82,485</b>	<b>22,993</b>	<b>693,029</b>	<b>301,427</b>	<b>17,184</b>	<b>756,680</b>	<b>18,135</b>	<b>1,166</b>	<b>93,618</b>	<b>2,310,553</b>

## 2.3 Reported by project benefit

Table 2.9 Number of animals reported as used by animal type, by project benefits

Animal Type	Development of techniques	Diseases- animal	Diseases- human	Diseases- zoonotic	Domestic animal management/ production	Education	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Total
*Guinea pig (lab)	110	1,572	2,962	4		36		178		30	42			<b>4,934</b>
*Macaques			85					19	6					<b>110</b>
*Marmosets								66	9					<b>75</b>
*Mouse (lab)	659	10,744	236,520	2,486	19,384	681		141,211	250	14,567	8,633			<b>435,135</b>
*Rabbit (lab)	50	774	131	2		20		358	113	64	70			<b>1,582</b>
*Rat (lab)	453	40	8,345		1	193		6,809	129	172	920			<b>17,062</b>
Amphibians			1			172	688	510			186	97	4,089	<b>5,743</b>
Bat													70	<b>70</b>
Bird exotic captive								48			48			<b>96</b>
Bird exotic wild							1,663						6,245	<b>7,908</b>
Bird native captive	5	6					15	571			83		92	<b>772</b>
Bird native wild		51		508		11	53,382	1,253			369		32,051	<b>87,625</b>
Bird other			400					53		3,912	1			<b>4,366</b>
Cats (non-wild)	21	467	9	5		134		17		1	291		17	<b>962</b>
Cats (wild)							404					73	63	<b>540</b>



Animal Type	Development of techniques	Diseases- animal	Diseases- human	Diseases- zoonotic	Domestic animal management/ production	Education	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Total
Cattle (domestic)		1,866			11,020	2,271	36	28	2	1,407	784			<b>17,414</b>
Cephalopods						1	10						96	<b>107</b>
Crustaceans						262	2,684						12,370	<b>15,316</b>
Dasyurids							329	26			95		830	<b>1,280</b>
Dogs (non-wild)	21	212		13	72	206	50	50		1	1,849			<b>2,474</b>
Dogs, foxes (wild)							59						255	<b>314</b>
Exotic feral mammal other							476						520	<b>996</b>
Exotic Zoo mammal													3	<b>3</b>
Feral Animal-Other													4	<b>4</b>
Ferret (lab)	4		544	9					1	40	6			<b>604</b>
Fish	4,263	1,700	2,915		21,211	93	613,557	142,671			395	881	15,728	<b>803,414</b>
Goats (domestic)		1,306			30	11								<b>1,347</b>
Horses (domestic)	2	252	49	34	119	20		145	2	50	268			<b>941</b>
Horses (wild)													4	<b>4</b>
Koalas							6	26			4		330	<b>366</b>

Animal Type	Development of techniques	Diseases- animal	Diseases- human	Diseases- zoonotic	Domestic animal management/ production	Education	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Total
Laboratory mammal other			24					2,702						<b>2,726</b>
Lizards						29	1,741	1,634			6		1,839	<b>5,249</b>
Macropods						9	441	194			65		3,889	<b>4,598</b>
Mice (wild)							233				8	112	377	<b>730</b>
Monotremes							24				1		90	<b>115</b>
Native mammal other				57			2,960	2			130		4,427	<b>7,576</b>
Native Rats, Mice				12			989				72		1,563	<b>2,636</b>
Other domestic mammals						31			5		114			<b>150</b>
Pigs (domestic)	2	67	278		177	25			3	4	123			<b>679</b>
Possums, Gliders							11,916	53			35		3,465	<b>15,469</b>
Poultry		5,611	18,412	9,574	3,088	141		2,288	15,080	736,233	119			<b>790,546</b>
Rabbits (wild)						38	15						223	<b>276</b>
Rats (wild)						18	553					3	639	<b>1,213</b>
Reptile other							308				51			<b>359</b>
Seals, Sealions													3,701	<b>3,701</b>

Animal Type	Development of techniques	Diseases- animal	Diseases- human	Diseases- zoonotic	Domestic animal management/ production	Education	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Total
Sheep (domestic)	4,518	4,064	1,267	350	27,378	18,591	30	515	1,584	199	3,362			<b>61,858</b>
Snakes							110				2		22	<b>134</b>
Tortoises/ turtle					5		134						286	<b>425</b>
Whales, Dolphins							9						295	<b>304</b>
Wombats							207				3		35	<b>245</b>
<b>Total</b>	<b>10,108</b>	<b>28,732</b>	<b>271,942</b>	<b>13,054</b>	<b>82,485</b>	<b>22,993</b>	<b>693,029</b>	<b>301,427</b>	<b>17,184</b>	<b>756,680</b>	<b>18,135</b>	<b>1,166</b>	<b>93,618</b>	<b>2,310,553</b>

\*Specified animals.



**Table 2.10 Number of animals used, by project impact by project benefit**

Project Impact	Development of techniques	Diseases- animal	Diseases- human	Diseases- zoonotic	Domestic animal management/ production	Education	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Total
Observational study involving minor interference	8,350	6,055	33,453	112	27,180	22,216	74,696	102,193	5	14,794	3,859	5	47,067	<b>339,965</b>
Animal unconscious without recovery	1,026	2,669	38,792	305	2,528	340	823	48,462	13,235	8,926	5,205	73	177	<b>122,561</b>
Minor conscious intervention	19	6,470	32,230	1,408	36,783	254	587,796	66,977	1,615	1,884	6,567	97	37,769	<b>779,869</b>
Minor operative procedures with recovery	42	165	16,690	105	14,624	140	1,381	15,081	290	2	2,363		2,895	<b>53,778</b>
Minor physiological challenge	151	2,316	47,930	9,565	1,294		27,169	28,107	1,570	730,952	81	110	5,556	<b>854,801</b>
Surgery with recovery	520	186	40,137		12	26	114	6,566	8	82	60		44	<b>47,755</b>
Moderate to major physiological challenge		7,016	57,670	1,559	64	17	1,050	34,041	461	40		881	110	<b>102,909</b>
Death as an end point		3,855	5,040											<b>8,895</b>
<b>Total</b>	<b>10,108</b>	<b>28,732</b>	<b>271,942</b>	<b>13,054</b>	<b>82,485</b>	<b>22,993</b>	<b>693,029</b>	<b>301,427</b>	<b>17,184</b>	<b>756,680</b>	<b>18,135</b>	<b>1,166</b>	<b>93,618</b>	<b>2,310,553</b>



Table 2.11 Number of animals reported as used by project purpose

Project Purpose	Number of animals used
Educational objectives	50,049
Environmental objectives	626,758
Improve animal management/production	812,752
Maintenance/improvement human/animal health/welfare	244,461
Understand human/animal biology	576,533
<b>Total</b>	<b>2,310,553</b>

## 2.4 Number of animals used and animal deaths

Investigators must plan for animals at the conclusion of a project. If appropriate, animals are returned to normal husbandry conditions or their natural habitat. When results rely on tissue analysis, this usually requires the humane killing of the animals. Opportunities to rehome animals that are not needed for tissue analysis are considered wherever possible. Under certain conditions, with special justification, an AEC may approve an animal to be used in a subsequent project.

**Table 2.12 Number of animals used and deaths by type**

Animal Type	Number of animals	Number of deaths
*Guinea pig (lab)	4,934	4,822
*Macaques	110	18
*Marmosets	75	44
*Mouse (lab)	435,135	380,013
*Rabbit (lab)	1,582	1,411
*Rat (lab)	17,062	15,452
Amphibians	5,743	1,266
Bat	70	0
Bird exotic captive	96	48
Bird exotic wild	7,908	0
Bird native captive	772	279
Bird native wild	87,625	225
Bird other	4,366	4,317
Cats (non-wild)	962	27
Cats (wild)	540	73
Cattle (domestic)	17,414	435
Cephalopods	107	100
Crustaceans	15,316	5,439
Dasyurids	1,280	12
Dogs (non-wild)	2,474	5
Dogs, foxes (wild)	314	0
Exotic feral mammal other	996	0
Exotic Zoo mammal	3	0
Feral Animal-Other	4	0
Ferret (lab)	604	602
Fish	803,414	126,183
Goats (domestic)	1,347	5
Horses (domestic)	941	15
Horses (wild)	4	0
Koalas	366	0

Laboratory mammal other	2,726	1,743
Lizards	5,249	525
Macropods	4,598	193
Mice (wild)	730	116
Monotremes	115	4
Native mammal other	7,576	10
Native Rats, Mice	2,636	11
Other domestic mammals	150	2
Pigs (domestic)	679	490
Possums, Gliders	15,469	3
Poultry	790,546	543,804
Rabbits (wild)	276	1
Rats (wild)	1,213	0
Reptile other	359	5
Seals, sea lions	3,701	0
Sheep (domestic)	61,858	4,248
Snakes	134	2
Tortoises/ turtle	425	55
Whales, dolphins	304	0
Wombats	245	0
<b>Total</b>	<b>2,310,553</b>	<b>1,092,128</b>

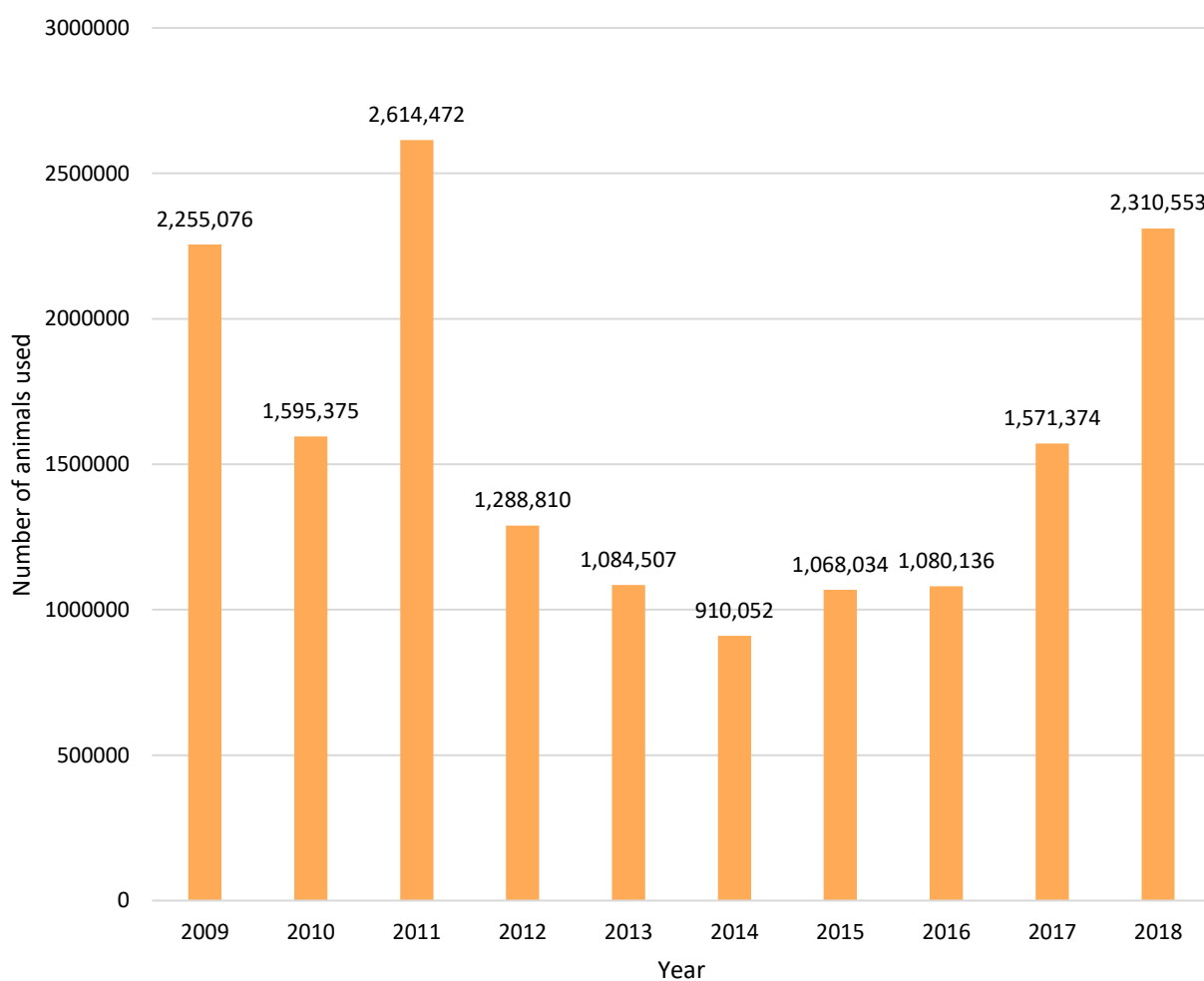
*\*Specified animals.*

## Part 3: Animal use statistics from 2009 to 2018

### 3.1 Number of animals used in research, teaching and testing 2009–2018

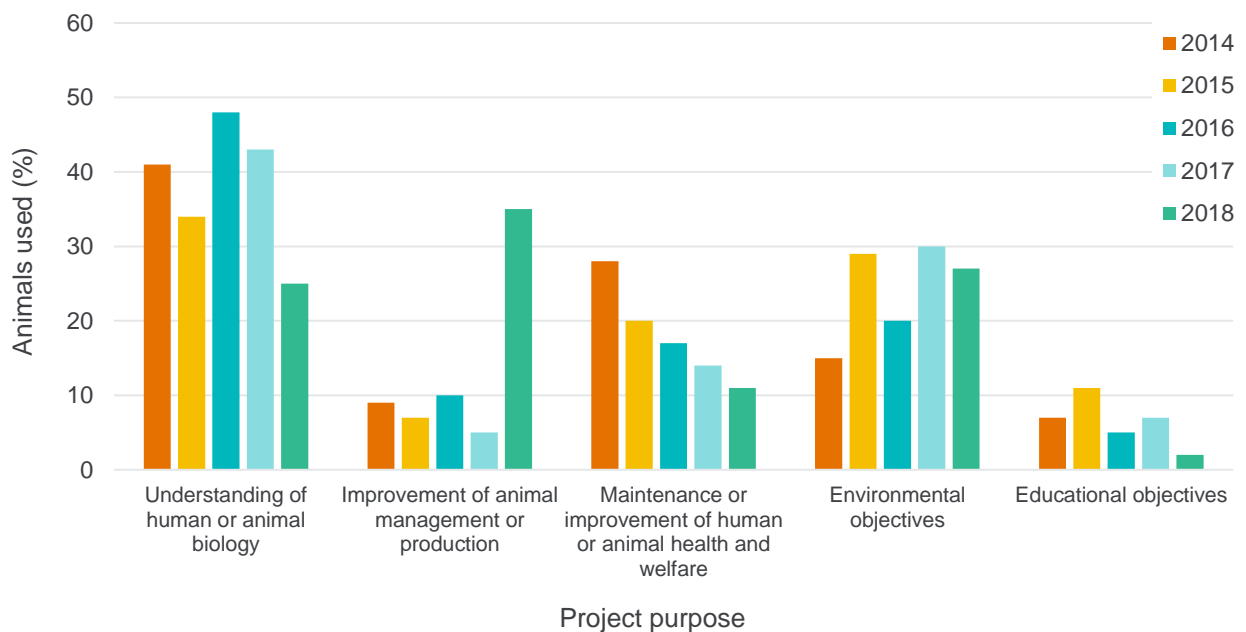
The number of animals used in research, teaching and testing in 2018 was 2,310,553.

Figure 3.1 Number of animals used 2009–2018

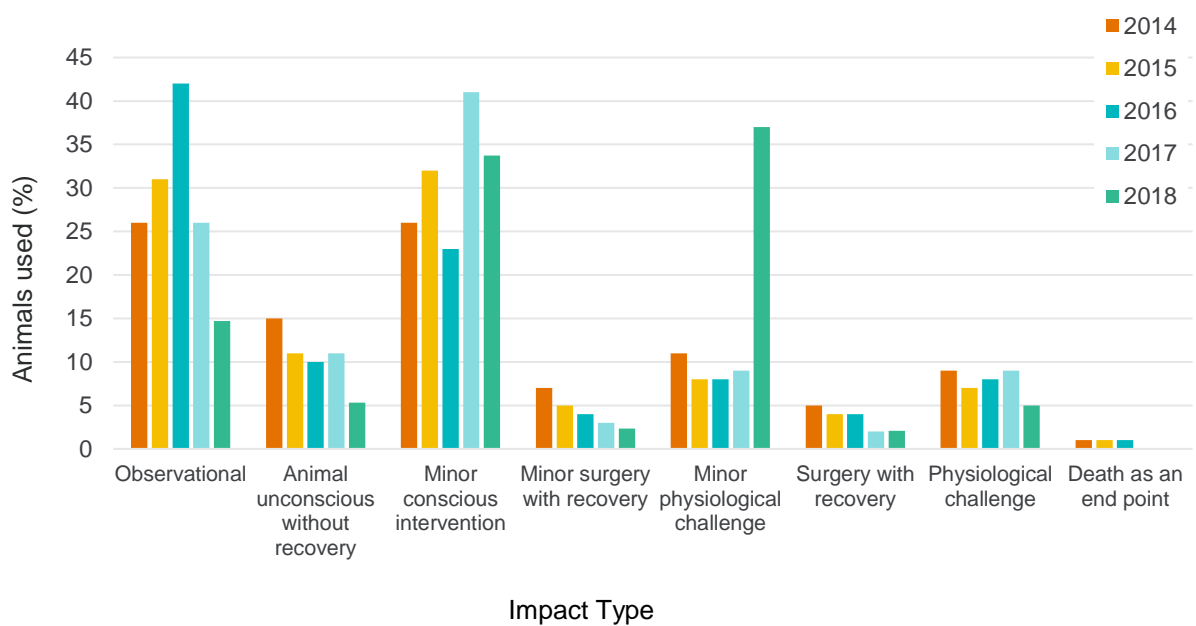




**Figure 3.2 Percentage of animals used by project purpose, 2014–2018**

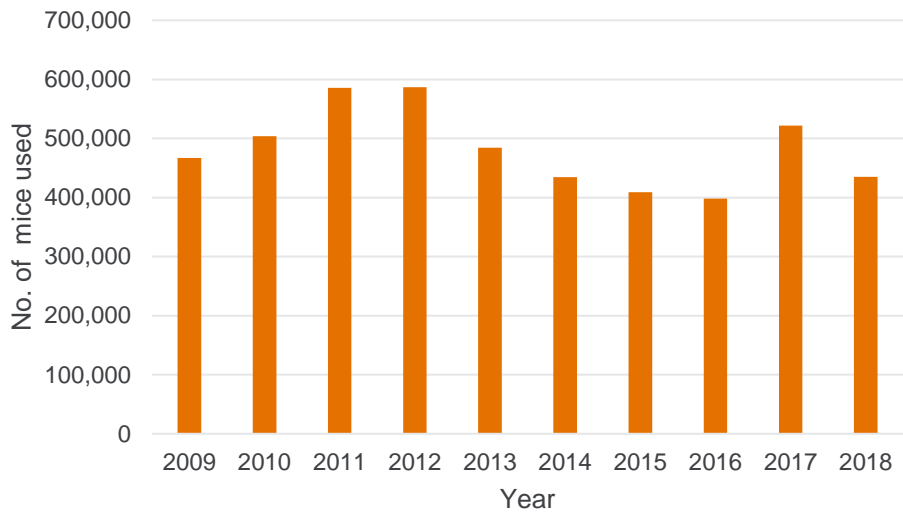


**Figure 3.3 Percentage of animals used by impact type, 2014–2018**

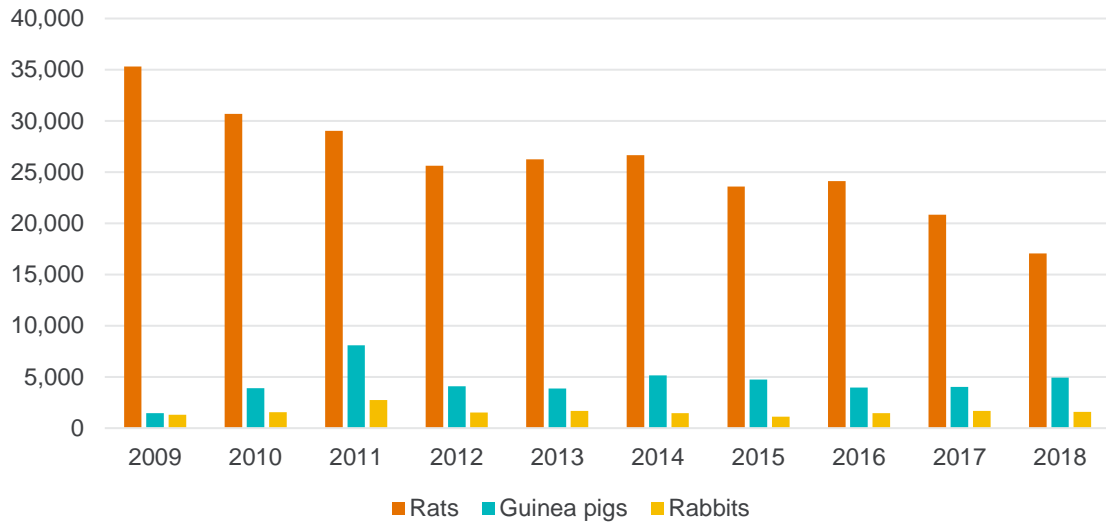


### 3.2 Number of specified animals used, 2009–2018

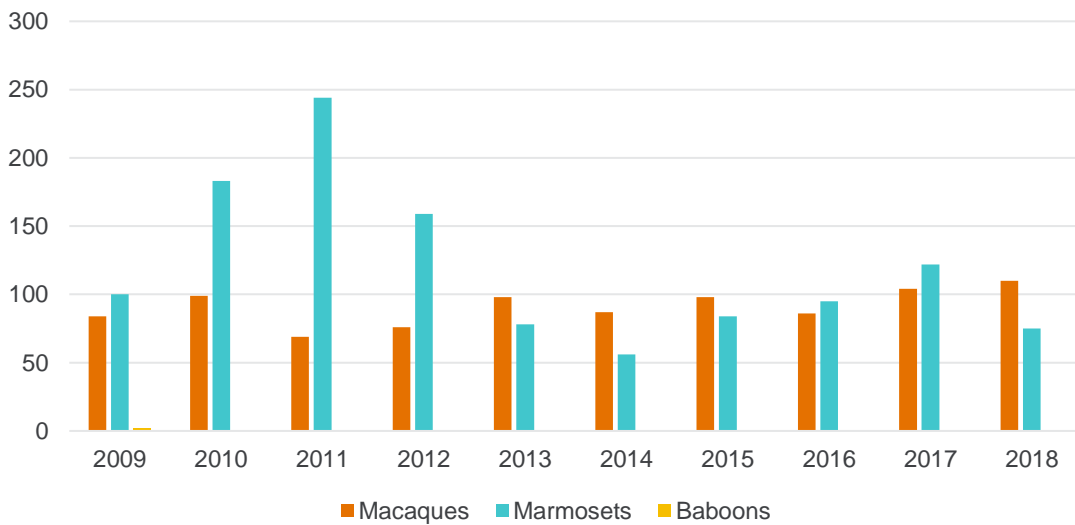
**Figure 3.4 Number of specified mice used, 2009–2018**



**Figure 3.5 Number of specified animals, excluding mice and non-human primates 2009-2018**



**Figure 3.6 Number of non-human primates 2009-2018**



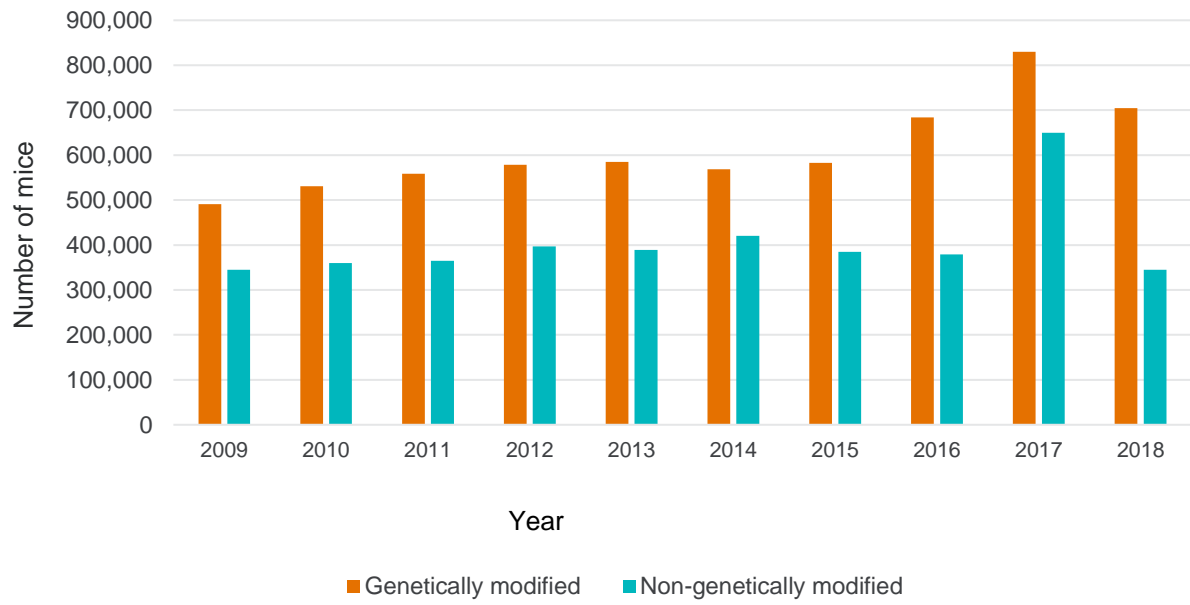
**Table 3.1 Number of non-genetically modified specified animals in breeding colonies by animal type, 2009–2018**

Animal type	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Guinea pigs	1,087	1,153	388	320	244	345	294	96	48	3,202
Macaques	225	243	250	244	226	263	282	274	476	258
Marmosets	166	177	156	146	273	305	440	463	744	309
Mice	344,823	360,185	365,009	396,710	389,049	420,126	384,762	379,198	644,519	345,107
Rabbits	515	445	489	214	197	133	179	159	86	793
Rats	56,993	52,786	48,543	31,886	33,308	25,546	23,744	27,754	40,719	20,606
<b>Total</b>	<b>403,809</b>	<b>414,989</b>	<b>414,835</b>	<b>429,520</b>	<b>423,297</b>	<b>446,718</b>	<b>409,701</b>	<b>407,944</b>	<b>691,592</b>	<b>370,275</b>

**Table 3.2 Number of genetically modified specified animals in breeding colonies by animal type 2009–2018**

Animal type	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Mice	490,962	531,098	558,293	578,240	584,660	568,495	582,925	683,769	829,940	704,297
Rats	1,923	1,146	1,744	1,381	1,992	4,271	2,714	2,286	2,907	2,160
<b>Total</b>	<b>492,885</b>	<b>532,244</b>	<b>560,037</b>	<b>579,621</b>	<b>586,652</b>	<b>572,766</b>	<b>585,639</b>	<b>686,055</b>	<b>832,847</b>	<b>706,457</b>

Figure 3.7 Number of specified mice in breeding colonies 2009–2018



## 4 Appendices

### Appendix 1

Table 4.1 Reporting categories

Category	Description
Observation involving minor interference	Studies in which the normal activities of animals are minimally impacted on. For example, laboratory animals held in cages for acclimatization; a feeding trial, such as Digestible Energy determination of feed in a balanced diet; behavioural or growth study with minor environmental manipulation; or teaching of normal, non-invasive husbandry such as handling, grooming, etc.
Unconscious without recovery	Studies in which animals are humanely rendered unconscious under controlled circumstances (i.e. not in a field situation) with as little pain or distress as possible. Capture methods are not required. Any pain is minor and brief and does not require analgesia. Procedures are carried out on the unconscious animal that is then killed without regaining consciousness. Examples include animals (including fish) in laboratory killed painlessly for dissection, biochemical analysis, etc.; or teaching of surgical techniques using live, anaesthetised patients that are not allowed to recover following the procedure
Minor conscious intervention	Studies in which animals are subjected to minor procedures that would normally not require anaesthesia. Any pain is minor, although some distress may occur as a result of trapping or handling. For example, capture and release (with or without tagging) of animals (including fish) in the wild; trapping and humane euthanasia for collection of specimens; ear notching for identification of new line GM animals; injections, blood sampling in conscious animal; minor dietary or environmental deprivation or manipulation, such as feeding nutrient-deficient diets for short periods; or stomach tubing, branding, disbudding, shearing, etc.
Minor operative procedure with recovery	Studies in which animals are anaesthetised for a minor procedure such as cannulation or skin biopsy. Animals are allowed to recover. Depending on the procedure, pain may be minor or moderate and post-operative analgesia may be appropriate. For example, biopsies or blood sampling under anaesthesia or sedation; cannulations under anaesthesia or sedation; sedation/anaesthesia for relocation, examination or injections/blood sampling; field capture using chemical restraint methods.

Category	Description
Minor physiological challenge	Studies in which there is interference with the animals' physiological or psychological processes. The challenge may cause mild or short-lived pain/distress, or any pain/distress is quickly and effectively alleviated. For example, electrofishing; minor infection, minor or moderate phenotypic modification, early oncogenesis; arthritis studies with pain alleviation; prolonged deficient diets, induction of metabolic disease; polyclonal antibody production; or antiserum production.
Surgery with recovery	Studies in which animals are anaesthetised for a major procedure such as abdominal or orthopaedic surgery following which the animal is allowed to recover. Post-operative pain should be managed with analgesia. For example, orthopaedic surgery; abdominal or thoracic surgery; transplant surgery; or surgery under anaesthesia for implantation of telemetry tags
Moderate to major physiological challenge	Studies in which there is interference with the animals' physiological or psychological processes. The procedure/s may cause moderate or longer lasting pain/distress. Pain or distress may not be able to be entirely alleviated, either due to the nature of the process (e.g., neurological impairment) or because of the experimental question (e.g., pain studies). Other examples include: severe infection, significant disability due to genetic modification, induction of cancer without pain alleviation; arthritis studies without pain alleviation, uncontrolled metabolic disease; isolation or environmental deprivation for extended periods.
Death as an endpoint	Studies where the death of the animal is essential for the scientific result, such as for efficacy of some antivenoms, development of pest control agents and studies of acutely fatal conditions. In these studies, death is a deliberate measure in the procedure and there can be no intervention to kill the animal humanely before death occurs in the course of the procedure. 'Death as an endpoint' procedures must be approved by the Minister for Agriculture. They do not include studies where animals are humanely killed at the conclusion of the experiment.