Who cares about lab rodents?

Humanities and social sciences help advance "cultures of care" around laboratory animal science and welfare

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Rodents are widely seen as a commensal pest species and an unwelcome addition to human society. Consequently, caring about mice and rats—relative to more charismatic species, such as cats or dogs—is less commonly a focus of public concern. Yet, in discussions around rodents in research, questions of care are prominent. This prompts the question, who cares about rodents in research? To answer this, we draw on recent research from across the humanities and social sciences that seeks to better understand the social aspects of laboratory animal science and welfare. Care comes in and out of focus in complicated ways. We unpack some of these below, first introducing the background and relevance of work in the humanities and social sciences to laboratory animal research, followed by an exploration of how care operates in policy, in practice, and in relation to different publics.

There are many reasons why mice and rats figure prominently in the history and current organization of animal research. Their relatively small size and fast reproduction make rodents economical to keep, adaptable to changing technologies, and responsive to new research trajectories. Well supported by extensive supply networks that provide purpose-bred animals alongside largely standardized caging and rodent housing, rodents and their care practices have, in a sense, been built into the material infrastructures of animal facilities. As the use of rats and mice in laboratories expanded, so too did knowledge of their husbandry, care, and welfare. Care in research is shaped by diverse perspectives and a complex landscape encompassing ethical regulation, empirical evidence, animal charisma, and perceived public concerns. Care is increasingly recognized as a component of reproducible and translational research, linking animal care to care for future patients. Care often extends beyond experimental procedures to animal breeding and culling—to encompass animals bred but not used—and to research training, animal handling, and rehoming.

For these reasons and more, a "culture of care" is now a common expectation within animal research facilities, increasingly integrated within regulatory expectations. From 2017 to 2023, we led the Animal Research Nexus Programme, which took an interdisciplinary approach to examine changes to research regulation, cultures of care, professional expertise, and public engagement around animal research in the UK, culminating in a recently published open access volume (*1*). The book applies a range of historical and social methods to better understand the current use of animals in research, including questions around rodent care. Our research, although largely focused on the UK, is nonetheless relevant to other national contexts, given the overlapping histories between countries, the way that policies and practices travel, and new international initiatives. There is now a wealth of literature and many organizations addressing the question of how to care for rodents in research, and an increasing number of social scientists are interested in the cultural contexts that shape rodent care.

CARE AND INTERDISCIPLINARY RESEARCH

The scope for the humanities and social sciences to inform different aspects of laboratory animal use and care is broad. Historical, geographical, and legal analyses can help chart the direction and implementation of regulation in different contexts as biomedical research becomes increasingly global. Sociological, anthropological, and philosophical research can help trace how the practices of animal care change and inform future directions. For example, for our work (*1*), we used historical and textual analysis to trace the origins of animal research and care, locating these within evolving and intersecting cultures of science and policy. We used interviews with a broad range of people involved in animal research to examine how they understood and carried out their roles and how they saw themselves working with others. We used participant observation to study how knowledge is applied in practice, and we generated new creative practices to facilitate dialogue around what people saw as emerging challenges, including the culture of care and patient and public engagement. All of these approaches can help in understanding how care for different species in the laboratory is linked to care about animals in various professional, public, and regulatory debates. All have specific things to say about the prominent and peculiar place of mice and rats in research facilities today.

This ability of humanities and social science approaches to contribute to animal research practice and policy has been long recognized but rarely harnessed to its full potential. First proposed in the UK more than 60 years ago, the principles of replacement, reduction, and refinement (the "3Rs") now provide an ethical framework for animal research worldwide (*2*). Their principal author, W. M. S. Russell, developed the 3Rs as part of a wider analysis of the connections between humane values, ethical practice, and scientific research. Russell drew heavily on the humanities and social sciences of his time, envisaging a new interdisciplinary field of humane experimental technique that would apply methods from the life sciences, social sciences, and humanities to simultaneously improve animal welfare and the reliability of animal-based scientific research. Russell's broad interdisciplinary argument, however, obscured the core message. His work had limited recognition until the 1980s, when the 3Rs, now shorn of their wider humane ethos and attention to the social components of scientific work, were reimagined as a pragmatic ethical framework compatible with good scientific technique (*3*).

In the meantime, scholars across the humanities and social sciences came independently to animal research as an object of study, from philosophy, history, geography, sociology, anthropology, and elsewhere. Three concerns drove this interest: (i) activism on behalf of animals, drawing on the utilitarian and rights-based philosophies of Peter Singer and Tom Regan and feminist care ethics; (ii) cultural and historical inquiry, exploring how certain species, such as rodents, entered the laboratory and why animal research became the focus of public concern; and (iii) science studies, tracing how objectivity was constructed and subjectivity was managed within animal-dependent science. All touched on questions of who cares about laboratory animals and who cares for laboratory animals, reemphasizing the personal and sociological factors that were underappreciated within the existing laboratory animal sciences.

There is once again increasing attention being paid to how the 3Rs might be furthered by dialogue across the life sciences, social sciences, and humanities, contributing to the development of a culture of care within animal research. This has developed slowly, using collaborative agenda-setting exercises and policy engagement to rebuild interdisciplinary knowledges around the use and care of laboratory animals (*4*). As a recent review of the 3Rs argues, "the humanities and social sciences are not the fifth wheel: they are as important as

natural science and biomedicine in the project of advancing implementation of the 3Rs and developing the 3Rs themselves" [(*5*), p. 9].

CARE IN REGULATION

The first place to look for an answer to who cares about rodents in research is regulation (*1*). Approached in its broadest sense, studying regulation and its implementation reveals the distribution of roles and responsibilities that shape animal care in practice alongside structural differences, such as the long-standing inclusion of rodents in British regulation as opposed to their exclusion in the 1966 Animal Welfare Act of the US (*6*).

The UK has a long history of regulation, first through the 1876 Cruelty to Animals Act and later though the Animals (Scientific Procedures) Act (ASPA) of 1986, which, in a revised form, delivers current governance with strong emphasis on the application of the 3Rs. UK legislation was shaped by a fragile consensus emerging from discussions among moderate scientists and activists, in the face of marked public polarization and increasingly vocal animal rights organizations (*1*). Although public and policy debate was dominated by the more charismatic species—cats, dogs, and nonhuman primates—rodents (mice and rats), the most used species, were nevertheless fully protected from 1876.

ASPA introduced enhanced care for animals, including rodents, not least by establishing the need for comprehensive veterinary assessment for all licensed animal facilities. Better understanding of rodent analgesia, behavior, and enrichment needs was developed in response to regulatory expectations that care should be grounded in scientific evidence. Examining these changes, humanities and social science research reveals how regulation is enacted through new forms of specialization, professionalization, and expertise and is grounded in new identities. These identities codify veterinary and animal welfare expertise in a way that strives to balance objective technical practice alongside the more subjective understanding of animals that is necessary for their care (*1*). In this way, the humanities and social sciences can contribute a better understanding of the tensions and synergies shaping social and material interactions within animal research, a crucial step in sustaining a culture of care.

Most countries with animal research legislation now include provisions for rodent care. Even where they may be excluded from legislation, other mechanisms ensure that rodent care is properly considered [e.g., Institutional Animal Care and Use Committees (IACUCs) in the US context]. Though varying in their makeup and approach, such committees are now common across national contexts, partly because of their incorporation in global standards of animal care, such as that of the Association for Assessment and Accreditation of Laboratory Animal Care International. In bringing together diverse perspectives and forms of expertise, they provide important oversight, supporting animal care, ethics, and the 3Rs at a local level. Humanities and social science research can contribute to better understanding and functioning of these committees by investigating their different approaches and clarifying their practices (*7*).

CARE IN PRACTICE

Humanities and social sciences research can also contribute to understanding what happens when animal care falls short. Exposés by animal rights activists have historically tended to target research using primates or companion species, seeking to trigger public concern to add to arguments about ending animal research. However, the 2013 exposé of poor animal care at Imperial College London was rather different. This focused on mice and rats. The outcome was to identify the various organizational issues related to leadership, training, and poor institutional

communication, especially between researchers and technicians who care for animals, which had severely hindered the practice of animal care (*8*). Rather than foregrounding arguments to end the use of rodents in research, this high-profile event led to an increasing focus on the need to actively promote a culture of care in animal research (*1*). Loosely defined as going above and beyond regulatory expectation and the 3Rs, a culture of care encompasses broader questions around how organizational ethos, research culture, and staff welfare shape the experience of both animals and people in animal research facilities.

Promoting a culture of care in practice responds to the recognition that what makes good animal care today is increasingly a question of institutional organization and logistics as opposed to the individual actions of researchers and animal technologists. This has led to growing interest across scientific facilities and research funders around how to promote laboratory animal care by improving material practices—e.g., through the addition of environmental enrichment to rodent cages. Such trends mark a return to questions around how good animal welfare and good science go hand in hand and how stressed animals make for poor experimental models as well as related debates around research reproducibility, replicability, and validity (*9*).

However, promoting a culture of care can be in tension with other institutional pressures, such as cost or competitiveness. Generating evidence for new interventions within a research funding landscape that prioritizes biomedical progress over animal welfare research and creates pressurized working cultures, especially for early career researchers, is challenging. Financial costs and the staff time required to implement refinements—such as the use of cages for rats where they can rear up, standing on their hind legs—can hinder implementation of improved animal care. This can be exacerbated by research leaders demanding rigorous evidence of improved animal welfare to justify changing their practices while relying on anecdotes to preserve the status quo (*10*). In short, the general rule is that scientific need is often prioritized over animal welfare, and improvements to animal care practice are only adopted when there is unequivocal evidence that change makes for better animal models (*11*).

Such reasoning curtails more than the improvement of animal welfare. For example, those who look after mice and rats in the laboratory on a daily basis value opportunities to improve the welfare of the animals that they care for because these improvements act as an important balance to the emotional labor of participating in animal research (*1*). To value the welfare of animals, a culture of care must equally work to value the staff who care for them. Humanities and social science methods can contribute practical tools to promote reflection on how to care for those who care for laboratory rodents, such as the use of storytelling to enable people that work in animal research to reflect on their institution's culture of care (*12*).

CARING PUBLICS

Recent years have witnessed moves toward greater public engagement with science in general and more openness around animal research in particular, often fostered by policy-makers and research organizations seeking to bolster public support for research. In the UK, national opinion polls suggest that public concern for laboratory animal care varies by species. For example, in a 2018 poll in the UK, 47% of participants believed the use of rats acceptable for medical experiments, falling to 14% for cats and dogs (*13*). However, public opinion polls are constrained to a limited vision of what publics can and do care about, particularly when used to track change over time. Changes to questions and uncertainties in interpretation create disparate datasets, and polls construct and circulate a particular and often limited impression

of animal research to varied publics. Indeed, social science analysis suggests that polls frame public feelings (or societal sentience) (*14*) in particular and narrow ways and that this helps explain why charismatic species often receive privileged ethical protection relative to less charismatic species, such as rodents (*1*).

Humanities and social sciences methods can inform more-nuanced and expansive public engagement through methods such as public writing, creative practices, and patient engagement. Roe and colleagues, for example, developed the Mouse Exchange Toolkit for use with trainee researchers and publics at science fairs, revealing the complexity and fluidity of public understanding (*1*). The invitation to craft a laboratory mouse out of felt and discuss where laboratory animals come from provokes rich conversations about what it means to create, care for, and use a laboratory mouse. Such methods use the idea of "taking materials to participants and seeing what they build and what questions they ask, rather than offering them an existing vision of animal research about which to ask questions" [(*1*), p. 423]. This approach empowers wider publics to develop a deeper and more nuanced understanding of animal research—one capable of comprehending and accepting its complex and often contradictory ethical challenges.

Working with patients reveals further dimensions to what people want to know and care about in relation to the use of rodents in research. Patient groups are increasingly seen as an important group whose views should inform the culture of care, a view often motivated by the assumption that people affected by health conditions will advocate for research (*1*). Some do, but many care about the use of rodents for other reasons, reflecting their personal responsibility for review processes, their interest in model translatability, their shared vulnerability with animals, and the ongoing dominance of rodents in research.

CONCLUSION

Social sciences and humanities research shows us that many more people care about rodents in research than might at first be assumed. The complexity of care reflects the growing number of people, places, materials, and animals that work together to generate contemporary biomedical research. Care is increasingly center stage within animal research while also having limits. Challenging questions emerge around who carries the burden of care, who cares for those who care, and how care practices might change as care itself increasingly becomes the focus of measurement and regulation. In recent years, concern has moved beyond questions of how to care to consider the rationale that governs the species that are cared for and those that are not. Regulatory concern, responding to ethical concern, prioritizes species that are considered sentient. This capacity to feel has often been associated with vertebrates for regulatory purposes. However, the exclusion of invertebrates is increasingly questioned. In 1993, UK animal research regulation included the octopus (*Octopus vulgaris*) in response to the likelihood of their capacity for sentience (an approach followed by the European Union in 2010). How to expand the range of species considered to be sentient is an open-ended challenge with consequences for society as whole (*1*). As such, it is an area where insights from the humanities and social sciences, in dialogue with the natural sciences, may again prove valuable (*15*).

Notably, foregrounding care is not exclusive to animal research. Humanities and social science approaches can also contribute to expanding what care practice and a culture of care may mean for animal research by connecting this topic to trends and developments in cultural and societal understandings of care elsewhere.

REFERENCES AND NOTES

1. G. Davies *et al.*, Eds., *Researching Animal Research: What the Humanities and Social Sciences Can Contribute to Laboratory Animal Science and Welfare* (Manchester Univ. Press, 2024).

2. W. M. S. Russell, R. L. Burch, *The Principles of Humane Experimental Technique* (Methuen, 1959).

3. R. G. W. Kirk, *Sci. Technol. Human Values* 43, 622 (2018).

4. G. F. Davies *et al.*, *PLOS ONE* 11, e0158791 (2016).

5. H. Grimm *et al.*, *Front. Vet. Sci*. 10, 1185706 (2023).

6. G. Davies, *Stud. Hist. Philos. Sci*. 89, 177 (2021).

7. P. Hawkins, P. Hobson-West, "Delivering effective ethical review: The AWERB as a 'forum for discussion'" (RSPCA, 2017); https://www.rspca.org.uk/documents/1494935/9042554/AWERB+forum+for+discussion+booklet.pdf.

8. S. Brown *et al.*, "Independent Investigation into Animal Research at Imperial College London" (2013); https://nc3rs.org.uk/sites/default/files/2023-02/The-Brown-Report.pdf.

9. C. Friese, *Curr. Anthropol*. 54 (S7), S129 (2013).

10. H. Mazhary, P. Hawkins, *Animals (Basel)* 9, 1104 (2019).

11. E. Giraud, G. Hollin, *Theory Cult. Soc*. 33, 27 (2016).

12. B. Greenhough, H. Mazhary, M. Berdoy, Care-full Stories: Interactive training resources for developing your institution's culture of care; https://www.geog.ox.ac.uk/research/technological-life/projects/care-full-stories/index.html.

13. M. Clemence, "Public attitudes to animal research in 2018" (Ipsos, 2019); https://www.ipsos.com/ipsos-mori/en-uk/public-attitudes-animal-research-2018.

14. P. Hobson-West, A. Davies, *Sci. Technol. Human Values* 43, 671 (2018).

15. J. Burch, C. Burn, A. Schnell, H. Browning, A. Crump, "Review of the Evidence of Sentience in Cephalopod Molluscs and Decapod Crustaceans" (London School of Economics and Political Science, 2021); https://www.lse.ac.uk/business/consulting/reports/review-of-the-evidence-of-sentiences-in-cephalopod-molluscs-and-decapod-crustaceans.

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