

# Reasons to Reduce Surplus Animals in Research (in Switzerland) – Or Why the Killing and Death of Animals and Potentially Standard Husbandry Conditions Should be Classified as Harms

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## Abstract

*In Switzerland, approximately 1.2 million animals are used annually for scientific purposes. This number includes animals directly involved in experiments as well as those excluded due to factors like genotype, sex, or age — so-called “surplus animals”. While ethical debates in animal research have focused largely on the pain and suffering caused by procedures such as surgeries or injections, much less attention has been paid to moral issues raised by surplus animals. These animals are typically housed under standard laboratory conditions and killed when deemed unnecessary. Although the Swiss Animal Welfare Act aims to protect the dignity and welfare of all sentient animals, standard housing conditions and the killing by (legally) accepted methods are not considered a harm. In this paper, we argue that this oversight leads to an underestimation of the harms involved in animal research. We make three claims: (i) the death of research animals — whether used in experiments or not — should be recognized as a non-sentientist harm; (ii) since standard killing methods often cause pain or distress, the killing of (surplus) animals should be considered a sentientist harm; and (iii) standard housing conditions in research facilities frustrate animal interests and potentially negatively impact animal welfare and thus should be reassessed with regards to their potential sentientist and non-sentientist harms. Since surplus animals are affected by various harms, moral and legal consideration should be given to their housing and killing in research.*

## Keywords

Animal research, surplus animals, harms, death, killing, animal housing, animal dignity, ethics

## Suggested Citation Style

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# Reasons to Reduce Surplus Animals in Research (in Switzerland) – Or Why the Killing and Death of Animals and Potentially Standard Husbandry Conditions Should be Classified as Harms

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## I. Introduction

Moral concerns and considerations regarding animals in research practice have predominantly centred on the pain, suffering and distress experienced by animals during experimental procedures, such as surgery, injections, or disease-related burdens. In contrast, significantly less attention has been paid to the lives of research animals outside experiments. This paper aims to address this gap by examining potential sources of harms related to standard housing conditions, killing (by legally accepted methods) and death of research animals.<sup>1</sup> Special focus is given to so-called “surplus animals”, defined as animals used for breeding or bred for research purposes but never used in actual experiments. Such animals never entered an experiment due to various reasons like having the wrong genotype, sex or age,<sup>2</sup> or because the number of births cannot be predicted precisely and “backups” often remain

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<sup>1</sup> Methodologically, this legal-philosophical study employs an interdisciplinary approach, operating at the intersection of law, ethics, and animal welfare sciences. Its normative framework is provided by Swiss law, in particular the constitutional principle of respect for the dignity of living beings (art. 120 Constitution), as well as the more detailed provisions contained in the Swiss Animal Welfare Act (AWA) and the Swiss Act on Non-Human Gene Technology (GTA). As a legal-philosophical study, it engages with legal methodology and considers the linguistic-grammatical, systematic, historical, and teleological principles of interpretation insofar as they prove meaningful for the inquiry. With its focus on philosophical arguments, ethical concepts, and the most recent findings from the animal welfare sciences, the study transcends a purely immanent legal analysis. This external perspective makes it possible to critically examine existing legal regulations, bring in new ethical perspectives and also provide a sound basis for formulating proposals for future legal adjustments.

<sup>2</sup> Animals that have not been part of an experiment or breeding have been referred to as “surplus animals” by Swiss Universities (2025). Animals that were used for breeding are usually not included in research proposals and the harm-benefit-analysis. In this paper we use the term surplus animals to refer to animals that were not part of an experiment but used for breeding as they have not undergone scientific procedures.

unused. These animals are usually killed because logistical and economic constraints preclude keeping them until natural death.<sup>3</sup>

The death and killing of animals have been a topic of discussion since the inception of academically institutionalized animal ethics. In addition to indirect arguments,<sup>4</sup> five principal arguments against the killing of animals can be distinguished.<sup>5</sup> These are: (i) the argument of comprehensive protection of life,<sup>6</sup> (ii) interest or desire-based arguments, (iii) the prohibition of instrumentalization, (iv) the deprivation argument, and (v) quantitative-ethical arguments.

What has received too little attention in the German-speaking debate and critique of killing in relation to animal dignity is, first, that the Swiss Animal Welfare Act protects not only the dignity but also the well-being of animals. This allows interest-based arguments and sentience-based deprivation arguments to be advanced against the killing of animals.

Second, too little attention has been paid to surplus animals. This is a significant oversight, considering that the number of surplus animals amounts to approximately 600,000 animals annually in Switzerland only. In this paper, we critically evaluate both the killing of surplus animals, as well as other potential harms they are suffering due to standard husbandry conditions.

We will argue that the housing of surplus animals leads to (at least) non-sentientist harms but also potentially to sentientist harms. If true, greater moral and legal consideration should be given to the housing and killing of animals in research.

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<sup>3</sup> Persson, K., Rodriguez Perez, Ch., Louis-Maerten, E., Müller, N., Shaw, D., Killing in the Name of 3R? The Ethics of Death in Animal Research, (2025) 38(4) *J Agric Environ Ethics* 1–8, 4.

<sup>4</sup> This includes Kant's moral argument against cruelty or the side-effects (e.g. pain and suffering of killing animals for food).

<sup>5</sup> Birnbacher, D., Dürfen wir Tiere töten? in Birnbacher, D., *Bioethik zwischen Natur und Interesse* (=stw, Bd. 1772 Suhrkamp 2006 [1995]) 222–247.

<sup>6</sup> In the context of the dignity of living beings, the issue of killing became a topic at the latest with the explanatory report of the Federal Council (1997). The report reads (2002: 674): "The law protects the dignity and the well-being of the animal, but not its life." (Schweizerischer Bundesrat, *Botschaft zur Revision des Tierschutzgesetzes vom 9. Dezember 2002* (2002), available at <<https://www.admin.ch/opc/de/federal-gazette/2003/657.pdf>>, 657, 674. This position has been widely criticized, particularly in the German debate (see Luy, J., Zum Problem gesetzlicher Regelungen des Lebensschutzes von Tieren, in Bolliger, G., Goetschel, A.F. and Rehbindler, M. (eds) *Psychologische Aspekte zum Tier im Recht* (Stämpfli Verlag 2011) 47–62; Maisack, Ch., Lebensschutz für Tiere – Notwendige Erweiterung oder logische Folge des Würdeschutzes? in Ammann, Ch., Christensen, B., Engli, L. and Michel, M. (eds), *Würde der Kreatur. Ethische und rechtliche Beiträge zu einem umstrittenen Konzept* (Schulthess 2015) 185–232; Stucki, S., *Grundrechte für Tiere. Eine Kritik des geltenden Tierschutzrechts und rechtstheoretische Grundlegung von Tierrechten im Rahmen einer Neupositionierung des Tieres als Rechtssubjekt* (Nomos 2016) 103–105, 381; Bolliger, G., *Animal Dignity Protection in Swiss Law – Status Quo and Future Perspectives* (=Schriften zum Tier im Recht, Bd. 15, ed Stiftung für das Tier im Recht (TIR), Schulthess 2016) 80–82; Michel, M., *Rechtsgemeinschaft mit Tieren. Eine Spurensuche* (Springer 2024) 330–335. – The main argument falls under the category of 'comprehensive protection of life'. It states that the Swiss concept of the dignity of living beings is a biocentric concept that identifies flourishing as the central moral good. Following Aristotle, Christine Korsgaard aptly characterizes flourishing: "When we regard an organism as a functional system, we regard its end as being, as I said earlier, something along these lines: to maintain itself, to survive and reproduce, or to live the life characteristic of its kind. The end of an organism is, in a sense, simply to be and to continue being what it is, or as I have put it elsewhere, to constitute itself.", Korsgaard, Ch.M., On Having a Good, (2014) 89(3) *Philosophy* 405–429, 422. This flourishing is irreversibly curtailed by killing and must therefore be regarded as the greatest harm. In other words, if the restriction of individual functions is regarded as a strain, then an act that impairs all functions must be considered the gravest harm, see Rippe, K.P., Ein Lebensschutz für Tiere? in Michel, M., Kühne, D., Hänni, J. (eds), *Animal Law – Entwicklungen und Perspektiven im 21. Jahrhundert* (Zürich/ Berlin 2012) 87–115, 87, 94.

## 1. Animal Research Legislation in Switzerland

The Swiss Animal Welfare Act protects the dignity and the welfare<sup>7</sup> of sentient animals (art. 1, AWA).<sup>8</sup> That is, the legislation protects sentient animals from so-called sentientist harms, that is pain, suffering, harm<sup>9</sup> and anxiety. Such strains are negatively experienced by the animal. Examples are pain from surgical intervention, distress through handling, or suffering from experimentally induced diseases. The legislation also protects animals from non-sentientist harms (e.g., humiliation, major interference with appearance and abilities and excessive instrumentalization). Humiliation refers to acts that ridicule and devalue animals, such as dressing animals up in funny costumes or excessive submission. Major interference with appearance and abilities refers to interventions that irreversibly alter the animals' anatomy, behavior or physiology. The Swiss Act on Non-Human Gene Technology (art. 8, lit. 1, GTA) states this harm more clearly as "species-specific properties, functions or habits". An example are nude mice, that 1) have no fur which impairs thermoregulation and 2) are immuno-compromised and thus more prone to getting certain diseases.<sup>10</sup>

Excessive instrumentalization is a complex category. It is often described as a form of a non-sentientist harm. The complexity results from the fact that instrumentalization consists of a value and a content dimension.<sup>11</sup> The value dimension refers to a (dis)respectful attitude of a moral agent to the instrumentalized entity, while the content dimension refers to a (dis)respectful action.

Since the dignity of animals is based on their inherent worth, animals are instrumentalised excessively if their inherent worth is not recognized (i), not properly respected (ii) or if the necessary condition for the moral worth – flourishing – is eradicated (iii). In other words, animals are instrumentalised excessively, if their worth is reduced to their aesthetic, social or other instrumental value, and therefore merely or excessively to their usefulness for someone.

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<sup>7</sup> The Swiss concept of animal welfare encompasses both sentientist and non-sentientist (biocentric) elements (art. 3, lit. b, AWA). The characteristics bodily functions, species-appropriate behavior and biological adaptability refer to a non-sentient concept; pain, suffering, harm and anxiety refer to a sentientist concept. Because the non-sentientist features are already covered by the dignity concept, they are redundant and therefore only the sentientist features are relevant for the purpose of this investigation.

<sup>8</sup> Animal Welfare Act (SR 455), available at <[www.admin.ch/opc/de/classified-compilation/20022103/index.html](http://www.admin.ch/opc/de/classified-compilation/20022103/index.html)>, accessed 14 March 2025.

<sup>9</sup> The legal concept of "harm" is subject to controversy (see Michel 2024, 264) and can be relevant to the question of killing. If harm is understood as sentient harm (beyond pain, suffering and anxiety), it could refer to various kinds of subjectively experienced stress that may play a role in the manner of killing. If, however, it is interpreted as non-sentient, biocentric harm, it also encompasses death, which can be regarded as the greatest possible harm (Bolliger 2016, 67). The question then arises of how this kind of non-sentient harm can be distinguished from the strain of "major interference with the animal's abilities" since death precludes all functions or abilities. If the concept of harm is construed broadly as non-sentient harm (as, for example, in Binder 2011), it then encompasses all forms of non-sentient harms. See Binder, R., *Würde erster und zweiter Klasse? Überlegungen zur Forderung nach Anerkennung der Würde des Tieres aus tierschutzrechtlicher Sicht*, (2011) 3(3) *TIE-Rethik* 32–55.

<sup>10</sup> These mice are kept in temperature-controlled and sterile environments. Thus, they are not very likely to be cold due to being furless or getting sick due to being immunocompromised. Nonetheless, they have been harmed by being made furless and being immunocompromised.

<sup>11</sup> Camenzind, S., *Instrumentalisierung. Zu einer Grundkategorie der Ethik der Mensch-Tier-Beziehung* (Mentis 2020) 201–220. See further Michel, M., *Instrumentalisierung und Würde der Kreatur – Eine Annäherung an ein grundlegendes Verhältnis aus juristischer Sicht*, in Ammann, Ch., Christensen, B., Engi, L. and Michel, M. (eds), *Würde der Kreatur. Ethische und rechtliche Beiträge zu einem umstrittenen Konzept* (Schulthess 2015) 253–286. Because instrumentalization (and humiliation) does not always require a harm but rather expresses a disrespectful attitude towards an animal it can also be understood as a form of "harmless wrongdoing" (see Camenzind 2020, 7f.).

This disrespectful attitude on the value dimension is mirrored in an action on the content dimension and the animal's flourishing. This means an entity is instrumentalised excessively when the animal's good (flourishing) is not recognized (i), negatively affected and therefore not respected (ii), or extinguished (iii).<sup>12</sup> The extinguishing of flourishing entails that killing animals within merely instrumental relations constitutes a violation of their dignity (whether this amounts to excessive instrumentalization, we discuss further below). An extreme example, where individual flourishing of animals is not properly respected, is Parabiosis,<sup>13</sup> where the blood circulation of two animals is joined thus terminating their status as individual beings.

## 2. Harms Evoked in Animals Used in Research

In the approval process of licenses for animal experimentation in Switzerland, both sentientist harms and non-sentientist harms must be justified by overriding interests,<sup>14</sup> such as knowledge on fundamental biological processes or animal or human health or the protection of the environment. The extent of the sentientist harms determines the classification of experiments into different severity degrees (SD), from 0 (no harm) to 3 (severe harm). Non-sentientist harms must be listed and justified but they do not influence the severity degree. Interestingly, or puzzlingly, the Swiss legislation protects the dignity of animals but does not explicitly protect the lives of animals and hence, the painless killing of animals is not considered a harm and is therefore not part of the Harm-Benefit-Analysis (HBA) or weighing of interests.<sup>15</sup>

In the HBA it is then decided whether the sentientist and non-sentientist harms inflicted on animals are justified by the expected benefits.

Again, currently, the killing by legally accepted methods and the death of animals used in research projects (as well as surplus animals), and their standard housing conditions (if not downgraded due to experimental reasons) are not considered harms and are thus not considered in the HBA. Because of this, we will argue in this paper, the harms involved in animal research and husbandry are underestimated.

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<sup>12</sup> The following description of excessive instrumentalization by the Swiss Academy of Arts and Sciences (2022) is, in our opinion, imprecise: "Excessive instrumentalization describes a form of non-sentientist harm which occurs when the animal, as an independent living being, is disvalued or is excessively subjected to external purposes that contradict its own interests." (p. 5). – What can be emphasised positively is that both the value dimension (attitude) and the content dimension (action) are mentioned in this description of excessive instrumentalization. However, it must first be specified that animals who are excessively instrumentalized may indeed, and even highly, be valued — for example, with regard to their economic, social or aesthetic value. What is relevant for a morally impermissible instrumentalization is the animal's *moral* worth: if this is not recognized or only insufficiently respected, the animal is excessively instrumentalised. Secondly, in the given examples, which refer to frustrated interests and loss of control, no explicit reference is made to the morally relevant good of flourishing. See Swiss Academies of Arts and Sciences, Weighing of interests for proposed animal experiments. Guidance for applicants (2nd ed.) (2022) 17(9) *Swiss Academies Communications*.

<sup>13</sup> Parabiosis experiments are currently not performed in Switzerland, but this example illustrates well the dimension of non-sentientist harms. In other countries (e.g., in the US), however, this procedure is still used.

<sup>14</sup> Animal Protection Ordinance (SR 455.1), art. 137, available at <[www.admin.ch/opc/de/classified-compilation/20080796/index.html](http://www.admin.ch/opc/de/classified-compilation/20080796/index.html)>, accessed 14 March 2025).

<sup>15</sup> In comparison, in Germany, the lives of animals are protected by the legislation, and the killing of animals requires justification, see e.g., Shaw, D., Rodriguez Perez, Ch. and Persson, K., Slaying the Swiss Unicorn of Animal Dignity, (2024) *Animals* <<https://doi.org/10.3390/ani14030507>>.

### 3. Surplus Animals

The number of surplus animals is significant. In Switzerland, ca. 600,000 animals are used in experiments annually,<sup>16</sup> while at the same time, approximately another 600,000 animals are bred annually that never enter an experiment.<sup>17</sup> As mentioned above, such animals might have been used as breeding animals, or they might never have entered an experiment due to various reasons like having a genotype, sex or age incompatible with the requirements of the planned experiments. Usually, these animals are housed under standard conditions and killed as soon as they are no longer needed for a specific purpose. Only very few of these animals are rehomed that is, placed in private homes or sanctuaries.<sup>18</sup>

Breeding, standard housing and killing (if performed according to the legal requirements), and the death of these animals is, according to the Animal Welfare Act, not considered a harm in Switzerland. Yet, in recent years, Swiss authorities, academic institutions<sup>19</sup> and industry<sup>20</sup> involved in animal research have declared efforts to reduce these surplus animals.<sup>21</sup> This interest is also reflected in the recent revision of the Animal Welfare Ordinance concerning the reporting of animals bred but not used.<sup>22</sup> Starting in 2026, animal husbandries must count all animals from the day of birth, with the exception of mice and rats that must be counted no later than postnatal day 9 of life (instead of only at weaning). Fish and amphibians are to be counted from the free feeding stage, and birds from hatching. In addition, animal husbandries must newly report the fate of animals that were not used in experiments and indicate how many of these animals were given to third parties (e.g., rehomed or used for feeding other animals), and how many were killed or died. This is an interesting development as the goal to reduce surplus animals makes only sense if some form of harm is involved in either bringing them into existence, keeping or killing them.

## II. The Harms Involved in Housing and Killing of Research Animals

### 1. Housing Practices as (Potentially) both Sentientist and Non-Sentientist Harm

In Switzerland, standard housing conditions for laboratory rodents, which are the most commonly used species, as defined by the Animal Welfare Act,<sup>23</sup> include a certain floor space, access to food and water,

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<sup>16</sup> <https://www.tv-statistik.ch/de/statistik/>.

<sup>17</sup> <https://www.tv-statistik.ch/de/versuchstierhaltungen/>. The situation is similar in the EU, where every year approximately 7 million animals are used for research. At the same time, an additional 9.5 million animals are bred but not used in experiments (<https://www.eara.eu/post/2022-eu-figures-on-the-number-of-animals-used-in-research-are-welcomed-by-the-biomedical-community/>).

<sup>18</sup> <https://www.uzh.ch/de/researchinnovation/ethics/animals/3R-replace-reduce-refine/rehoming.html>.

<sup>19</sup> E.g., in Switzerland: Swiss Universities, [https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Forschung/Tierversuche/en\\_surplus.pdf](https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Forschung/Tierversuche/en_surplus.pdf); University of Basel, <https://www.unibas.ch/en/News-Events/News/Uni-Research/Award-for-animal-care-technicians-working-to-reduce-surplus-laboratory-animal-numbers.html>; University of Zurich, <https://www.tierschutz.uzh.ch/en/Resources/Biobanks,-Tissue-Sharing,-Databanks.html>; 3RCC, <https://swiss3rcc.org/previous-funding-schemes/funding-scheme-example/>, others: GV Solas, [https://www.gv-solas.de/wp-content/uploads/2022/03/Reducing-surplus-experimental-animal-generation\\_03-2022.pdf](https://www.gv-solas.de/wp-content/uploads/2022/03/Reducing-surplus-experimental-animal-generation_03-2022.pdf).

<sup>20</sup> Interpharma, (2022) *Animal Welfare Report*, available at [https://www.interpharma.ch/wp-content/uploads/2022/10/GzD-22010\\_en\\_iph\\_animal\\_welfare\\_report-1.pdf](https://www.interpharma.ch/wp-content/uploads/2022/10/GzD-22010_en_iph_animal_welfare_report-1.pdf).

<sup>21</sup> Ways to reduce surplus animals according to Swiss Universities (2025) include e.g., optimised breeding management (by using statistical tools and dedicated software), the use of modern gene-editing technologies such as CRISPR, cryopreservation, the use of both sexes, sharing of lines, and the limitation of in-house breeding (by instead acquiring animals commercially).

<sup>22</sup> Animal Protection Ordinance (SR 455.1), art. 145.

<sup>23</sup> Animal Welfare Act (SR 455).

bedding, nesting material, and a shelter.<sup>24</sup> The scientific consensus on whether these or comparable standard housing conditions adequately safeguard animal welfare remains unsettled.<sup>25</sup> Nevertheless, behavioral and animal welfare scientists have repeatedly criticized standard housing systems for failing to meet rodents' behavioral and psychological needs.<sup>26</sup> Despite improvements to housing in recent decades, more evidence becomes available that indicates current practices may negatively impact animal welfare. Laboratory cages, at least for rodents, continue to restrict the expression of behaviors such as burrowing, foraging, exploration, climbing, and more complex forms of social interaction.<sup>27</sup> Social species are housed in groups, with their cage or stable mates often representing their only form of social interaction. Reproductive behaviors are also frequently limited, further constraining the expression of species-typical behaviors.

Such examples of constraining species-typical behaviors and limiting the animals' ability to live their lives according to their interests should be classified as non-sentientist harms, which they are currently not. Furthermore, environments that prevent animals from performing natural behaviors can lead to negative affective states such as boredom, frustration, stress, and depression, and behaviors widely recognised as indicators of poor welfare<sup>28</sup>.

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<sup>24</sup> Specific regulations apply accordingly to other animal species.

<sup>25</sup> Bailoo, J.D., Murphy, E., Varholick, J.A. et al., Evaluation of the effects of space allowance on measures of animal welfare in laboratory mice, (2018) 8 *Sci Rep* 713 <<https://doi.org/10.1038/s41598-017-18493-6>>; Mieske, P., Hobbiesiefken, U., Fischer-Tenhagen, C. et al., Bored at home? – A systematic review on the effect of environmental enrichment on the welfare of laboratory rats and mice, (2022) 9 *Frontiers in Veterinary Science* 899219 <<https://doi.org/10.3389/fvets.2022.899219>>; Kappel, S., Hawkins, P. and Mendl, M., To group or not to group? Good practice for housing male laboratory mice, (2017) 7(12) *Animals* 88 <<https://doi.org/10.3390/ani7120088>>; Makowska, I.J. and Weary, D.M., Differences in anticipatory behaviour between rats (*Rattus norvegicus*) housed in standard versus semi-naturalistic laboratory environments, (2016) 11(1) *PLOS ONE* e0147595 <<https://doi.org/10.1371/journal.pone.0147595>>.

<sup>26</sup> Lewejohann, L., Schwabe, K., Häger C. et al., Impulse for animal welfare outside the experiment, (2020) 54(2) *Laboratory animals* 150–158; Burn, C.C., Bestial boredom: a biological perspective on animal boredom and suggestions for its scientific investigation, (2017) 130 *Anim Behav* 141–15; Ratuski, A.S. and Weary, D.M., Environmental enrichment for rats and mice housed in laboratories: a metareview (2022) 12(4) *Animals* 414.

<sup>27</sup> Makowska, I.J. and Weary, D.M., Differences in anticipatory behaviour between rats (*Rattus norvegicus*) housed in standard versus semi-naturalistic laboratory environments, (2016) 11(1) *PLOS ONE* e0147595 <<https://doi.org/10.1371/journal.pone.0147595>>.

<sup>28</sup> Bracke, M.B.M. and Hopster, H., Assessing the importance of natural behavior for animal welfare, (2006) 19 *Journal of Agricultural and Environmental Ethics* 77–89; Lecorps, B., Weary, D.M. and von Keyserlingk, M.A.G., Captivity-induced depression in animals, (2021) 25 *Trends in Cognitive Sciences* 539–541; Burn, C.C., Bestial boredom: a biological perspective on animal boredom and suggestions for its scientific investigation (2017) 130 *Anim Behav* 141–15; Powell, S.B., Newman, H.A., Pendergast, J.F. et al., A rodent model of spontaneous stereotypy: initial characterization of developmental, environmental, and neurobiological factors, (1999) 66 *Physiol Behav* 355–63; Novak, J., Bailoo, J.D., Melotti, L. et al., Effect of cage-induced stereotypies on measures of affective state and recurrent perseveration in CD-1 and C57BL/6 mice, (2016) 11(5) *PLOS One* e0153203; Mason G.J., Stereotypies and suffering, (1991) 25(2-3), *Behavioural processes* 103–115; Mason, G. and Latham, N., Can't stop, won't stop: is stereotypy a reliable animal welfare indicator?, (2004) *Animal Welfare* <<https://doi.org/10.1017/S096272860001438X>>; Gross, A.N., Engel, A.K.J., Richter, S.H. et al., Cage-induced stereotypies in female ICR CD- 1 mice do not correlate with recurrent perseveration, (2011) 216 *Behav Brain Res* 613–20 <<https://doi.org/10.1016/j.bbr.2010.09.003>>; Meagher, A.R.K., Campbell, D.L.M. and Mason, J., Boredom-like States in Mink and Their Behavioural Correlates: A Replicate Study, (2017) 197 *Appl. Anim. Behav. Sci* 112–119 <<https://doi.org/10.1016/j.applanim.2017.08.001>>; Meagher, R.K. and Mason, G.J., Environmental enrichment reduces signs of boredom in caged mink, (2012) 7 *PLOS One* e49180; Tatemoto, P., Broom, D.M. and Zanella, A.J., Changes in Stereotypies: Effects over Time and over Generations, (2022) *Animals* <<https://doi.org/10.3390/ani12192504>>; Gross, A.N., Richter, S.H. and Engel, A.K.J., Cage-induced

Additionally, a recent meta-analysis found that standard laboratory housing has negative effects on rodent health. Compared to enriched environments, standard housing significantly increased the severity of stress-related conditions such as anxiety, cancer, cardiovascular disease, and stroke. It also raised overall mortality rates. These effects were consistent across mice and rats and both sexes, suggesting that conventional housing causes chronic distress that compromises rodent welfare.<sup>29</sup>

In summary, the literature suggests that standard laboratory housing may compromise animal welfare. Given the international variability in housing standards and the inconsistency of scientific findings, caution is warranted in drawing definitive conclusions. Nevertheless, if current housing conditions do impair animal welfare, this would represent a sentientist harm and, depending on its severity, should be classified accordingly.<sup>30</sup> Furthermore, most laboratory animals are born, bred and kept under restricted conditions. Thus, current housing conditions severely limit the autonomy of animals and their species-specific behavior and can lead to boredom and contradict many of their interests and desires. This should be classified as non-sentientist and potentially also as sentientist harm.

## 2. Death as Non-Sentientist Harm

There is a significant amount of literature arguing for the moral significance of animal death.<sup>31</sup> Notable accounts include deprivation accounts,<sup>32</sup> or accounts concerned with the frustration of future-related desires.<sup>33</sup> On such accounts the badness of animal death is linked to how much good the animal is deprived of, what kind of desires are frustrated and the awareness of an animal of itself in time (present and future) and place.

Desire-based views argue that death is only important insofar as it frustrates current desires and the badness depends on the quality of desires that are frustrated. The badness of death for animals then depends on whether animals have a concept<sup>34</sup> and aversion of death. Depending on the quality of frustrated desires, death is either worse or less bad for an individual. Different authors come to

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stereotypies, perseveration and the effects of environmental enrichment in laboratory mice, (2012) 234(1) *Behav Brain Res* 61–68 <<https://doi.org/10.1016/j.bbr.2012.06.007>>.

<sup>29</sup> Cait, J., Cait, A., Scott, R.W. et al., Conventional laboratory housing increases morbidity and mortality in research rodents: results of a meta-analysis, (2022) 20 *BMC Biol* 15 <<https://doi.org/10.1186/s12915-021-01184-0>>. This review analysed studies comparing standard cage conditions to enriched ones – characterised by features such as increased space, environmental complexity, nesting materials, shelters, and running wheels.

While standard cages may also include some of these elements, enriched cages offer a greater quantity or variety of these items. It is important to mention that the legally binding standard conditions for rodent housing in Switzerland slightly exceed the conditions described as standard in most countries in this meta-analysis. It is therefore unclear if the results can be applied to Swiss conditions without limitations.

<sup>30</sup> Severity degrees exist only for animals in experiments, e.g. describe harms due to experimental procedures and specific experimental housing conditions, but do not apply for standard housing conditions. If our assessment is correct, the current approach may need to be reevaluated.

<sup>31</sup> Persson, K., Rodriguez Perez, Ch., Louis-Maerten, E. et al., “Killing in the Name of 3R?” The Ethics of Death in Animal Research, (2024) *Journal of Agricultural and Environmental Ethics* 38 <<https://doi.org/10.1007/s10806-024-09936-y>>.

<sup>32</sup> DeGrazia, D., *Taking animals seriously: Mental life and moral status* (Cambridge University Press 1996); DeGrazia, D., Sentient nonpersons and the disvalue of death, (2016) 30(7) *Bioethics* 511–519; Regan, T., *The case for animal rights* (updated edn, University of California Press 2004); Sapontzis, S.F., *Morals, reason, and animals* (Temple University Press 1987); Selter, F., *Planning for the future: Do animals have a time-relative interest in continuing to live?* (Mentis Press 2020); McMahan, J., *The ethics of killing: Problems at the margins of life* (Oxford University Press 2002); McMahan, J., The comparative badness for animals of suffering and death in Višak, T. and Garner, R. (eds), *The ethics of killing animals* (Oxford University Press 2016) 65–85.

<sup>33</sup> Belshaw, C.J., Death, value and desire in Feldman, F., Bradley, B. and Johannsen, J. (eds.), *The Oxford handbook of philosophy of death* (Oxford University Press 2013) 274–296.

<sup>34</sup> See Monsó, S., *Playing Possum: How Animals Understand Death* (Princeton University Press 2024).

different conclusions regarding the quality of desires of animals. We do not aim to settle this discussion in this paper (however, please see footnote for an overview).<sup>35</sup> Importantly, however, across all accounts presented, the death of animals is considered a harm. However, while its severity depends on the position, it is morally significant, nonetheless.

Contrary to desire-based accounts, deprivationism also includes future (unformed) interests. On such an account death is bad insofar as it deprives a being of what would have been good for them had they continued to exist. That is, death is bad because of what it prevents a being from having and the earlier a being dies, the worse death is. This argument has also been brought forward for animals.<sup>36</sup> Importantly, on such accounts you do not have to be connected to yourself in the future to be deprived by death. That is, such accounts explain why death can be bad for animals even *if* they lack the ability to be connected to their own future.

We agree with Delon<sup>37</sup> that the killing of animals should be considered morally relevant. However, deprivation arguments face several problems. First, possible future prospects are difficult to quantify,

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<sup>35</sup> For example, Belshaw (Belshaw, C.J., Death, value and desire in Feldman, F., Bradley, B. and Johannsen, J. (eds), *The Oxford handbook of philosophy of death* (Oxford University Press 2013) 274–296.) claims that humans have the ability to form desires that are, morally speaking, more important (i.e. categorical desires such as realizing one’s potential or future goals) than the desires of animals (non-categorical desires that do not transcend the present such as the interest to eat, to be warm). Based on this, Belshaw argues that animal death is less bad than the death of a human person. Bower and Fischer (Bower, M. and Fischer, B., Categorical desires and the badness of animal death, (2018) 52(1) *Journal of Value Inquiry*, 97–111 <<https://doi.org/10.1007/s10790-017-9604-y>>) criticise this view and claim there is evidence indicating that animals might have the ability to form categorical desires in the sense of Belshaw, and hence their death is worse than Belshaw claims. Singer, for example, claims that all mammals, plus some birds and fish, are persons, who conceive of themselves as distinct beings with a past and a future (Singer, P., *Practical Ethics* (Cambridge University Press 2011 [1979]), Chap. 5). Similarly, McMahan, with his time-relative interest account, claims that death harms a being by the amount of time lost *and* depending on the strength of its psychological connections – such as memory, anticipation, plans, and self-awareness – between its present self and its future self. On McMahan’s account, embryos and very young infants are only weakly connected to their future selves. Because of this minimal psychological connectedness, their deaths are less harmful to them than the deaths of adult human beings, who are strongly bound to their futures. However, Singer’s and McMahan’s account also lack empirical evidence. For more details, see McMahan, J., *The Ethics of Killing: Problems at the Margins of Life* (Oxford University Press 2002). Selter (2020) agrees that all sentient animals have an interest in continuing to live and thus are harmed through their untimely deaths. However, she claims that the empirical data available suggests that most animals (except corvids and great apes) are unable to transcend the temporally and spatially local in McMahan’s sense. If so, then most animals thus do not have the ability to form strong time-relevant interests in the sense of McMahan’s TRIA, but can only be ascribed with a comparably weak time-relative interest in continuing to live (Selter 2020). For an in-depth discussion of this issue see Selter, F., *Planning for the future: Do animals have a time-relative interest in continuing to live?* (Mentis Press 2020).

<sup>36</sup> Delon, N., The value of death for animals in Giroux, V., Pepper, A. and Voigt, K. (eds) *The ethics of animal shelters* (Oxford University Press 2023) 103–130; DeGrazia, D., *Taking animals seriously: Mental life and moral status* (Cambridge University Press 1996); DeGrazia, D., Sentient nonpersons and the disvalue of death, (2015) 30(7) *Bioethics* 511–519; Harman, E., The moral significance of animal pain and animal death in Beauchamp, T.L. and Frey R.G. (eds), *The Oxford handbook of animal ethics* (Oxford University Press 2011) 726–737; Nussbaum, M.C., *Frontiers of justice: Disability, nationality, species membership* (Harvard University Press 2007); Overall, C. Throw out the dog? Death, longevity, and companion animals in Overall, C. (ed), *Pets and people: The ethics of our relationships with companion animals* (Oxford University Press 2017) 249–263; Regan, T., *The case for animal rights* (updated edn, University of California Press 2004).

<sup>37</sup> Delon, N., The value of death for animals in Giroux, V., Pepper, A. and Voigt, K. (eds), *The ethics of animal shelters* (Oxford University Press 2023) 125.

and assuming that a life will be good may be overly optimistic.<sup>38</sup> Especially in the laboratory setting, where animals are exposed to varying degrees of harm, it might in fact be better to die sooner. In this case, death would have to be regarded as a benefit – one that is never experienced.<sup>39</sup>

In any case, it is already sufficient to say that an animal's death frustrates the satisfaction of its actual desires and interests. That alone is enough to state that death and killing are morally problematic. However, this line of reasoning is sentientist (see section 3).

Now it still needs to be clarified whether the killing of surplus animals constitutes an excessive instrumentalization (which Birnbacher also identifies as a third argument against the killing of animals). The answer depends on the reason why the animal was excluded from an experiment or why it was killed. Animals in a research setting are bred for a very specific research purpose. Many animals will unavoidably have the wrong genotype, sex and age. Animals with the wrong genotype and sex are excluded prior to the start of an experiment. Strictly speaking, they never had an instrumental value to the researcher. They are killed because researchers have no use for them. In this case their inherent worth is not respected when they are killed. However, since there never was an instrumental value, they were not instrumentalised.<sup>40</sup>

If surplus animals are killed because they are too old for experimental purposes or if they are used as animal feed,<sup>41</sup> then in both cases there was an instrumental value.<sup>42</sup> Hence, their death would constitute a form of excessive instrumentalization. Importantly, however, the key point is, that in both cases, the dignity of animals is violated, and this should be considered a morally relevant harm, since their moral worth is not respected and their flourishing is forcibly prevented.

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<sup>38</sup> Anti-natalists, for example, claim that life generally constitutes more pain than pleasure and should be regarded as harm. See Benatar, D., *Better Never to Have Been: The Harm of Coming into Existence* (Oxford University Press 2006). This argument is based on the hedonistic assumption that a life is good if the net sum of experiences is positive (e.g. that one experiences in quantity more pleasure than pain and suffering). This is debatable. Opponents of hedonism will argue that reducing the question of what constitutes a life worth living to a simple arithmetic exercise oversimplifies matters significantly. Arguably, many of the most meaningful experiences at least in human life include pain and suffering (failure, disappointment, loss, grief, sacrifice, etc.). However, for research animals such as rodents, we agree that it is at least a valid question whether such lives are, for the animals, a life worth living or whether they are better off dead.

<sup>39</sup> See Rippe, K.P., *Ethik im ausserhumanen Bereich* (Mentis 2008) 284.

<sup>40</sup> These surplus animals are an interesting case because they are an unwanted by-product of the breeding of other laboratory animals. In this respect, they resemble male chicks in the poultry industry, which are likewise an undesired side effect of breeding. The chicks, however, are generally used as animal feed in falconries, zoos, or for private purposes, thus they still have some instrumental value, whereas surplus animals in laboratories have no instrumental (e.g. economic or scientific) value for the researchers that might conflict with their inherent worth. On the contrary, they require space, care, and food, and thus represent a cost factor without any benefit for the research facility. Since there is no instrumental relation, they aren't instrumentalised. However, the dignity of surplus animals is anyway violated by their killing, since their moral worth is not respected and their flourishing is forcibly prevented. In its motion 'Stop the shredding of live chicks' (19.3003), the Committee for Science, Education and Culture of the National Council finds it ethically problematic to kill chicks for purely economic reasons. See Motion Kommission für Wissenschaft, Bildung und Kultur des Nationalrates "Stopp dem Schreddern lebender Küken" (19.3003), <<https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaefte?AffairId=20193003>>, accessed 18 September 2025.

<sup>41</sup> This is only allowed for non-genetically modified animals (Swiss Ordinance on Handling Organisms in Contained Systems (814.912) and Ordinance on the Handling of Organisms in the Environment (814.911)).

<sup>42</sup> Assuming that the animal previously met all criteria for potential experimental use (e.g., age, sex, etc.), it originally possessed instrumental value for the researcher. Once it becomes too old to qualify for the study, however, this instrumental value is lost.

Based on the Animal Welfare Act, this could lead to the surprising conclusion that the killing of animals which possess instrumental value for the researcher involves a greater number of strains (excessive instrumentalization and major interference with abilities<sup>43</sup>) than the killing of animals that never had any value for the researcher at all (i.e. only major interference with abilities).

### 3. Killing as a Sentientist Harm

Many current methods to kill research animals carry significant welfare implications. Therefore, the killing of research animals is often linked to sentientist harms. One of the most used killing techniques for rodents in research facilities is carbon dioxide exposure. Yet evidence suggests that CO<sub>2</sub> can cause distress, air hunger, and possibly pain before loss of consciousness.<sup>44</sup> The Swiss Federal Food Safety and Veterinary Office has acknowledged ongoing uncertainty about how stressful this method is and is currently funding research to explore alternatives that are more humane.<sup>45</sup> Another method which is sometimes used is cervical dislocation. Cervical dislocation can result in rapid death when performed correctly. However, it carries a significant risk of error, which may cause considerable animal suffering. In Switzerland, its use is therefore strictly limited and permitted only under specific conditions. This technique, like other methods of killing, can also place a substantial emotional burden on the personnel required to carry it out.<sup>46</sup> Chemical methods, such as barbiturate overdose (e.g., pentobarbital), are generally accepted as less stressful but may involve longer times to death and require careful handling to avoid errors.

Across all commonly used killing methods, concerns persist regarding their impact on animal welfare, including error rates, variability in the time to unconsciousness and death, and stress associated with handling.<sup>47</sup> These challenges highlight the urgent need for continued evaluation, refinement of current

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<sup>43</sup> If the impairment of individual functions is regarded as a strain, then an act that impairs all functions must be considered the gravest harm (i.e. death).

<sup>44</sup> Turner, P.V., Hickman, D.L., Van Luijk, J. et al., Welfare impact of carbon dioxide euthanasia on laboratory mice and rats: a systematic review, (2020) 7 *Frontiers in Veterinary Science* 411; Valentim, A.M., Guedes, S.R., Pereira, A.M. et al., Euthanasia using gaseous agents in laboratory rodents, (2015) 50(4) *Laboratory Animals* 241–253 <<https://doi.org/10.1177/0023677215618618>>; Clarkson, J.M., Martin, J.E. and McKeegan, D.E.F. A review of methods used to kill laboratory rodents: issues and opportunities, (2022) 56(5) *Laboratory Animals* 419–436 <<https://doi.org/10.1177/00236772221097472>>.

<sup>45</sup> <<https://www.blv.admin.ch/blv/de/home/tiere/tierschutz/tierschutzbericht-2021/tiere-angst-und-schmerzfrei-getoetet.html>>.

<sup>46</sup> Studies have shown that taking care of and killing research animals in laboratory settings sometimes causes significant burden on the staff. This is often referred to as compassion fatigue (Rumpel, S., Kempen, R., Merle, R. et al., Psychological stress and strain in laboratory animal professionals – a systematic review (2023) *Laboratory Animals* <<https://doi.org/10.1177/00236772221129111>>; LaFollette, M.R., Riley, M.C., Cloutier, S. et al., Laboratory animal welfare meets human welfare: A cross-sectional study of professional quality of life, including compassion fatigue in laboratory animal personnel (2020) 7 *Frontiers in Veterinary Science* 114 <<https://doi.org/10.3389/fvets.2020.00114>>. – Compassion fatigue is the result of caring for others and their pain and the wish to relieve their pain and suffering. The repeated exposure to pain, suffering and killing (death) leads to a reduced ability to feel sympathy and empathy. This has first been described in the medical context and recently also for the animal research context. Compassion fatigue as a human response of animal care takers is, in our opinion, indicative that the staff working with the animals believes that the lives of animals and their welfare matter from a moral point of view and such a reaction only occurs if they believe that animals are burdened or harmed in a morally significant sense in a laboratory setting.

<sup>47</sup> Clarkson, J.M., Martin, J.E. and McKeegan, D.E.F., A review of methods used to kill laboratory rodents: issues and opportunities, (2022) 56(5) *Laboratory Animals* 419–436 <<https://doi.org/10.1177/00236772221097472>>.

techniques, or the development of new approaches. Despite their widespread use, there is still no universally accepted method that reliably minimizes pain and distress in laboratory animals.

To summarize, death ought to be classified as non-sentientist harm due to excessive instrumentalization and the killing of animals as sentientist harm due to many current methods of killing inflicting negative subjective experience on animals.

### III. Ethical Implications

The classification of surplus animals' husbandry conditions as both sentientist and non-sentientist harms, killing as sentientist harm and death as non-sentientist harm, constitute a serious ethical concern. This concern is further amplified by the fact that the number of surplus animals is comparable to that of animals actually used in research, underscoring the magnitude of the problem. In the following, we discuss ethical and legal implications regarding (i) the animal research authorization process and (ii) the strategies of refinement and reduction.

(i) As mentioned, standard husbandry conditions and accepted methods for killing are not considered harms. Therefore, severity degrees do not even exist for animals kept in research facilities if not involved in experiments. The categorization into severity degrees only happens if and once an animal enters an experiment. We argue that harms involved in standard husbandry conditions and accepted killing methods should be taken into account in the evaluation of the severity degree. This is particularly relevant given that the minimum level of negative subjective experience required to be classified as severity degree one (SD 1) is rather low. For comparison, in an experiment, tattooing and ear punching are considered severity degree one (SD 1). It is thus conceivable that the negative experience of an animal while dying or in standard housing conditions is similar in extent to this. The extent of harms involved in keeping and killing animals we have described in this paper, highlights the need to extend severity evaluation to non-procedural aspects, such as standard husbandry and killing.

All animal experiments, irrespective of their severity degree, require approval in Switzerland.<sup>48</sup> In several cantons, authorities evaluate applications with severity degree 0 (SD 0) for whether the application provides sufficient gain to outweigh the harms. Such a practice only makes sense if there are morally relevant harms involved. Our argumentation regarding the harms involved in husbandry, death and killing of animals provides a rationale for why allegedly harm free practices still involve morally significant harms.

(ii) Qualifying standard husbandry conditions, the killing of animals and their death as harms would also have practical implications with regards to the 3Rs. Regarding the strategy to reduce animal research on the macro level, the harms involved in husbandry, death and killing of animals provides an ethical rationale to reduce surplus animals in general.

A further implication concerns the relation between reduction and refinement. For example, when faced with the option of using ten animals with moderate pain or twenty animals with low pain (where the aggregate sum of pain is in both cases equal), it is unclear which option is morally more desirable.<sup>49</sup> So far in Switzerland, death and husbandry conditions have not been counted as harms and the focus of the legislation is on protecting the welfare of every individual. Thus, it would make sense to choose the second option (using more animals with lower individual harm). However, if death counts as harm, these questions become more difficult and there might be scenarios where it might be preferable to use less animals (with increased individual suffering). This also illuminates the tension between incompatible moral goods in the Swiss Animal Welfare Act. Within the sentientist paradigm, death is

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<sup>48</sup> Animal Welfare Act, art. 18

<sup>49</sup> Swiss Academies of Arts and Sciences, Ethical guidelines for animal experiments (4th ed.), (2025) 20(3) *Swiss Academies Communications*.

regarded as preferable to a life characterized by intense suffering, whereas in a non-sentientist, biocentrist paradigm the choice is less clear, since death itself is conceived as the greatest harm.

However, where these thresholds are, remains to be determined. Similarly, when thinking about experiments that are performed to refine a specific practice (e.g. refinement for refinement's sake) it is not only the suffering of animals in these experiments (but also the value of their deaths) that must be weighed against the expected reduction in suffering of future animals. One example is the genetic pain disenchantment of animals, where it is the goal to make research animals less perceptive to pain and suffering.<sup>50</sup> The reduction of suffering and elimination of negative subjective experiences is the focus of sentientist frameworks (such as the EU regulation on animal research). However, should the killing of animals and their death be of moral significance, research on genetically disenchanted animals would still be morally problematic (in the sense that their use and their death would still require justification by overriding interests). Similarly, all applications that aim to reduce sentientist suffering but also include death of research animals, would have to take this into consideration.

#### IV. Conclusion

The classification of surplus animals' husbandry conditions as both sentientist and non-sentientist harms, killing as sentientist harm and death as non-sentientist harm, constitutes a serious ethical concern. The need to reduce surplus animals has recently been recognised by scholars, society and by the Federal Food Safety and Veterinary Office and Swiss Research Institutions.

However, against the broad body of animal ethics literature arguing for the significance of animal death as sentientist and non-sentientist harm and its biocentric foundations, in the Swiss Animal Welfare Act, the life of animals is not protected. In this paper, we have argued that the death of animals in the laboratory setting concerns not only sentientist and non-sentientist harms but also ought to be classified as excessive instrumentalization and the killing of research animals potentially as sentientist harms. This is, because current methods used to kill laboratory rodents can carry significant welfare implications and death deprives animals of a valuable future. Furthermore, we argued that current standard husbandry conditions (at least for rodents) could represent both non-sentientist and sentientist harms due to frustrating many significant animal interests and needs or species-specific behavior and due to negatively impacting animal welfare. It is important to note that procedures that involve these harms are not per se unjustified. But classifying them as harm would mean that they would have to be justified by overriding interests in a harm-benefit-analysis.

Together, our argument provides an ethical rationale for i) reconsidering the current status of surplus animals, ii) reducing surplus animals, iii) why severity degree zero (SD 0) applications require approval and that iv) current Swiss regulations on animal experimentation ought to be reformed so that death, killing, and housing conditions (for surplus and experimental animals alike) are considered as potential strains making their inclusion in severity categorisation and assessment legally binding.

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<sup>50</sup> Devolder, K. and Eggel, M., No pain, no gain? In defence of genetically disenchanting (most) research animals (2019) 9(4) *Animals* 154; Eggel, M. and Camenzind, S., Authorization of animal research proposals – A comparison of harm concepts in different European regulations, (2020) 133 *Berliner und Münchener Tierärztliche Wochenschrift* 270–278; Camenzind, S. and Eggel, M., The 3Rs principles and genetic pain disenchantment (2022) 31(4) *Animal Welfare* 495–503.

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