

<b>DOCUMENT TYPE</b>	Annotated Bibliography
<b>SUBJECT</b>	Attitudes Toward Animal Research and Experimentation
<b>DATE(S)</b>	2011-2019
<b>CREATED BY</b>	Erich Yahner
<b>AFFILIATION</b>	The Humane Society Institute for Science and Policy

**Agell, L., Soria, V., & Carrió, M. (2015). Using role play to debate animal testing. *Journal of Biological Education*, 49(3), 309-321. <https://doi.org/10.1080/00219266.2014.943788>**

The use of animals in biomedical research is a socio-scientific issue in which decision-making is complicated. In this article, we describe an experience involving a role play activity performed during school visits to the Barcelona Biomedical Research Park (PRBB) to debate animal testing. Role playing games require students to defend different positions and permit participants to debate and reflect on their personal opinions. A total of 262 students from 15- to 30-years-old participated in the activity. The article presents an analysis of the students' opinions on this topic before and after performing the activity. Our results show that students actively took part in debate and made use of the new information provided by the game, especially the legal aspects. In conclusion, the role play activity helped participants to create a more informed opinion, stimulated critical thinking and argumentation skills. We encourage science teachers to use role playing games to discuss socio-scientific issues.

**Beversdorf, D., & Adams, N. (2016). Attitudes Toward Animal Research Among Medical Students in the United States (S3. 006).**

Background: For the process of development of new treatments for patients, there are many steps necessary to establish safety, mechanism of action, and efficacy before the new treatment can be used clinically. One of these steps involves testing in animals. The attitude of medical professionals regarding this process is not known. Methods: We surveyed medical students in the United States that were members of the American Academy of Neurology regarding their attitudes towards animal research. Students were queried as to their agreement or disagreement with a set of 14 questions. Students were then presented an educational video regarding animals in research, and repeated the survey immediately following the viewing of the video. Results: 168 students completed the initial survey. Among respondents to the first survey, 4.8[percent] agreed with the statement 'Animal research cannot be justified and should be stopped'. 13.2[percent] disagreed with the statement 'New surgical procedures should be tested on animals before they are used on people', and 7.2[percent] disagreed with 'New drugs should be tested on animals before they are used on people'. Those with previous research experience had a significantly more positive attitude towards animal research, but years in medical training, diet (vegetarian vs nonvegetarian), pet ownership, farming experience, and rural vs urban upbringing did not impact attitudes towards animal research. 108 students repeated the survey after the video. After viewing the video, t-tests showed that the group's overall attitude changed to be significantly more positive toward animal research, with the responses above decreasing to 0.9[percent], 2.8[percent], and 0.9[percent] for the aforementioned statements. Conclusions: This is the first study to examine attitudes towards animal research among medical students. These findings should be considered in the future of medical education curriculum development.

**Bressers, S., van den Elzen, H., Gräwe, C., van den Oetelaar, D., Postma, P. H. A., & Schoustra, S. K. (2019). Policy driven changes in animal research practices: mapping researchers' attitudes towards animal-free innovations using the Netherlands as an example. *Research integrity and peer review*, 4(1), 8. [HTML](#)**

Background: Reducing the number of animals used in experiments has become a priority for the governments of many countries. For these reductions to occur, animal-free alternatives must be made more available and, crucially, must be embraced by researchers. Methods: We conducted an international online survey for academics in the field of animal science ( $N = 367$ ) to explore researchers' attitudes towards the implementation of animal-free innovations. Through this survey, we address three key questions. The first question is whether scientists who use animals in their research consider governmental goals for animal-free innovations achievable and whether they would support such goals. Secondly, responders were asked to rank the importance of ten roadblocks that could hamper the implementation of animal-free innovations. Finally, responders were asked whether they would migrate (either themselves or their research) if increased animal research regulations in their country of residence restricted their research. Results: While nearly half (40%) of the responders support governmental goals, the majority (71%) of researchers did not consider such goals achievable in their field within the near future. In terms of roadblocks for implementation of animal-free methods, ~80% of the responders considered 'reliability' as important, making it the most highly ranked roadblock. However, all other roadblocks were reported by most responders as somewhat important, suggesting that they must also be considered when addressing animal-free innovations. Importantly, a majority reported that they would consider migration to another country in response to a restrictive animal research policy. Thus, governments must consider the risk of researchers migrating to other institutes, states or countries, leading to a 'brain-drain' if policies are too strict or suitable animal-free alternatives are not available. Conclusion: Our findings suggest that development and implementation of animal-free innovations are hampered by multiple factors. We outline three pillars concerning education,

governmental influence and data sharing, the implementation of which may help to overcome these roadblocks to animal-free innovations.

**Clemence, M., & Leaman, J. (2016). Public attitudes to animal research in 2016. Ipsos MORI: London, UK. [PDF](#)**

This report presents the findings of the 2016 survey into public awareness of, and attitudes towards, the use of animals in scientific research. This is the second wave of a tracker survey initially conducted in 2014, which was also conducted by Ipsos MORI. Both waves were conducted using Ipsos MORI's face-to-face "Capibus" survey vehicle, allowing for greater robustness in crosswave comparisons. The 2014 survey was broadly based on a long-term trend survey running from 1999; however, in 2014 a qualitative analysis of this long-term survey was conducted and the questions were reviewed and updated to reflect the changed context from when first asked in 1999. This new survey was run alongside the previous survey wave in 2014 to check for comparability of results to measure the impact of the new wordings. The comparison showed that the rewording did not have a significant impact on question response, however as the questions were different, direct comparisons between pre-2014 data and this year's results are not possible, and so have not been included.

**Cox, L., & Montrose, T. (2016). How do human-animal emotional relationships influence public perceptions of animal use? *The Journal of Animal Ethics*, 6(1), 44-53. [PDF](#)**

Human-animal emotional relationships have a complicated interplay with public perceptions of the morality of animal use. Humans may build emotional relationships with companion species. These species are not usually intensively farmed in the United Kingdom, but they may be utilized during animal experimentation. From a relational ethical standpoint, the public may therefore perceive animal experimentation as being less acceptable than intensive farming. This study aimed to determine whether human-animal emotional relationships affect public attitudes regarding use of animals in intensive farming and research. Responding to an online questionnaire, British citizens (N = 85) rated their agreement with 20 statements relating to their acceptance of intensive farming and animal experimentation, scientific research involving a given species (e.g., an animal which either is or is not typically associated with the companion context), killing free-living animals, and consuming animals existing within companion and farming contexts. Positive correlations were found between public acceptance of intensive farming and animal experimentation, such that acceptance of animal experimentation corresponded with acceptance of intensive farming practices. This finding disproved our theory that the British public may perceive animal experimentation as less acceptable than intensive farming due to the use of companion species in scientific research. Public acceptance of animal experimentation also did not significantly differ between that involving companion or noncompanion species. However, respondents were more accepting of the consumption of a typical farmed animal raised for meat purposes than consuming an animal if it had been raised in a companion context or consuming a typical companion species raised in either a farmed or companion context. These findings illustrate that the human-animal relationship can influence (but only to a degree) public perceptions of the morality of animal use.

**Crettaz von Roten, F. (2018). Laboratory animal science course in Switzerland: participants' points of view and implications for organizers. *Laboratory animals*, 52(1), 69-78. <https://doi.org/10.1177/0023677217708807>**

Switzerland has implemented a mandatory training in laboratory animal science since 1999; however a comprehensive assessment of its effects has never been undertaken so far. The results from the analysis of participants in the Swiss Federation of European Laboratory Animal Science Associations (FELASA) Category B compulsory courses in laboratory animal science run in 2010, 2012, 2014 and 2016 showed that the participants fully appreciated all elements of the course. The use of live animals during the course was supported and explained by six arguments characterized with cognitive, emotional and forward-looking factors. A large majority considered that the 3R (replacement, reduction and refinement) principles were adequately applied during the course. Responses to an open question offered some ideas for improvements. This overall positive picture, however, revealed divergent answers from different subpopulations in our sample (for example, scientists with more hindsight, scientists trained in biology, or participants from Asian countries).

**Dignon, A. (2016). 'If you are empathetic you care about both animals and people. I am a nurse and I don't like to see suffering anywhere': Findings from 103 healthcare professionals on attitudes to animal experimentation. *Journal of health psychology*, <https://doi.org/10.1177/1359105316678307>**

This report presents qualitative and quantitative data from 103 UK healthcare professionals describing attitudes to the current system of animal testing (to produce medicines and health interventions). To gather qualitative testimony, these healthcare professionals were organised into six separate focus groups (of 18, 17, 17, 15, 17 and 19 participants) where they were asked 'what is your opinion about the current system of animal testing?' The study focussed on attitudes to the current system rather than attitudes to animal testing in general. The healthcare professionals also completed a quantitative attitude scale questionnaire consisting of 20 statements (all favourable) towards the system of animal testing as currently practised. Statements such as 'Testing agencies abide by legislation to safeguard animal welfare' were displayed and the healthcare professionals were invited to agree or disagree with these statements. The results from both the quantitative and qualitative data suggest that healthcare professionals were opposed to the current system of animal experimentation.

**Dignon, A. (2016). 'I think it will eventually be done away with': Attitudes among healthcare professionals towards the current system of animal experimentation. *Journal of health psychology*, 21(8), 1630-1643. [PDF](#)**

This article describes a study of attitudes to the current system of animal experimentation (for the production of health interventions) among 52 UK healthcare professionals. These healthcare professionals participated in three separate focus groups (of 18, 17 and 17 participants) and were invited to respond to the question 'what is your opinion about the current system of animal testing?' The study focused specifically on their views of the current system (rather than their views of animal testing in general). The healthcare professionals were critical of the current system, particularly with regard to regulation, secrecy, validity, unnecessary suffering and welfare.

**Fedyk, O., & Wilczyński, K. M. (2015). Influence of selected factors on development the students' of the biological sciences faculties bioethical attitudes towards experimental animal studies. *Psychiatria Danubina*, 27(2), S596-S601. [PDF](#)**

**Background:** Although it may help to widen our knowledge, conducting experiments with use of animals, is very controversial, especially since the most recent technology enables us to significantly avoid their use. Currently, the European directives require researchers to reduce the using of animals in scientific experiments, but some studies suggest awareness of the problem is still insufficient. Thanks to examining students' attitude towards conducting scientific experiments on animals the authors wanted to discover and mark the most significant factors that might have impact on moulding students' opinions. **Subjects and methods:** 217 subjects participated in the study. They were students of the Faculty of Medicine at the Silesian Medical University in Katowice and students of the Biology & Biotechnology Faculty at the University of Silesia. A proprietary questionnaire sent via the Internet was used. The authors created specific ratios and numeral 5-grade Likert-type scale showing the behavioural, cognitive and affective component of the respondents' attitudes on the issue being studied. It contained among other things the questions such as granting animals personality, consciousness, and the right to life. The method used allowed the investigators to show the general trends of all the studied responses and therefore the compilation of results. **Results:** The study showed that the attitude of respondents on studied subject undergoes some changes related to gender. Furthermore, the results did not depend with statistical significance on previous experience in conducting such experiments, religious belief of respondent, his or her parents type and level of education. It also showed the that students had little knowledge about current animal protection law and alternative methods to animal research. **Conclusions:** The results show the complexity and multiplicity of factors influencing the attitudes of bioethics and point to the need to deepen our knowledge in the studied area.

**Felsmann, M., Szarek, J., Szarek-Bęska, A., & Babińska, I. (2015). Veterinary surgeons and attitudes towards experiments on animals. *Medycyna Weterynaryjna*, 71(1), 13-17.**

Considering the amendments made to the regulations on animal protection in the EU, the authors outline the legal perspectives of the place and role of veterinary surgeons in the protection of animals used in experiments. They show that there is controversy arising in the relationship between humans and animals by using animals in scientific experiments and for educational purposes. They also show that experiments that inflict pain and suffering (not only physical) have a varied nature. Currently, the need to protect animals against suffering and pain, especially during scientific experiments, is a commonly-accepted ethical standard. In outlining the historical background of the topic, the authors note that in the 20th century (from 1928 till 1997), the Polish law defining the issues of experiments on animals was based on two articles featured in the statutory instrument. This general statement was extended in the Act of 1997 on Animal Protection. After the accession of Poland to the European Union, the protection of animals used in experiments was regulated by a separate act (The Act of 2005 on Experiments on Animals). This resulted from the requirements set by the Council Directive of November 24, 1986 on the approximation of laws, regulations and administrative provisions of the Member States regarding the protection of animals used for experimental and other scientific purposes (86/609/EWG). Despite the substantial expansion of the legal regulations established at the turn of the 21st century, the apparent protection of animals used for scientific purposes prompted objections in many European countries. As a result, in 2010 a new directive was established to reinforce the legal protection of animals used for experimental and educational purposes. However, the legislative responses still leave space for EU Member States to construct their own legal regulations. In particular, they do not include the role of veterinary surgeons as a professional group with specialist knowledge and statutory authorizations in the process of conducting and supervising experiments on animals. The Directive obliged the EU Member states to implement novel legal regulations by the end of 2012. In Poland, the legislative process was initiated in January 2014. The bill prepared by the Ministry of Science and Higher Education includes proposed regulations that contradict the meaning of the Directive. Although the role of veterinary surgeons is underappreciated, this professional group has the knowledge and skills to identify pathological conditions in animals and administering medical treatments. This is the sole professional group which is legally authorized to diagnose and treat animals and perform medical procedures. In addition, there are a variety of veterinary specializations, including those in the utilisation and pathology of laboratory animals. In contrast, the new legal regulations do not include this knowledge, experience or legal authority. The current proposals are insufficient to provide veterinarians with the right to participate in ethical commissions on animal experiments. Furthermore, the lack of possibility for veterinary surgeons to be involved (or at least to supervise) anaesthetic procedures (which are crucial for the protection of animals against suffering) is another inconsistency in the bill. These facts are difficult for the veterinary profession to accept. Considering the premises that form the basis for the new Directive established in 2010, it had been expected that there would be legislation in Poland to completely protect animals

used for experimental purposes. This requirement will not be met unless the representatives of this professional group are involved in evaluating projects involving experiments on animals and providing direct supervision of such experiments.

**France, B., & Birdsall, S. (2015). Secondary students' attitudes to animal research: examining the potential of a resource to communicate the scientist's perspective. *European Journal of Science and Mathematics Education*, 3(3), 233-249. [PDF](#)**

A DVD resource that provided a scientist's perspective on the use of animals in research and teaching was evaluated with a questionnaire that asked students' views pre and post their access to the resource. Thirty-nine secondary students (Y10-Y13) took part in three different teaching programmes that provided information about animal research and allowed them to explore the issues. Students' opinions about the use of animals for research and teaching were measured by matched pre and post questionnaires and open responses they made to justify their positions. The findings showed that students' views on animal research are strongly held and they express their views with emotion. The resource helped students to realise the complexity of the issue and provided them with knowledge to write more nuanced justifications. This resource was focused on providing students with cognitive input and this evaluation indicated that equal attention should be provided to the affect component of attitude formation.

**Franco, N. H., Sandøe, P., & Olsson, I. A. S. (2018). Researchers' attitudes to the 3Rs—An upturned hierarchy?. *PLoS One*, 13(8), e0200895. <https://doi.org/10.1371/journal.pone.0200895>**

Animal use in biomedical research is generally justified by its potential benefits to the health of humans, or other animals, or the environment. However, ethical acceptability also requires scientists to limit harm to animals in their research. Training in laboratory animal science (LAS) helps scientists to do this by promoting best practice and the 3Rs. This study evaluated scientists' awareness and application of the 3Rs, and their approach to other ethical issues in animal research. It was based on an online survey of participants in LAS courses held in eight venues in four European countries: Portugal (Porto, Braga), Germany (Munich, Heidelberg), Switzerland (Basel, Lausanne, Zurich), and Denmark (Copenhagen). The survey questions were designed to assess general attitudes to animal use in biomedical research, Replacement alternatives, Reduction and Refinement conflicts, and harm-benefit analysis. The survey was conducted twice: immediately before the course ('BC', N = 310) and as a follow-up six months after the course ('AC', N = 127). While courses do appear to raise awareness of the 3Rs, they had no measurable effect on the existing low level of belief that animal experimentation can be fully replaced by non-animal methods. Most researchers acknowledged ethical issues with their work and reported that they discussed these with their peers. The level of an animal's welfare, and especially the prevention of pain, was regarded as the most pressing ethical issue, and as more important than the number of animals used or the use of animals as such. Refinement was considered more feasible than Replacement, as well as more urgent, and was also favoured over Reduction. Respondents in the survey reversed the 'hierarchy' of the 3Rs proposed by their architects, Russell and Burch, prioritizing Refinement over Reduction, and Reduction over Replacement. This ordering may conflict with the expectations of the public and regulators.

**Franco, N. H., & Olsson, I. A. S. (2016). Killing animals as a necessary evil? The case of animal research. In *The end of animal life: a start for ethical debate: Ethical and societal considerations on killing animals* (pp. 219-226). Wageningen Academic Publishers. [PDF](#)**

This chapter addresses the question of killing animals in research, primarily from a moral perspective, but also taking into account some of the practical and scientific considerations with moral consequences in this context. We start by exploring in which situations animals are killed in research and whether these are always inevitable, analysing re-use and re-homing of animals as potential alternatives. We then discuss for whom – and under what circumstances – killing matters, considering situations where there may be a conflict between the wish to avoid killing and that to avoid suffering, and further take human-animal interactions into account. We argue that, although there are relevant practical, scientific and ethical arguments favouring the euthanasia of animals in most research contexts, there is a potential for rehabilitating more animals than is currently the practice.

**Franco, N. H., & Olsson, I. A. S. (2014). Scientists and the 3Rs: attitudes to animal use in biomedical research and the effect of mandatory training in laboratory animal science. *Laboratory Animals*, 48(1), 50-60. [PDF](#)**

The 3Rs principle of replacement, reduction, and refinement has increasingly been endorsed by legislators and regulatory bodies as the best approach to tackle the ethical dilemma presented by animal experimentation in which the potential benefits for humans stand against the costs borne by the animals. Even when animal use is tightly regulated and supervised, the individual researcher's responsibility is still decisive in the implementation of the 3Rs. Training in laboratory animal science (LAS) aims to raise researchers' awareness and increase their knowledge, but its effect on scientists' attitudes and practice has not so far been systematically assessed. Participants (n = 206) in eight LAS courses (following the Federation of European Laboratory Animal Science Associations category C recommendations) in Portugal were surveyed in a self-administered questionnaire during the course. Questions were related mainly to the 3Rs and their application, attitudes to animal use and the ethical review of animal experiments. One year later, all the respondents were asked to answer a similar questionnaire (57% response rate) with added self-evaluation questions on the impact of training. Our results suggest that the course is effective in promoting awareness and increasing knowledge of the 3Rs, particularly with regard to refinement. However, participation in the course did not change perceptions on the current and future needs for animal use in research.

**Franco, N. (2013). Animal experiments in biomedical research: a historical perspective. *Animals*, 3(1), 238-273. [PDF](#)**

The use of non-human animals in biomedical research has given important contributions to the medical progress achieved in our day, but it has also been a cause of heated public, scientific and philosophical discussion for hundreds of years. This review, with a mainly European outlook, addresses the history of animal use in biomedical research, some of its main protagonists and antagonists, and its effect on society from Antiquity to the present day, while providing a historical context with which to understand how we have arrived at the current paradigm regarding the ethical treatment of animals in research.

**Gaafar, K., & Fahmy, S. R. (2018). Effects of Laboratory Animal Science Training on Scientists' Attitudes and Practice in Egypt. *Journal of the American Association for Laboratory Animal Science*, 57(6), 712-714. [PDF](#)**

The implementation of principles and guidelines that govern the various areas of research in an educational institution is one of the key factors in international recognition of its research integrity and value. The privilege of conducting research using animal subjects requires adherence to international regulations and standards governing the humane care and use of laboratory animals. The IACUC at our university deemed it critical to have an animal care and use training program to raise researchers' understanding and knowledge. Our IACUC recently designed a training program in the principles of laboratory animal science and the ethical issues involved in animal use. The present study aimed to measure the effect of such training on scientists' attitudes and practice. During 4 successive training courses, the participants (n = 100; 72% women and 28% men) were surveyed twice through self-administered questionnaire—before starting and after completing the course. Questions focused on ethical consideration for care and use of animals in research, ethical committees, international guidelines for humane care of animals, and 3Rs concepts and their interpretation. The results revealed that the scientists' knowledge and awareness increased effectively after the completion of the training courses. They understood the 3Rs concepts of replacement, reduction, and refinement; recognized the importance of standardization of animal handling on scientific results; and were able to distinguish between different ethical committees and their roles. Overall, training leads to standardization of animal care and use practices that are vital for the reproducibility of results fundamental to quality scientific research.

**Gabriel, K. I., Rutledge, B. H., & Barkley, C. L. (2012). Attitudes on animal research predict acceptance of genetic modification technologies by university undergraduates. *Society & Animals*, 20(4), 381-400. [PDF](#)**

Public acceptance of genetic modification (GM) technologies may be essential to their continued development, yet few studies have investigated the manner in which demographic and educational factors predict support for GM research. The current study examined attitudes toward animal research and GM in ~400 university undergraduates enrolled in introductory or upper-level psychology courses with material on animal experimentation. Results revealed that men were more accepting of animal and GM research than were women. Enrollment in upper-level psychology classes that addressed specific topics in animal research did not directly predict support for GM research, but such enrollment was associated with increased endorsement of the validity of animal research, which then contributed to acceptance of GM scenarios. The current findings highlight the impact of educational variables on support for animal research, which may then influence attitudes toward GM research.

**Garrett, J. R. (2012). *The ethics of animal research: Exploring the controversy*. Cambridge, Mass: MIT Press. ISBN: 9780262017060.**

An estimated 100 million nonhuman vertebrates worldwide—including primates, dogs, cats, rabbits, hamsters, birds, rats, and mice—are bred, captured, or otherwise acquired every year for research purposes. Much of this research is seriously detrimental to the welfare of these animals, causing pain, distress, injury, or death. This book explores the ethical controversies that have arisen over animal research, examining closely the complex scientific, philosophical, moral, and legal issues involved. Defenders of animal research face a twofold challenge: they must make a compelling case for the unique benefits offered by animal research; and they must provide a rationale for why these benefits justify treating animal subjects in ways that would be unacceptable for human subjects. This challenge is at the heart of the book. Some contributors argue that it can be met fairly easily; others argue that it can never be met; still others argue that it can sometimes be met, although not necessarily easily. Their essays consider how moral theory can be brought to bear on the practical ethical questions raised by animal research, examine the new challenges raised by the emerging possibilities of biotechnology, and consider how to achieve a more productive dialogue on this polarizing subject. The book's careful blending of theoretical and practical considerations and its balanced arguments make it valuable for instructors as well as for scholars and practitioners.

**Germain, P. L., Chiapperino, L., & Testa, G. (2017). The European politics of animal experimentation: From Victorian Britain to 'Stop Vivisection'. *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 64, 75-87. [HTML](#)**

This paper identifies a common political struggle behind debates on the validity and permissibility of [animal experimentation](#), through an analysis of two recent European case studies: the Italian implementation of the European Directive 2010/63/EC regulating the use of animals in science, and the recent European Citizens' Initiative (ECI) 'Stop Vivisection'. Drawing from a historical parallel with Victorian antivivisectionism, we highlight important threads in our case studies that mark the often neglected specificities of debates

on animal experimentation. From the representation of the sadistic scientist in the XIX century, to his/her claimed capture by vested interests and evasion of public scrutiny in the contemporary cases, we show that animals are not simply the *focus* of the debate, but also a privileged *locus* at which much broader issues are being raised about science, its authority, accountability and potential misalignment with public interest. By highlighting this common socio-political conflict underlying public controversies around animal experimentation, our work [prompts](#) the exploration of modes of authority and argumentation that, in establishing the usefulness of animals in science, avoid reenacting the traditional divide between epistemic and political fora.

**Goodman, J., Chandna, A., & Roe, K. (2015). Trends in animal use at US research facilities. *Journal of Medical Ethics*, 41(7), 567-569. [PDF](#)**

Minimising the use of animals in experiments is universally recognised by scientists, governments and advocates as an ethical cornerstone of research. Yet, despite growing public opposition to animal experimentation, mounting evidence that animal studies often do not translate to humans, and the development of new research technologies, a number of countries have reported increased animal use in recent years. In the USA—one of the world's largest users of animals in experiments—a lack of published data on the species most commonly used in laboratories (eg, mice, rats and fish) has prevented such assessments. The current study aimed to fill this gap by analysing the use of all vertebrate animals by the top institutional recipients of National Institutes of Health research funds over a 15-year period. These data show a statistically significant 72.7% increase in the use of animals at these US facilities during this time period—driven primarily by increases in the use of mice. Our results highlight a need for greater efforts to reduce animal use. We discuss technical, institutional, sociological and psychological explanations for this trend.

**Goodman, J. R., Borch, C. A., & Cherry, E. (2012). Mounting opposition to vivisection. *Contexts*, 11(2), 68-69. [PDF](#)**

Justin R. Goodman, Casey A. Borch, and Elizabeth Cherry discuss public attitudes toward animal testing and its growing opposition.

**Hansen, L. A., & Kosberg, K. A. (2019). Ethics, Efficacy, and Decision-making in Animal Research. In *Animal Experimentation: Working Towards a Paradigm Change* (pp. 273-288). Brill. [PDF](#)**

Animal experimentation has been one of the most controversial areas of animal use, mainly due to the intentional harms inflicted upon animals for the sake of hoped-for benefits in humans. Despite this rationale for continued animal experimentation, shortcomings of this practice have become increasingly more apparent and well-documented. However, these limitations are not yet widely known or appreciated, and there is a danger that they may simply be ignored. The 51 experts who have contributed to *Animal Experimentation: Working Towards a Paradigm Change* critically review current animal use in science, present new and innovative non-animal approaches to address urgent scientific questions, and offer a roadmap towards an animal-free world of science.

**Hazel, S. J., Signal, T. D., & Taylor, N. (2011). Can teaching veterinary and animal-science students about animal welfare affect their attitude toward animals and human-related empathy?. *Journal of Veterinary Medical Education*, 38(1), 74-83. <https://doi.org/10.3138/jvme.38.1.74>**

Attitudes toward animals are important in influencing how animals are treated. Few studies have investigated attitudes toward animals in veterinary or animal-science students, and no studies have compared attitudes to animals before and after a course teaching animal welfare and ethics. In this study, students enrolled in veterinary (first-year) or animal-science (first- and third-year) programs completed a questionnaire on attitudes toward different categories of animals before and after the course. Higher attitude scores suggest a person more concerned about how an animal is treated. Normally distributed data were compared using parametric statistics, and non-normally distributed data were compared using non-parametric tests, with significance  $p < .05$ . Attitudes toward pets (45.5–47.6) were higher than those toward pests (34.2–38.4) or profit animals (30.3–32.1). Attitude scores increased from before to after the course in the veterinary cohort on the Pest (36.9 vs. 38.4, respectively,  $n=27$ ,  $p < .05$ ) and Profit (30.3 vs. 32.1, respectively,  $n=28$ ,  $p < .05$ ) subscales, but not in the animal-science cohorts. Attitude scores in all categories were higher for women than for men. Currently having an animal was associated with higher pet scores (46.8 vs. 43.8,  $ns=120$  and 13, respectively,  $p < .05$ ), and having an animal as a child was associated with higher profit scores (31.0 vs. 26.6,  $ns=129$  and 8, respectively,  $p < .05$ ). Students electing to work with livestock had lower scores on the Pest and Profit subscales, and students wanting to work with wildlife had significantly higher scores on the Pest and Profit subscales. This study demonstrates attitudinal changes after an animal-welfare course, with significant increases in veterinary but not animal-science students.

**Holmberg, T., & Ideland, M. (2012). Secrets and lies: “selective openness” in the apparatus of animal experimentation. *Public Understanding of Science*, 21(3), 354-368. [PDF](#)**

Researchers and other (human) actors within the apparatus of animal experimentation find themselves in a tight corner. They rely on public acceptance to promote their legitimacy and to receive funding. At the same time, those working with animal experimentation take risks by going public, fearing that the public will misunderstand their work and animal rights activists may threaten them. The dilemma that emerges between openness and secrecy is fairly prevalent in scientific culture as a whole, but the apparatus of animal experimentation presents specific patterns of technologies of secrets. The aim of the paper is to describe and analyse the meanings of secrets and openness in contemporary animal experimentation. We suggest that these secrets – or “selective openness” – can be

viewed as grease in the apparatus of animal experimentation, as a unifying ingredient that permits maintenance of status quo in human/animal relations and preserves existing institutional public/science relations.

**Ipsos, M. O. R. I. (2012). Survey for the Department for Business, Innovation and Skills (BIS): Views on the Use of Animals in Scientific Research. [PDF](#)**

This report presents the findings of a 2012 survey on awareness of, and public attitudes towards, the use of animals in scientific research. The study also looks at awareness of possible alternatives to the use of animals in scientific research. This is the twelfth wave of research which Ipsos MORI (and previously MORI) has conducted. In previous years the work has been sponsored by the Medical Research Council (in 1999), New Scientist magazine (in 1999), the Coalition for Medical Progress (in 2002 and 2005), the Department of Trade and Industry (in 2006), BERR (in 2007) and BIS (since 2008). In 2012, the study was sponsored by the Department for Business, Innovation and Skills (BIS).

**Joffe, A. R., Bara, M., Anton, N., & Nobis, N. (2016). The ethics of animal research: a survey of the public and scientists in North America. *BMC medical ethics*, 17(1), 17. [PDF](#)**

**Background:** To determine whether the public and scientists consider common arguments (and counterarguments) in support (or not) of animal research (AR) convincing. **Methods:** After validation, the survey was sent to samples of public (Sampling Survey International (SSI; Canadian), Amazon Mechanical Turk (AMT; US), a Canadian city festival and children's hospital), medical students (two second-year classes), and scientists (corresponding authors, and academic pediatricians). We presented questions about common arguments (with their counterarguments) to justify the moral permissibility (or not) of AR. Responses were compared using Chi-square with Bonferonni correction. **Results:** There were 1220 public [SSI,  $n = 586$ ; AMT,  $n = 439$ ; Festival,  $n = 195$ ; Hospital  $n = 107$ ], 194/331 (59%) medical student, and 19/319 (6%) scientist [too few to report] responses. Most public respondents were <45 years (65%), had some College/University education (83%), and had never done AR (92%). Most public and medical student respondents considered 'benefits arguments' sufficient to justify AR; however, most acknowledged that counterarguments suggesting alternative research methods may be available, or that it is unclear why the same 'benefits arguments' do not apply to using humans in research, significantly weakened 'benefits arguments'. Almost all were not convinced of the moral permissibility of AR by 'characteristics of non-human-animals arguments', including that non-human-animals are not sentient, or are property. Most were not convinced of the moral permissibility of AR by 'human exceptionalism' arguments, including that humans have more advanced mental abilities, are of a special 'kind', can enter social contracts, or face a 'lifeboat situation'. Counterarguments explained much of this, including that not all humans have these more advanced abilities ['argument from species overlap'], and that the notion of 'kind' is arbitrary [e.g., why are we not of the 'kind' 'sentient-animal' or 'subject-of-a-life'?). Medical students were more supportive (80%) of AR at the end of the survey ( $p < 0.05$ ). **Conclusions:** Responses suggest that support for AR may not be based on cogent philosophical rationales, and more open debate is warranted.

**Khoo, S. (2018). Justifiability and Animal Research in Health: Can Democratisation Help Resolve Difficulties?. *Animals*, 8(2), 28. [PDF](#)**

Current animal research ethics frameworks emphasise consequentialist ethics through cost-benefit or harm-benefit analysis. However, these ethical frameworks along with institutional animal ethics approval processes cannot satisfactorily decide when a given potential benefit is outweighed by costs to animals. The consequentialist calculus should, theoretically, provide for situations where research into a disease or disorder is no longer ethical, but this is difficult to determine objectively. Public support for animal research is also falling as demand for healthcare is rising. Democratisation of animal research could help resolve these tensions through facilitating ethical health consumerism or giving the public greater input into deciding the diseases and disorders where animal research is justified. Labelling drugs to disclose animal use and providing a plain-language summary of the role of animals may help promote public understanding and would respect the ethical beliefs of objectors to animal research. National animal ethics committees could weigh the competing ethical, scientific, and public interests to provide a transparent mandate for animal research to occur when it is justifiable and acceptable. Democratic processes can impose ethical limits and provide mandates for acceptable research while facilitating a regulatory and scientific transition towards medical advances that require fewer animals.

**Knight, A. (2014). Conscientious objection to harmful animal use within veterinary and other biomedical education. *Animals*, 4(1), 16-34. [PDF](#)**

Laboratory classes in which animals are seriously harmed or killed, or which use cadavers or body parts from ethically debatable sources, are controversial within veterinary and other biomedical curricula. Along with the development of more humane teaching methods, this has increasingly led to objections to participation in harmful animal use. Such cases raise a host of issues of importance to universities, including those pertaining to curricular design and course accreditation, and compliance with applicable animal welfare and antidiscrimination legislation. Accordingly, after detailed investigation, some universities have implemented formal policies to guide faculty responses to such cases, and to ensure that decisions are consistent and defensible from legal and other policy perspectives. However, many other institutions have not yet done so, instead dealing with such cases on an ad hoc basis as they arise. Among other undesirable outcomes this can lead to insufficient student and faculty preparation, suboptimal and inconsistent responses, and greater

likelihood of legal challenge. Accordingly, this paper provides pertinent information about the evolution of conscientious objection policies within Australian veterinary schools, and about the jurisprudential bases for conscientious objection within Australia and the USA. It concludes with recommendations for the development and implementation of policy within this arena.

**Konstantin, B., & Bruno, P. (2016). Acceptance of animal research in our science community. *F1000Research*, 5. <https://doi.org/10.12688/F1000RESEARCH.8169.1>**

Animal research is debated highly controversial, as evident by the “Stop Vivi-section” initiative in 2015. Despite widespread protest to the initiative by researchers, no data is available on the European medical research community’s opinion towards animal research. In this single-center study, we investigated this question in a survey of students and staff members at the Medical University of Vienna. A total of 906 participants responded to the survey, of which 82.8% rated the relevance of animal research high and 62% would not accept a treatment without prior animals testing. Overall, animal research was considered important, but its communication to the public considered requiring improvement.

**Lairmore, M. D., & Ilkiw, J. (2015). Animals used in research and education, 1966-2016: Evolving attitudes, policies, and relationships. *Journal of Veterinary Medical Education*, 42(5), 425-440. <https://doi.org/10.3138/jvme.0615-087R>**

Since the inception of the Association of American Veterinary Medical Colleges (AAVMC), the use of animals in research and education has been a central element of the programs of member institutions. As veterinary education and research programs have evolved over the past 50 years, so too have societal views and regulatory policies. AAVMC member institutions have continually responded to these events by exchanging best practices in training their students in the framework of comparative medicine and the needs of society. Animals provide students and faculty with the tools to learn the fundamental knowledge and skills of veterinary medicine and scientific discovery. The study of animal models has contributed extensively to medicine, veterinary medicine, and basic sciences as these disciplines seek to understand life processes. Changing societal views over the past 50 years have provided active examination and continued refinement of the use of animals in veterinary medical education and research. The future use of animals to educate and train veterinarians will likely continue to evolve as technological advances are applied to experimental design and educational systems. Natural animal models of both human and animal health will undoubtedly continue to serve a significant role in the education of veterinarians and in the development of new treatments of animal and human disease. As it looks to the future, the AAVMC as an organization will need to continue to support and promote best practices in the humane care and appropriate use of animals in both education and research.

**Lyons, D. (2013). The politics of animal experimentation. Basingstoke : Palgrave Macmillan. ISBN: 9780230355118.**

The reality of animal experimentation and its regulation in Britain have been hidden behind a curtain of secrecy since its emergence as a political controversy in the 1870s. Public debate and political science alike have been severely hampered by a profound lack of reliable information about the practice. In this remarkable study, Dan Lyons advances and applies policy network analysis to investigate the evolution of British animal research policy-making.

**Lyons, D. (2011). Protecting animals versus the pursuit of knowledge: the evolution of the British animal research policy process. *Society & Animals*, 19(4), 356-367. [PDF](#)**

Animal research in the United Kingdom is regulated by the Animals (Scientific Procedures) Act 1986, which requires a government minister to weigh the expected suffering of animals against the expected benefits of a proposed animal research project—the “cost-benefit assessment”—before licensing the project. Research into the implementation of this legislation has been severely constrained by statutory confidentiality. This paper overcomes this hindrance by describing a critical case study based on unprecedented primary data: pig-to-primate organ transplantation conducted between 1995 and 2000. It reveals that researchers and regulators significantly underestimated the adverse effects suffered by the animals involved, while overestimating the scientific and medical benefits likely to accrue. Applying dynamic policy network analysis to this case in the context of the evolution of animal research policy indicates that an elitist, policy community type network has persisted since shortly after the network’s formation in 1876. Animal research interests have repeatedly withstood pressure for change from animal protection groups because of their greater resources, structural advantages, and a culture of secrecy that facilitates an implementation gap in animal research regulation.

**Machado, G. F., Melo, G. D., Perri, S. H., Fernandes, F. V., Moraes, O. C., Souza, M. S., ... & Nunes, C. M. (2017). Perceptions of animal experimentation: a longitudinal survey with veterinary students in Araçatuba, São Paulo, Brazil. *Journal of Biological Education*, 51(4), 391-398. <https://doi.org/10.1080/00219266.2016.1257501>**

Animal experimentation is a controversial topic, especially among the general public and the scientific community. Thirty-eight undergraduate students attending the College of Veterinary Medicine – São Paulo State University in the municipality of Araçatuba, São Paulo, Brazil, were followed up between 2008 and 2011 and were asked to complete an annual questionnaire focused on different aspects of animal experimentation, including the animal species involved, the objectives of the research, ethics, animal welfare and euthanasia. Most students agreed that animal testing is not morally incorrect, and the dynamics of students’ attitudes were notable:

undergraduates tended to change their opinion over time, with junior students opposing animal experimentation more than seniors do, indicating that the more scientific knowledge the students acquire, the more favourable to animal experimentation they become. Nevertheless, they agreed that research must consider the basic principles of animal welfare.

**Masterton, M., Renberg, T., & Källemark Sporrang, S. (2014). Patients' attitudes towards animal testing: 'To conduct research on animals is, I suppose, a necessary evil'. *Biosocieties*, 9(1), 24-41. <https://doi.org/10.1057/biosoc.2013.39>**

A strong argument for the practice of animal testing in medical research is the potential benefit to patients in getting improved pain relief, minimising morbidity and mortality. However, patients' opinions on the ethics of animal testing are seldom sought, despite their role as principal stakeholders. This study compared the attitudes of patients and researchers on animal testing. Focus-group interviews were held with patients suffering from chronic inflammatory diseases, resulting in a questionnaire that was distributed January-May 2011. The questionnaire was posted to patient members of the Swedish Rheumatism Association (n=1195) and to all scientific experts serving on Ethical Review Boards in Sweden (n=364), with response rates of 65 per cent and 60 per cent, respectively. Results show that patients hold a positive stance towards animal testing, but with many caveats, and the level of support is comparable to those held by the general public found in national surveys. A clear majority of researchers were positive towards animal testing, and large statistical differences between patients and researchers were found regarding their attitudes towards testing animals commonly held as pets (P<0.001). Women were more critical than men regarding which species are used for what purposes (P<0.001). Researchers need to be aware that their more positive attitude towards animal testing is not shared to an equal degree with patients, who are the intended end-users and beneficiaries of medical research. The moral basis for using animals in research needs to be further discussed by all stakeholders.

**Metzger, M. (2017). Exposure to Animal Welfare Regulations Does Not Influence Attitudes Toward Animal Research Procedures. *Journal of Articles in Support of the Null Hypothesis*, 13(2). [PDF](#)**

This study explored whether exposure to facts about the Animal Welfare Act and Animal Welfare Regulations (AWA/AWR) would impact participant's perceptions of a fictitious research scenario using either rats or dogs as subjects. Participants read AWA/AWR facts or generic research facts and then read a research scenario. After, they completed a questionnaire that measured the value of the research proposal and their concern for animal subjects. Participants responded significantly more favorably to the research scenario when rats were used, but exposure to AWA/AWR regulations did not have an impact on their favorability ratings. This finding is contrary to Metzger (2015) who reported knowledge of regulations protecting the welfare of animals in research settings favorably impacted perception toward animal research.

**Metzger, M. M. (2015). Knowledge of the Animal Welfare Act and animal welfare regulations influences attitudes toward animal research. *Journal of the American Association for Laboratory Animal Science: JAALAS*, 54(1), 70. [PDF](#)**

Recent public-opinion polls indicate that Americans have shown a decline in support for animal experimentation, and several reports suggest a relationship between people's knowledge of animal welfare regulations and their attitudes toward animal research. Therefore, this study was designed to assess respondent's knowledge of several provisions in the Animal Welfare Act (AWA) and Animal Welfare Regulations (AWR), and determine whether exposure to elements of this legislation would influence an individual's attitudes toward the use of animals in research. A survey was used to assess knowledge of animal research regulations and attitudes toward animal research from a sample of individuals recruited through Amazon's Mechanical Turk crowdsourcing marketplace. Results from study 1 confirmed the hypothesis that respondents had little knowledge of various federal regulations that govern animal research activities. Data from study 2 revealed that exposure to elements of the AWA and AWR influenced participants' attitudes toward the use of animals in research. These results suggest that providing information to the general public about the AWA and AWR that protect laboratory animals from abuse and neglect may help alleviate concerns about using animals in research settings.

**Metzger, M. M. (2014). Attitudes toward animal research: Revisiting. *Journal of Undergraduate Neuroscience Education*, 12(2), A154. [HTML](#)**

Gallup and Beckstead's (1988) commentary in the American Psychologist reported an assessment of college student's attitudes toward animal research. Among many findings, one main conclusion reached by the authors was that the participants in their study were generally concerned about the welfare of animals used in research, but that they also appreciated and valued the need for animal experimentation. Given the declining support for animal research from the general population over the past few decades, the present study administered the same questionnaire to a contemporary sample of university students to determine whether any patterns would emerge in a current sample's responses to these items. While the results suggest that respondents still demonstrate significant concern for animal welfare, importantly, the present sample of participants showed significantly less agreement with items that stressed the importance and value of conducting animal research. Educating college students about the importance of animal research and its valuable contributions to science as an enduring component of instructional practice in neuroscience and other courses may be an important step toward reversing these trends.

**Mills, K. E., Han, Z., Robbins, J., & Weary, D. M. (2018). Institutional transparency improves public perception of lab animal technicians and support for animal research. *PLoS one*, 13(2), e0193262. [HTML](#)**

The use of animals in research is controversial and often takes place under a veil of secrecy. Lab animal technicians responsible for the care of animals at research institutions are sometimes described as performing 'dirty work' (i.e. professions that are viewed as morally tainted), and may be stigmatized by negative perceptions of their job. This study assessed if transparency affects public perceptions of lab animal technicians and support for animal research. Participants (n = 550) were randomly assigned to one of six scenarios (using a 3x2 design) that described identical research varying only the transparency of the facility (low, high) and the species used (mice, dogs, cows). Participants provided Likert-type and open-ended responses to questions about the personal characteristics (warmth, competence) of a hypothetical lab technician 'Cathy' and their support for the described research. Quantitative analysis showed participants in the low-transparency condition perceived Cathy to be less warm and were less supportive of the research regardless of animal species. Qualitative responses varied greatly, with some participants expressing support for both Cathy and the research. These results suggest that increasing transparency in lab animal institutions could result in a more positive perception of lab animal researchers and the work that they do.

**Mohamed Azahar, F. A., Mohd Fakri, N. M. R., & Mat Pa, M. N. (2014). Associations between gender, year of study and empathy level with attitudes towards animal welfare among undergraduate Doctor of Veterinary Medicine students in Universiti Putra Malaysia. *Education in Medicine Journal*, 6(4). [PDF](#)**

Attitudes towards animal welfare are important in influencing how animals are treated. Studies of attitudes towards animal welfare in veterinary students are scarce. It is hoped that the findings will enhance a diverse research in the future in order to explore a variety of factors in relation to animal welfare since such study is currently limited. Objective: The study is to determine the associations of gender, year of study and empathy level of undergraduate DVM students in UPM into their attitude towards animal welfare. Method: Questionnaires were given to 440 Doctor of Veterinary Medicine undergraduate students in UPM to study the associations between gender, year of study and empathy level with attitudes towards animal welfare. Data were collected from respondents through two sets of self-guided questionnaires. Interpersonal Reactivity Index (IRI) which assessed empathy level where only two sub-scales from the IRI were used. Empathic Concern (EC) and Perspective Taking (PT). Animal Attitude Scales (AAS) were used to assess attitudes towards animal welfare. Data collected were analysed using Statistical Package for Social Science (SPSS) version 20. Result: 367 (83.4%) out of 440 students participated in this study. Anti-animal welfare attitude (74.9%) was the highest compared to the pro-animal welfare attitude (25.1%). Analysis showed a significant difference ( $p < 0.005$ ) between year of study and attitudes towards animal welfare ( $p = 0.001$ ), however, there were no significant difference ( $p > 0.005$ ) between gender and attitudes towards animal welfare ( $p = 0.057$ ) as well as between empathy level and attitudes towards animal welfare for empathic concern sub-scale ( $p = 0.194$ ) and perspective taking sub-scale ( $p = 0.320$ ). Conclusion: Majority of students were categorized as anti-animal welfare and the attitudes were significantly different among years of study. Female and male students have nonsignificant differences in their attitudes towards animal welfare. Students with good and poor empathy level also have no significant difference in their attitudes towards animal welfare.

**Nerlekar, S., Karia, S., Harshe, D., Warkari, R., & Desousa, A. (2018). Attitude and Knowledge of Undergraduate Medical Students towards the Use of Animals in Medical Research: An Exploratory Study. *Journal of Clinical & Diagnostic Research*, 12(7). [PDF](#)**

Introduction: Medical undergraduate courses and medical students have less emphasis on animal research and the various ethical issues surrounding animal research. Animal research plays a vital role in basic medical research and yet undergraduate students know very little about the same. Aim: To assess the attitude and knowledge of medical undergraduate students towards animal research in general. Materials and Methods: A total of 152 undergraduate medical students in the final year of their medical studies from two medical colleges (one from Mumbai and one from Kolhapur) were administered a semi-structured questionnaire on attitude and knowledge towards animal research. The questionnaire was validated by three senior researchers and was specially designed for the study. The data were collected and analysed using frequency and percentages. Results: Only 66(43.42%) students had visited an animal house/animal laboratory in their medical training and 114 (75%) of them had actual experience of handling animals mainly in the form of dissection studies on rats, frogs and guinea pigs. Only 21(13.8%) were aware of ethical guidelines regarding animal research and 23 (15.1%) strongly agreed that ethical aspects of animal research needed stringent regulation in India. Conclusion: Animal research awareness is scarce in undergraduate medical students and there is a need to incorporate animal research awareness from a medical science point of view in their curriculum to help them develop an understanding of animal research and its ethical dimensions.

**Newton, D. E. (2013). *The animal experimentation debate: A reference handbook*. Santa Barbara, California : ABC-CLIO, LLC. ISBN: 9781610693172.**

The debate over the use of nonhuman animals in experimental research has gone on for centuries, and it continues as vigorously today as it ever has. In fact, in the last decade, the controversy has intensified, making animal testing a topic at the highest level of debate of any socioscientific issue in the United States. This book presents all sides of the issue so that readers can come to their own conclusions as to the morality and validity of animal experimentation, and provides biographies of individuals and descriptions of

organizations that have been involved in the debate over the centuries. Additionally, it documents the historical shift in thinking that made animal experimentation commonplace between the time of the ancient Greeks and the 19th century, to the mindset of some who argue for an end to the practice and alternative ways of conducting medical experimentation to benefit human health.

**Nobis, N., Bara, M., Joffe, A. R., & Anton, N. (2014). The Ethics of Animal Research: A Survey of Pediatric Health Care Workers. [PDF](#)**

Introduction: Pediatric health care workers (HCW) often perform, promote, and advocate use of public funds for animal research (AR). We aim to determine whether HCW consider common arguments (and counterarguments) in support (or not) of AR convincing. Design: After development and validation, an e-mail survey was sent to all pediatricians and pediatric intensive care unit nurses and respiratory therapists (RTs) affiliated with a Canadian University. We presented questions about demographics, support for AR, and common arguments (with their counterarguments) to justify the moral permissibility (or not) of AR. Responses are reported using standard tabulations. Responses of pediatricians and nurses/RTs were compared using Chi-square, with  $P < .05$  considered significant. Results: Response rate was 53/115(46%) (pediatricians), and 73/120(61%) (nurses/RTs). Pediatricians and nurses/RTs are supportive of AR. Most considered 'benefits arguments' sufficient to justify AR; however, most acknowledged that counterarguments suggesting alternative research methods may be available, or that it is unclear why the same 'benefits arguments' do not apply to using humans in research, significantly weakened 'benefits arguments'. Almost all were not convinced of the moral permissibility of AR by 'characteristics of non-human-animals arguments', including that non-human-animals may not be sentient, or are simply property. Most were not convinced of the moral permissibility of AR by 'human exceptionalism' arguments, including that humans have more advanced mental abilities, are of a special 'kind', can enter into social contracts, or face a 'lifeboat situation'. Counterarguments explained much of this, including that not all humans have these more advanced abilities [the argument from species overlap], and that the notion of 'kind' is arbitrary [e.g., why are we not of the kind 'sentient animal' or 'subject-of-a-life']. Pediatrician and nurse/RT responses were similar. Conclusions: Most respondents were not convinced of the moral permissibility of AR when given common arguments and counterarguments from the literature. HCW should seriously consider arguments on both sides of the AR debate.

**Nobis, N. (2012). Rational engagement, emotional response, and the prospects for moral progress in animal use "Debates". [PDF](#)**

This chapter is designed to help people rationally engage moral issues regarding the treatment of animals, specifically in experimentation, research, product testing, and education. Little "new" philosophy is offered here, strictly speaking. New arguments are unnecessary to help make progress in how people think about these issues. What is needed are improved abilities to engage the arguments already on the table, for example, stronger skills at identifying and evaluating the existing reasons given for and against conclusions on the morality of various uses of animals.

**Nøhr, R., Lund, T. B., & Lassen, J. (2016). The Danish 3R survey: knowledge, attitudes and experiences with the 3Rs among researchers involved in animal experiments in Denmark. Department of Food and Resource Economics, University of Copenhagen. IFRO Report, No.249. [PDF](#)**

No abstract available.

**Ormandy, E. H., & Griffin, G. (2016). Attitudes toward the use of animals in chronic versus acute pain research: results of a web-based forum. *Alternatives to Laboratory Animals*, 44(4), 323-335. [PDF](#)**

When asked about the use of animals in biomedical research, people often state that the research is only acceptable if pain and distress are minimised. However, pain is caused when the aim is to study pain itself, resulting in unalleviated pain for many of the animals involved. Consequently, the use of animals in pain research is often considered contentious. To date, no research has explored people's views toward different types of animal-based pain research (e.g. chronic or acute pain). This study used a web-based survey to explore people's willingness to support the use of mice in chronic *versus* acute pain research. The majority of the participants opposed the use of mice for either chronic (68.3%) or acute (63.1%) pain research. There was no difference in the levels of support or opposition for chronic *versus* acute pain research. Unsupportive participants justified their opposition by focusing on the perceived lack of scientific merit, or the existence of non-animal alternatives. Supporters emphasised the potential benefits that could arise, with some stating that the benefits outweigh the costs. The majority of the participants were opposed to pain research involving mice, regardless of the nature and duration of the pain inflicted, or the perceived benefit of the research. A better understanding of public views toward animal use in pain research may provide a stronger foundation for the development of policy governing the use of animals in research where animals are likely to experience unalleviated pain.

**Ormandy, E. H., & Schuppli, C. A. (2014). Public attitudes toward animal research: a review. *Animals*, 4(3), 391-408. [PDF](#)**

The exploration of public attitudes toward animal research is important given recent developments in animal research (e.g., increasing creation and use of genetically modified animals, and plans for progress in areas such as personalized medicine), and the shifting relationship between science and society (*i.e.*, a move toward the democratization of science). As such, public engagement on issues related to animal research, including exploration of public attitudes, provides a means of achieving socially acceptable scientific

practice and oversight through an understanding of societal values and concerns. Numerous studies have been conducted to explore public attitudes toward animal use, and more specifically the use of animals in research. This paper reviews relevant literature using three categories of influential factors: personal and cultural characteristics, animal characteristics, and research characteristics. A critique is given of survey style methods used to collect data on public attitudes, and recommendations are given on how best to address current gaps in public attitudes literature.

**Ormandy, E. H., Schuppli, C. A., & Weary, D. M. (2013). Public attitudes toward the use of animals in research: Effects of invasiveness, genetic modification and regulation. *Anthrozoös*, 26(2), 165-184.**  
<https://doi.org/10.2752/175303713X13636846944240>

This study describes an online public engagement experiment aimed at investigating how acceptance of animal-based research is affected by: (a) the presence of regulations that govern the use of nonhuman animals in laboratories, (b) the invasiveness of procedures, and (c) the use of genetically modified (GM) animals. To meet these aims, participants were asked if they were willing to accept the use of pigs in different scenarios involving agricultural research. Two-thirds of the 681 participants were female and the majority (58%) were young (19–29 years old) with college or university level education (62%). Participants came from 26 different countries, with the United States, Canada, and the United Kingdom being the top three countries represented. Participants who self-identified as being vegetarians, familiar with animal welfare, animal advocates, environmental advocates, and familiar with animal research were significantly more likely to be opposed to animal-based research. Older participants were significantly less likely to oppose animal-based research. Support significantly decreased when animal-based research involved an invasive procedure or GM animals. Support for invasive research significantly increased when regulation was in place, but regulation had less effect on acceptance of GM animal use. Comments provided by participants illustrated different decision-making strategies regarding different types of animal-based research. Given the increasing use of GM animals in research, more effort is required to understand people's concerns regarding this type of animal use and to determine how these concerns should be reflected in policy.

**Ormandy, E. H., Schuppli, C. A., & Weary, D. M. (2012). Factors affecting people's acceptance of the use of zebrafish and mice in research. *Alternatives to Laboratory Animals*, 40(6), 321-333.** [PDF](#)

The species of laboratory animal used is known to influence people's willingness to support animal-based research. An online experiment was used to test people's willingness to accept the use of zebrafish or mice, two of the most commonly used species, in research involving either induced mutation (specifically, ethyl-*N*-nitrosourea [ENU] mutagenesis) or genetic modification, with and without regulatory oversight. Participants who were willing to support research on zebrafish (31.9%) were also willing to support the same research on mice. The participants expressed low levels of support for research involving ENU mutagenesis of zebrafish in both unregulated (30.7%) and regulated (38.5%) research programmes. A reason for the rejection of ENU mutagenesis was the perception that the procedure is painful. Some participants expressed a preference for the use of genetically-modified (GM) animal models over ENU mutagenesis, based on the belief that the former involves less pain and improves both the accuracy and efficiency of the animal models. Better informing the public about scientific practice, and scientists about public attitudes, may help reduce the disconnect between scientific practice and societal values.

**Pervin, S., Ranchhod, A., & Wilman, M. (2014). Trends in cosmetics purchase: Ethical perceptions of consumers in different cultures. A cross country comparative study between South Asian and Western consumers. *Journal of Customer Behaviour*, 13(1), 57-72.** <https://doi.org/10.1362/147539214X14024779343758>

The focus of this paper is to investigate the differences between the decision-making processes that take place in a cross-cultural environment, with particular interest in exploring ethical concerns in cosmetics retailing. Research shows that the cultural differences between the East and West vary distinctly. This study has quantitatively tested the influence of ethical and animal welfare issues, assessing consumer buying behavior processes for cosmetics, in the context of Europe (UK) and Asia (Bangladesh). The results show interesting findings; it has become evident that ethical purchasing attitudes and concern for animal welfare seem to be predominant in both countries.

**Pervin, S., & Ranchhod, A. (2014). Ethical concerns in cosmetics retailing: a comparative study of consumer attitudes towards cosmetics purchase between Europe and Asia with particular reference to Bangladesh and the UK. *World Review of Entrepreneurship, Management and Sustainable Development* 5, 10(2-3), 230-246.**  
<https://doi.org/10.1504/WREMSD.2014.060385>

The purpose of this paper is to explore the ethical concerns in cosmetics retailing and its implications on comparative consumers' purchase decisions of cosmetics in the UK and Bangladesh. Consumer response to ethical and green issues in the recent years appears to vary considerably between developed and developing economies. In particular, this paper also intends to identify how and to what extent, in a developing country like Bangladesh, consumers' purchase decisions are influenced by the concept of ethical, green and animal welfare issues. Results show that ethical purchasing attitudes have some similarities between the UK and Bangladesh. However, there could be differing reasons for the adoption of ethical stances. Young consumers, however, have similar attitudes in both countries.

**Popa, V. I., Lascar, I., Valcu, M., Sebe, I. T., Caraban, B., & Margina, A. C. (2015). Bioethics in animal experimentation. *ARS Medica Tomitana*, 21(4), 169-177. [PDF](#)**

Animal experiments are used on a large scale worldwide in order to develop or to refine new medicines, medicinal products or surgical procedures. It is morally wrong to cause animals to suffer, this is why animal experimentation causes serious moral problems. We must realize that we have moral and legal obligations when dealing with animals in our care, and this should become our high priority before any experiment. We have to take responsibility for the life of the animals and we have to act honorably regarding this issue because we have been given a trust by society in general which is not to be taken lightly. There is an ongoing societal debate about ethical issues of animal use in science. This paper is addressed to current and future researchers and is an appeal for them to (re)consider their personal views concerning the issue under scrutiny and their responsibility in ensuring that results would make the sacrifice worthwhile.

**Schoustra, S., Bressers, S., Van Den Elzen, H., Gräwe, C., Van Den Oetelaar, D., & Postma, P. (2018). Policy driven changes in animal research practices: mapping researchers' attitudes towards animal-free innovations using the Netherlands as an example. *BioRxiv*, 337063. [PDF](#)**

Reducing the number of animals used in experiments has become a priority for the governments of many countries. For these reductions to occur, animal-free alternatives must be made more available and, crucially, must be embraced by researchers. We conducted an international online survey for academics in the field of animal science (N=367) to explore researchers' attitudes towards the implementation of animal-free innovations. Through this survey we address three key questions. The first question is whether scientists who use animals in their research consider governmental goals for animal-free innovations achievable and whether they would support such goals. Secondly, responders were asked to rank the importance of ten roadblocks that could hamper the implementation of animal-free innovations. Finally, responders were asked whether they would migrate (either themselves or their research) if increased animal research regulations in their country of residence restricted their research. While nearly half (40%) of the responders support governmental goals, the majority (71%) of researchers did not consider such goals achievable in their field within the near future. In terms of roadblocks for implementation of animal-free methods, ~80% of the responders considered 'reliability' as important, making it the most highly ranked roadblock. However, all other roadblocks were reported by the majority of responders as somewhat important, suggesting that they must also be considered when addressing animal-free innovations. Importantly, a majority reported that they would consider migration to another country in response to restrictive animal research policy. Thus, governments must consider the risk of researchers migrating to other institutes, states or countries, leading to a 'brain-drain' if policies are too strict or suitable animal-free alternatives are not available. Our findings suggest that development and implementation of animal-free innovations are hampered by multiple factors. We outline three pillars concerning education, governmental influence and data sharing, the implementation of which may help to overcome these roadblocks to animal-free innovations.

**Schuppli, C. A., Molento, C. F., & Weary, D. M. (2015). Understanding attitudes towards the use of animals in research using an online public engagement tool. *Public Understanding of Science*, 24(3), 358-374. <https://doi.org/10.1177/0963662513490466>**

Using an online public engagement experiment, we probed the views of 617 participants on the use of pigs as research animals (to reduce agricultural pollution or to improve organ transplant success in humans) with and without genetic modification and using different numbers of pigs. In both scenarios and across demographics, level of opposition increased when the research required the use of GM corn or GM pigs. Animal numbers had little effect. A total of 1037 comments were analyzed to understand decisions. Participants were most concerned about the impact of the research on animal welfare. Genetic modification was viewed as an intervention in nature and there was worry about unpredictable consequences. Both opponents and supporters sought assurances that concerns were addressed. Governing bodies for animal research should make efforts to document and mitigate consequences of GM and other procedures, and increase efforts to maintain a dialogue with the public around acceptability of these procedures.

**Svärd, P. A. (2017). Normative Dilemmas in Sweden's Ethical Review Policy for Animal Experiments. *Global Journal of Animal Law*, 5(2), 102-134. [PDF](#)**

Animal experimentation is a contentious ethical issue. In many countries, the debate over the morality of animal research has led to the institution of ethical review systems for animal experiments. This article discusses and problematizes the current regulations, policies, and recommendations governing the ethical review of animal experiments in Sweden. It is argued that the ongoing paradigm shift in society's view of animals prompts a serious re-evaluation of the values underpinning the routine use of sentient nonhumans animals in research. Following from this, two lines of argument are pursued in the article. First, I make the claim that the organizational and administrative exigencies of the current ethical committee system in Sweden is likely to work to the animals' disadvantage and undermine a fair assessment of their interests. Second, and more importantly, I reconstruct the utilitarian principles that the ethical review is supposed to be based on and argue that the reasons given for choosing utilitarian standards are undeveloped and reveal an unjustifiable speciesist bias. Moreover, I argue that even if we should accept these principles, the existing ethical review system would fail to meet the demands of a consistent utilitarian calculus, mainly due to its outdated understanding of how animal models work and what they allow us to predict.

**von Roten, F. C. (2013). Public perceptions of animal experimentation across Europe. *Public Understanding of Science*, 22(6), 691-703. [PDF](#)**

The goal of this article is to map out public perceptions of animal experimentation in 28 European countries. Postulating cross-cultural differences, this study mixes country-level variables (from the Eurostat database) and individual-level variables (from Eurobarometer Science and Technology 2010). It is shown that experimentation on animals such as mice is generally accepted in European countries, but perceptions are divided on dogs and monkeys. Between 2005 and 2010, we observe globally a change of approval on dogs and monkeys, with a significant decrease in nine countries. Multilevel analysis results show differences at country level (related to a post-industrialism model) and at individual level (related to gender, age, education, proximity and perceptions of science and the environment). These results may have consequences for public perceptions of science and we call for more cross-cultural research on press coverage of animal research and on the level of public engagement of scientists doing animal research.