Planning a better future for canine health and welfare research

Outcomes of the UK Canine Research Funding Analysis Project

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Note

This report is based on the data gathered and analysed during the UK Canine Research Funding Analysis Project, but the discussion, opinions and suggestions within it are those of the authors and should not be taken to represent the views of any other individuals or organisations that have contributed to this research.

Executive Summary

This report summarises the output from the UK Canine Research Funding Analysis Project, carried out from September 2022 - September 2024 at the Royal Veterinary College (RVC). This research was jointly commissioned by four funders (Battersea, Dogs Trust, The Kennel Club Charitable Trust (KCCT) and The Waltham Foundation), who, together with other animal-directed funding organisations, shared a large volume of historical funding data on canine research with the RVC team.

The brief was to conduct a gap analysis of UK not-for-profit canine health and welfare research funding to investigate previous funding patterns, with particular focus on the 'Benefit for the dog' and 'Pathway to impact' achieved by each funded research project, and to develop an evidence base that would support identification of future priority research topics and priority reforms for funding processes in this sector.

The lead researcher on the project was Dr Alison Skipper, a veterinarian and postdoctoral researcher, supported by senior researchers Dr Dan O'Neill (principal investigator, a veterinary epidemiologist) and Dr Rowena Packer (co-investigator, an animal welfare scientist).

Phase 1

Canine research funding data were collected from 10 wide-scope funders (UK Government funding councils and medical charities), 18 animal-directed funders (organisations specifically concerned with animal health and welfare) and 81 breed community groups. These 109 UK funders provided traceable canine-relevant funding of £57.8 million between 2012 and 2022 that supported over 500 distinct research projects. Detailed analysis compared funding patterns between wide-scope versus animal-directed funders and between individual funding organisations.

This phase also developed new metrics to assess 'Benefit for the dog' and 'Pathway to impact' for different research projects. These tools differentiate research primarily intended to produce direct benefits to canine lives from those projects with other priorities, such as advancing human health or wellbeing, and enable the value to canine health and welfare to be compared in a standardised way for research projects across all fields.

The output from Phase 1 was published open access in PLOS ONE in May 2024 (1). Part 1 of this report summarises the key findings from Phase 1 in more detail.

Key Phase 1 findings include:

- Wide-scope funders contribute over 70% of total UK canine-relevant funding, achieving greater public transparency and higher rates of peer-reviewed outputs than animal-directed funders, but favouring One Health/One Medicine research rather than research focusing primarily on dogs.

- Animal-directed funders support nearly 90% of UK not-for-profit canine-focused health research, making them crucial stakeholders in determining which dog-specific research priorities are progressed to research projects.

- Customised 'Benefit to the dog' and 'Pathway to impact' metrics can help funders to evaluate future research proposals effectively, supporting initiatives that provide the greatest benefit to canine welfare.

Phase 2

The second phase of the project centred on a modified Delphi study. This involved almost 60 stakeholders involved in the canine health and welfare sector, linked to more than 25 charities, universities and other relevant organisations, who individually suggested and then collaboratively prioritised a list of highest-priority issues in canine health and welfare and highest-priority issues with canine health and welfare research processes and infrastructure. Analysis of this information then determined the highest-priority future research topics, established their previous relative funding through comparison with Phase 1 historical data, and identified the highest-priority points of concern in current research approaches and methodologies and structural or logistical aspects of research funding processes.

The output from Phase 2 was published open access in PLOS ONE in December 2024. Part 2 of this report summarises the key findings from the Phase 2 analysis of highest-priority issues in canine health and welfare and their historical funding in more detail.

Key Phase 2 findings include:

- Eight high-priority research categories related to canine health and welfare were identified, largely focusing on real-world aspects of the human-canine relationship. Most of these topic categories are predominantly supported by animal-directed funders.

- A ranking analysis indicated that some important issues, particularly those related to human-canine interactions, have historically been relatively underfunded. The top three relatively underfunded issues were increasing the supply of healthy well-bred dogs, dog bite attacks, and the impact of human lifestyle on canine behaviour.

- Additional analysis revealed that some specific common chronic canine health conditions, including patellar luxation and periodontal disease, have also previously been relatively underfunded.

Phase 3

Three of the four original funders (Battersea, KCCT and Waltham Foundation) elected to support a project extension. This phase built on Phase 2 insights about highest-priority points of concern with current research approaches and methodologies and highest-priority points of concern with research funding processes, developing an enhanced analysis of potential methodological, logistical and structural innovations in canine health and welfare research.

Part 3 of this report summarises this analysis and suggests a series of key interventions that could be implemented by animal-directed funders and other stakeholders to enhance the value of their support for canine health and welfare research. It suggests suitable targets for

future reform and explores the main barriers to change. The current report is a major output from Phase 3.

Key Phase 3 recommendations include:

- Funders should generally prioritise research proposals that directly advance canine welfare, using comparative metrics, such as ‘Benefit for the dog’ and ‘Pathway to impact’. When appropriate, using research approaches that include human factor perspectives, together with broader sector engagement and public outreach, will align research with real-world needs to maximise its impact on canine lives.

- Collaboration between the many existing funding organisations and research centres can help to tackle complex challenges in canine health and welfare by supporting larger research projects, increasing transparency and encouraging joint priority-setting.

- Funders can improve research funding infrastructure by simplifying grant applications, supporting early career researchers, and promoting networking initiatives.

The final Phase 3 output is a further research paper, which is currently in preparation. This explores employment outcomes for master’s and PhD students who received UK funding to conduct research into canine health or welfare between 2012 and 2018. This paper will constitute the final output from the overall UK Canine Research Funding Analysis Project.

Key Recommendations

Phase 1: Funding patterns

- Despite relatively limited financial resources, animal-directed organisations fund almost 90% of UK not-for-profit canine-focused research in canine health and welfare and thus are key stakeholders whose decisions largely shape the nature of research in this field. **Therefore, funding organisations must ensure that these resources are most effectively allocated to improve canine lives.**
- Wide-scope funders provided over 70% of total funding, including some very large grants of over £1 million, with most of this funding supporting research intended to improve both canine and human health. **Therefore, researchers should consider approaching wide-scope funders to access larger grants, particularly for work that adopts a One Health/One Medicine approach.**
- Wide-scope funders provide greater public transparency of funded research and its outcomes than animal-directed funders, and projects supported by wide-scope funders achieve a significantly higher proportion of peer-reviewed publications than those supported by animal-directed funders. **Animal-directed funders could increase public transparency and accountability throughout the funding process, by following best practice already established in the wider funding sector.**
- Some research topics, such as antimicrobial resistance, are supported by both wide-scope and animal-directed funding sectors, while others, such as conformation-related disease, are predominantly supported by animal-directed funders**. Both funding organisations and researchers should be aware of these patterns to make informed decisions about where to direct their activities.**
- This research project developed 'Benefit to the dog' and 'Pathway to impact' metrics to facilitate the standardised evaluation of research proposals across different fields. These metrics are presented in this report. **Funders can use (and, if desired, customise) these 'Benefit to the dog' and 'Pathway to impact' metrics to achieve better-informed prioritisation of research with maximal impact to improve canine lives.**

Phase 2: Research topics

- Most of the highest-priority issues in canine health and welfare identified by this Delphi study concerned real-world aspects of the human-canine relationship. Highest-priority issues spanned eight research topic categories: canine behavioural issues; ownership issues; societal issues; breeding and supply issues; breed-related diseases; issues related to importation; issues related to clinical practice; and shelter welfare. **Both funders and researchers could consider prioritising these topic categories when planning future work.**
- A comparison of the highest-priority issues in canine health and welfare identified by the Delphi study with past research funding patterns from the phase 1 historical dataset revealed that animal-directed funders provided most or all historical in-scope funding for 6/8 highest-priority research topic categories. **All stakeholders should be aware that animal-directed funders currently provide crucial support for research into many**

of the most important issues that affect canine health and welfare. Animal-directed funders may therefore wish to continue supporting high-priority canine-focused issues. However, if wide-scope funders (e.g. UKRI councils) could also be persuaded to engage with these problems, then researchers could access significant further funding streams.

- A ranking analysis revealed that some highest-priority issues have previously been relatively underfunded. These relatively most underfunded issues all concerned human-canine interactions. The top three 'relatively most underfunded' issues were 'increasing the supply of healthy well-bred dogs', 'dog bite attacks' and 'the impact of human lifestyle on canine behaviour'. **These and other 'relatively most underfunded' issues are thus high priorities for increased future research funding. All are in-scope for animal-directed funders, but wide-scope funders (e.g. ESRC) could also be approached to support research into dog bite attacks, given the public health implications of this issue.**
- A further analysis of previous funding for research into common chronic disorders also revealed relative underfunding for some conditions. These 'relatively underfunded' conditions were patellar luxation, overgrown nails, otitis externa, periodontal disease and anal sac problems. **These five conditions are thus also potential candidates for increased future research funding.**

Phase 3:

3A - Research approaches and methodologies

- The Delphi study findings emphasised the importance of designing canine-focused research that foregrounds dogs and focuses on welfare. **Funders could require grant applicants to more explicitly state the primary beneficiary of their research (in most cases, the dog) and to state how the work will advance animal welfare. They could assess this using the 'Benefit for the dog' metric developed in Phase 1.**
- The Delphi study findings emphasised the importance of ensuring that canine health and welfare research has practical real-world impact. **Funders should assess this more explicitly, perhaps using the 'Pathway to impact' metric developed in Phase 1, while retaining the flexibility to sometimes fund valuable projects with less direct impact.**
- Because human actions are a major cause of canine health and welfare issues, as discussed in Phase 2, there is a strong argument for embedding social science/psychology research to understand human drivers, and including human behavioural change research and evidence-based interventions, within appropriate research projects. **Funders should ensure that such proposals describe clear, specific and achievable human behavioural change interventions. Funders could also consider supporting broader research that investigates how to apply human behavioural change in the canine health and welfare sector.**
- Speculative pilot research is inherently uncertain in output but can be highly productive in terms of advancing knowledge. **Funders that direct some smaller grants towards potentially valuable pilot projects should continue to do so.**
- Social science, humanities and anthrozoological research approaches can offer valuable and novel insights to address high-priority canine problems linked to human behaviours.

Funders should be receptive towards projects that use social science and humanities approaches, when in scope, and could consider funding larger qualitative and interdisciplinary studies that may offer deeper insights into social issues.

- Research into high-priority clinical problems that generates robust evidence (such as prospective studies, randomised controlled trials or multidisciplinary studies of complex clinical issues) provides valuable information but can be expensive. **Funders should assess the likely benefits and impact of such research, which may be sufficient to justify major investment.**
- There is considerable scope to increase dissemination, outreach and public engagement to shape research aims and circulate research outputs among wider stakeholder groups in the canine health and welfare sector, thereby increasing output impact on canine lives. **Where appropriate, funders and researchers should place greater emphasis on wider sector engagement throughout the research process.**

3B - Research funding processes and infrastructure

- Current grant application processes are burdensome for researchers, who often must rewrite and reformat applications to fit each funding organisation's application form and who are seldom given feedback detailing why unsuccessful proposals have been rejected, preventing them from improving applications accordingly. **Funders could simplify grant application processes by adopting a two-stage process for larger grants, with a common, simple preliminary application form used across funders and some standardisation of information fields for subsequent full application forms. Funders could offer basic feedback for rejected proposals, perhaps via a metric score or a standardised form, to minimise their administrative load.**
- Few research grants provide salaries for early career researchers working on canine health and welfare, especially at the postdoctoral level where even salary costs alone can often exceed the maximum grant funding offered. New researchers also face considerable difficulties in establishing themselves within research networks. **Funders that do not already do so could consider supporting early career researchers with specific awards, or co-funding larger awards. They could also support networking and outreach initiatives to facilitate access to the canine health and welfare sector for new researchers and to promote the activities of early career researchers in receipt of funding.**
- Formal collaboration between different funding organisations and/or different research centres can support more costly or complex research projects that offer significant potential benefit for the dog. **Funders and researchers should continue to support collaborative research projects on an ad-hoc basis and be explicit that smaller awards could potentially be supplemented by collaborative funding from other organisations.**
- Despite various obstacles, there is considerable value in greater formal collaboration between stakeholders in the canine health and welfare research sector. Such collaborations can take many forms. For example, a centralised public database could share information about past funding patterns across multiple animal-directed funders. This platform could also host collaborative funding calls. Collaboration could also involve strategic priority-setting through collaborative multi-stakeholder discussion of research

priorities and funding gaps, possibly addressing particular canine health issues in a system modelled on the James Lind Alliance in human medicine. **All stakeholders, particularly funding organisations, should assess the major legacy benefits of introducing formal collaboration initiatives and be open to participation in such initiatives if suggested by others.**

- There is great value in reducing gaps and barriers between sector stakeholders, both by deliberately including a wider range of participants (such as clinical veterinary staff, dog breeders and rescue workers) in research design and execution and by supporting outreach to interested parties. Engagement between funders and researchers that goes beyond financial support also improves sector relationships. **All parties should deliberately cultivate sector networks and encourage productive communication between stakeholder groups. All such initiatives contribute to the effective creation and dissemination of knowledge that advances canine welfare, thus improving canine lives more effectively.**

List of Abbreviations

AHRC – Arts and Humanities Research Council

AHT – Animal Health Trust

AMR – antimicrobial resistance

BBSRC – Biotechnology and Biological Sciences Research Council

BOAS – Brachycephalic Obstructive Airway Syndrome

BSAVA – British Small Animal Veterinary Association

BVA AWF – British Veterinary Association Animal Welfare Fund

EPSRC – Engineering and Physical Sciences Research Council

ESRC – Economic and Social Research Council

GDPR – General Data Protection Regulation

KCCT – Kennel Club Charitable Trust

MRC – Medical Research Council

MVD – Mitral valve disease

NERC – Natural Environment Research Council

PSP – Priority setting partnership

RSPCA – Royal Society for the Prevention of Cruelty to Animals

RVC – Royal Veterinary College

RVC ACT – Royal Veterinary College Animal Care Trust

SCAS – Society for Companion Animal Studies

SSPCA – Scottish Society for the Prevention of Cruelty to Animals

UFAW – Universities Foundation for Animal Welfare

UKRI – UK Research and Innovation

Phase 1: funding patterns

The published paper '**Researcher, research thyself? Mapping the landscape of canine health and welfare research funding provided by UK not-for-profit organisations from 2012–2022'** from Phase 1 provides full details of how in-scope data on the UK funding of canine health and welfare research was harvested, processed and analysed both quantitatively and qualitatively (1).

Key Phase 1 insights

A summary of the research funding reported in this paper is provided in Table 1.

Wide-scope funders provided a much larger proportion of the total reported funding (71.9%) than animal-directed funders (28.1%), and generally provided much larger individual grants (median = £267K) than animal-directed funders (median = £10K).However, wide-scope funders provided fewer individual grants (n=145) than animal-directed funders and breed communities (joint total n=539).

Only 13.2% (£5.4 million) of wide-scope funding was canine-focused (i.e., research where dogs were the primary species under investigation, rather than considered in a multi- or interspecies context such as One Health), whereas 88% (£14.7 million) of animal-directed funding was canine-focused. **Research that foregrounds canine health and welfare for its own sake is thus heavily dependent on support from animal-directed funders, which must therefore ensure that their resources are allocated most effectively. However, researchers who can adopt a One Health or One Medicine approach may be able to access larger grants by approaching wide-scope funders.**

Awards from wide-scope funders were significantly more likely to generate peer-reviewed publications than awards from animal-directed funders. Awards from wide-scope funders also had greater public transparency: all UKRI and Wellcome awards are listed online, but few animal-directed funders make this information public. **Therefore, animal-directed funders could increase public transparency and accountability throughout the funding process, to follow best practice in the wider funding sector.**

Wide-scope and animal-directed funders differed in their support of various research topics (see Table 2), with some topics (such as antimicrobial resistance or genetics) supported strongly and to similar extents by both sectors, but others (particularly conformation-related disease) supported much more strongly by animal-directed funders. **Both funding organisations and researchers should be aware of these patterns when deciding where to direct their activities.**

'Benefit to the dog' and 'Pathway to impact' metric scoring grids were created and are given below (Tables 3 and 4). Grants provided by animal-directed funders had significantly higher overall 'Benefit to the dog' scores than those provided by wide-scope funders. Animal-directed funders were less likely to support projects with low 'Benefit to the dog' scores than wide-scope funders, reflecting their more canine-focused priorities.

Grants provided by animal-directed funders had significantly higher overall ‘Pathway to impact’ scores than those provided by wide-scope funders. Animal-directed funders were less likely to support projects with low ‘Pathway to impact’ scores than wide-scope funders, again reflecting their more canine-focused priorities.

The ‘Benefit to the dog’ and ‘Pathway to impact’ metrics developed for this project provide an accessible way to compare very different research proposals. **These metrics could be readily adopted (and, if necessary, customised) by funders’ grant award committees as a tool to standardise comparisons between research projects.**

The published Phase 1 paper provides a more detailed analysis of funding sources, destinations, distributions and outcomes for these data on past funding patterns (1).

Table 1: Not-for-profit UK canine health and welfare research funding summary, 2012-2022, taken from Skipper et al, 2024a. * Other in-scope large-scale funding councils, < £3 million funding identified: AHRC, EPSRC, ESRC, Innovate UK, NC3Rs, NERC, UKRI; ** Other in-scope animal charities, < £500K funding identified: AHT, Battersea, Blue Cross, BVA AWF, CamVet, Guide Dogs, Langford Veterinary Services Clinical Research Fund, RSPCA, RVC ACT, SCAS, SSPCA, UFAW, Wood Green

Organisation	No. in-scope grants awarded	Percentage of in-scope grants awarded	Total in-scope funding	Percentage of total in-scope funding
Wide-scope funders				
BBSRC	66	9.6%	£18,907,671.00	32.7%
Wellcome Trust	17	2.5%	£7,239,461.00	12.5%
MRC	10	1.5%	£4,829,173.50	8.4%
Other UKRI councils (< £3 million each)*	52	7.6%	£10,188,900.00	17.6%
Subtotal	145	21.2%	£41,165,205.50	71.2%
Animal-directed funders				
Dogs Trust	81	11.8%	£6,955,661.17	12.0%
KCCT	51	7.5%	£3,952,356.03	6.8%
PetPlan Charitable Trust Charitable Trust	87	12.7%	£2,805,446.90	4.9%
BSAVA PetSavers	97	14.2%	£941,218.09	1.6%
Waltham Foundation	28	4.1%	£537,063.00	0.9%
Other funders (< £500K each)**	72	10.5%	£1,061,580.48	1.8%
Subtotal	416	60.8%	£16,253,325.67	28.1%
Breed communities	123	18.0%	£370,431.53	0.6%
TOTAL	**684**	100.0%	**£57,788,962.70**	100.0%

Table 2. Historical funding (2012-2022) directed towards various topics, divided by funding sector and including percentage of total funding in each sector (simplified from S1 Dataset of Skipper et al, 2024a).

Topic funding	Wide-scope funding sector	Animal-directed funding sector	Overall total, both funding sectors
Antimicrobial resistance	£4,103,619.48 (9.97%)	£2,266,636.97 (13.63%)	£6,370,256.45 (11.02%)
Breed-related disease	£10,039,265.56 (24.39%)	£8,150,314.52 (49.03%)	£18,189,580.08 (31.48%)
Conformation-related disease	£225,921.00 (0.55%)	£3,911,137.14 (23.53%)	£4,137,058.14 (7.16%)
Canine genetics	£15,968,993.56 (38.79%)	£6,761,760.33 (40.68%)	£22,730,753.89 (39.33%)
Neoplasia	£3,145,729.00 (7.64%)	£3,502,404.54 (21.07%)	£6,648,133.54 (11.50%)
Clinically relevant	£8,477,044.60 (20.59%)	£9,307,220.10 (55.99%)	£17,784,264.70 (30.77%)
Human-animal interactions	£9,352,529.00 (22.72%)	£3,397,480.17 (20.44%)	£12,750,009.17 (22.06%)
Practical behaviour (amount)	£2,547,719.00 (6.19%)	£2,297,465.91 (13.82%)	£4,845,184.91 (8.38%)
Sector totals (topic totals do not sum to 100% because some grants are excluded and others appear under more than one topic)	£41,165,205.50 (71.2%)	£16,623,757.20 (28.8%)	£57,788,962.70 (100%)

Table 3. 'Benefit to the dog' scoring grid to evaluate canine research. Final score for each project = A x B, i.e. possible values between 1 and 30 (taken from Skipper et al, 2024a).					
Number of dogs that may benefit (international)	**Examples of problem**	**A. Numerical score (number that benefit)**	**Impact of condition or problem on dog's wellbeing (includes severity and duration for affected dog)**	**Examples of problem**	**B. Numerical score (impact on wellbeing)**
			Severe impact, typically rapidly fatal	Rabies; myelomalacia	6
Millions	Arthritis; obesity; parasite control	5	Severely life-restricting, often fatal	Osteosarcoma; severe aggression	5
(tens/hundreds of) Thousands	Mitral valve disease; shelter husbandry; drug trial	4	Typically serious and/or lasting impact	Mitral valve disease; severe separation anxiety	4
Hundreds or fewer	Rare disease gene test; pioneering surgical treatment	3	Typically moderate impact	Atopy; obesity; arthritis	3
Indirect benefit only	Human wellbeing benefit; laboratory dog as human disease model	2	Typically minor or temporary impact	Surgical neutering; acute diarrhoea	2
No apparent benefit	Philosophy; canine archaeology	1	Little or no impact	Normal cognition; normal biomechanics	1

Table 4. 'Pathway to impact' scoring grid to evaluate canine research. Final score for each project = A + B, i.e. possible values between 2 and 11 (taken from Skipper et al, 2024a).					
Ideal-world impact of research findings	**Examples**	**A. Numerical score (ideal-world impact)**	**Feasibility and scope of human behavioural change (HBC)**	**Examples**	**B. Numerical score (HBC feasibility)**
			Direct route to HBC, within control of funder or linked organisation	Dogs Trust alters rehoming policies; KC alters approach to breed-related disease	6
Immediate direct canine benefit	Gene test; clinical trial; improved environment in rescue centres	5	Clear route to HBC, with few barriers to adoption within relevant sector	New gene test; clinical trial for new drug	5
Direct canine relevance but no immediate implementation	Finding a disease biomarker; sociology of welfare problem	4	Structural barriers to HBC – findings widely accepted but implementation tricky	Epidemiology of endemic zoonotic disease; antimicrobial resistance	4
Implementation to benefit other species, does not directly benefit dogs	Environmental impact of canine parasiticides; human benefit from canine therapy	3	Political barriers to HBC – findings potentially controversial	Conformation-related disease in pedigree dogs; health issues with international rescue dogs	3
Research advances knowledge but no direct practical intervention	Sequencing archaeological canine genomes; studying a normal biochemical process	2	Technical/professional HBC only – no public HBC expected	Most laboratory research; investigation of veterinary workplace practices	2
Limited scope or flawed design, significant output unlikely	Research trivial or poorly designed	1	No behavioural change expected	Very theoretical or poorly designed research	1

Phase 2: research topics

The published paper **'"*Maybe we should think outside the box?"* Prioritisation of issues with UK not-for-profit canine health and welfare research funding using Delphi expert consensus and gap analysis'** provides full details of the research carried out during Phase 2 of the UK Canine Research Funding Analysis Project (2).

This phase centred on a modified Delphi-style study. Fifty-nine stakeholders from across the UK canine health and welfare sector attended a workshop at the RVC in Potters Bar in September 2023. Each participant had previously completed an anonymous online questionnaire to indicate what they considered to be the highest-priority issues in canine health and welfare and in the funding and infrastructure of its research. These online responses were used to create a list of overall points of concern. During the workshop, participants were divided into seven groups, which each collaboratively prioritised each point of concern by assigning it a numerical score.

In subsequent data analysis, these priority scores and the discussion transcripts were used to derive a mean priority score and create a consensus comment for each point of concern. The highest-priority points of concern were identified, collated and divided into three categories.

- The consensus **highest-priority issues in canine health and welfare** were identified, collated and grouped into research topics. These were then used to interrogate the historical funding data that had been mapped in Phase 1, to determine which highest-priority research topics had previously been relatively most underfunded. This work is discussed below.
- Highest-priority points of concern that addressed **research approaches or methodologies** were grouped together, collated, condensed into new inductively determined problem categories, and scrutinised for overarching analytical themes.
- Highest-priority points of concern that addressed **structural or logistical aspects of research funding processes** were also grouped together, collated, condensed into new inductively determined problem categories, and scrutinised for overarching analytical themes.

Insights that emerged from the Phase 2 analyses of research approaches and methodologies and research funding processes were extended through further investigation and analysis in Phase 3 of this project. For greater clarity, these analyses are discussed together in Phase 3 of this report.

Key Phase 2 insights

Invitees were generally very keen to contribute to this modified Delphi study, indicating wide concern about current issues in the canine health and welfare sector and high motivation to influence the discussion about future research priorities and processes.

Research topics in canine health and welfare

The highest-priority issues in canine health and welfare identified by participants in this Delphi study spanned eight research topic categories (Figure 1). These were:

- canine behavioural issues
- ownership issues
- societal issues
- breeding and supply issues
- breed-related diseases
- issues related to importation
- issues related to clinical practice
- shelter welfare.

Almost all these highest-priority issues in canine health and welfare concerned various **real-world aspects of the human-canine relationship**. The only exceptions were issues related to some types of canine physical disease (breed-related diseases and common conditions in primary care clinical practice).

Comparison of highest-priority research topics identified by the phase 2 Delphi study with research funding patterns from the phase 1 historical dataset showed that:

- Animal-directed funders provided the majority of research funding for 6/8 highest-priority research topic categories, providing all the funding for 3/8 of them (see Table 5). **Animal-directed funders thus provide crucial support for research into the most important canine-focused real-world issues.**

- Wide-scope research funding that addressed highest-priority points of concern was mostly directed towards investigating disease; this research often adopted a One Health or One Medicine perspective. Some canine-focused grants from wide-scope funders addressed veterinary issues from a humanities perspective.

A ranking analysis plotted Delphi mean priority scores against historical allocated funding for the top 24 highest-priority specific issues (Figure 2). This revealed that:

- All the highest-priority points of concern that had received relatively less historical research funding concerned human-canine interactions.

- The top three ‘relatively most underfunded’ issues were ‘increasing the supply of healthy well-bred dogs’, ‘dog bite attacks’ and ‘the impact of human lifestyle on

canine behaviour'. **These and other 'most underfunded' issues are thus high priorities for increased future research funding.**

A subsidiary analysis of historical research funding for common chronic disorders (Figure 3) revealed:

- Heavy funding for osteoarthritis and behavioural disorders from both wide-scope and animal-directed funders; heart murmur/mitral valve disease was heavily supported by animal-directed funders but not by wide-scope funders.
- In contrast, otitis externa, periodontal disease and anal sac problems were relatively underfunded by animal-directed funders and not supported at all by wide-scope funders, while overgrown nails and patellar luxation received no funding at all within the study dataset. **These five conditions are thus also strong candidates for increased future research funding.**

Full data that includes quantitative and qualitative analysis of Delphi participants' responses and comparison of their highest-priority research topics with the historical funding dataset are in the second project paper (2). The key insights described above were also used to develop three infographics drawn from the second project paper and used to promote it on social media. These three infographics are shown on pages 22-24 (Figures 1-3).

Table 5. Historical funding from Phase 1 dataset tabulated against eight highest-priority research topic categories from Phase 2 Delphi study, divided to show total past funding and proportional funding by wide-scope and animal-directed funders for each topic category. Simplified from Skipper et al, 2024b.

Research category	Total relevant funding in dataset	Wide-scope funding	Wide-scope % of total category funding	Animal-directed funding	Animal-directed % of total category funding
1) Canine behaviour	£2,671,810.09	£959,705.00	35.9%	£1,712,105.09	64.1%
2) Ownership issues	£673,920.15	£0.00	0.0%	£673,920.15	100.0%
3) Societal issues	£419,210.00	£0.00	0.0%	£419,210.00	100.0%
4) Breeding and supply issues	£1,884,920.33	£133,989.00	7.1%	£1,750,931.33	92.9%
5) Breed-related diseases (overall)	£11,146,494.50	£3,391,829.56	30.4%	£7,754,664.94	69.6%
6) Issues related to importation	£2,322,325.00	£1,460,920.00	62.9%	£861,405.00	37.1%
7) Clinical practice	£9,219,113.10	£4,803,501.00	52.1%	£4,415,612.10	47.9%
8) Shelter welfare	£299,540.22	£0.00	0.0%	£299,540.22	100.0%

Figure 1.

‘What are the biggest issues with canine health and welfare?’

First infographic summarising findings from Skipper et al, 2024b (see also Table 5 of this report).

Figure 2.

‘What research is most needed to improve canine lives?’

Second infographic summarising findings from Skipper et al, 2024b.

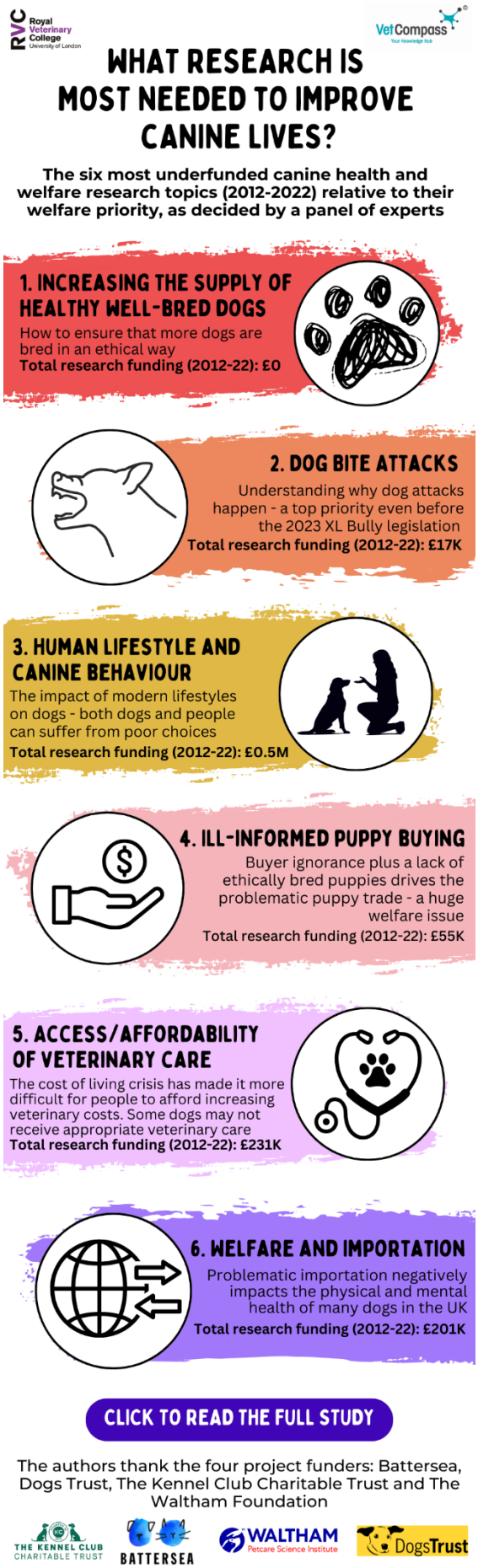
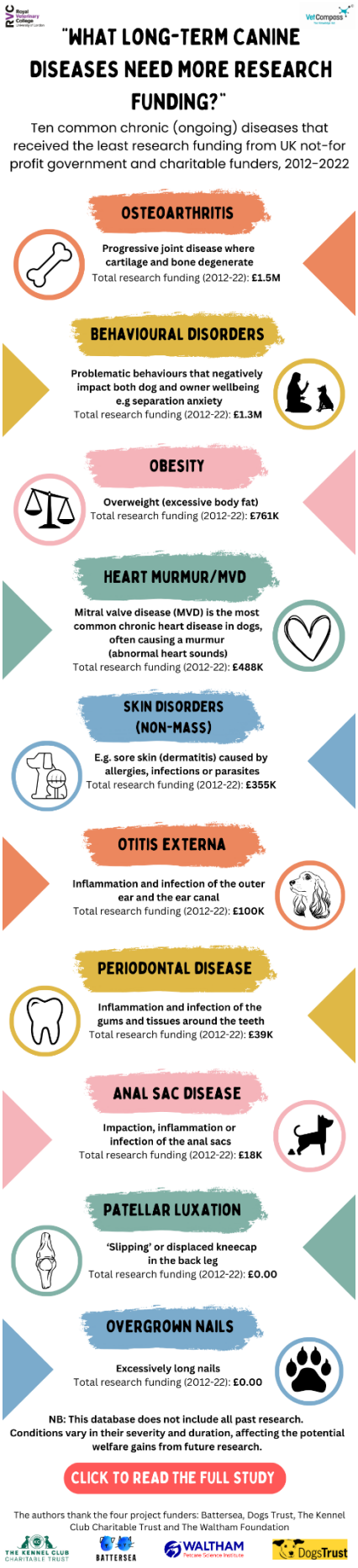


Figure 3.

‘What long-term canine diseases need more research funding?’

Third infographic summarising findings from Skipper et al, 2024b.



Phase 3: research design, processes and sector infrastructure

The UK Canine Research Funding Analysis Project extension aimed to investigate the **highest-priority points of concern for research approaches and methodologies** that were revealed by the Phase 2 Delphi study, exploring the suggested key future priorities and their implementation. The project extension also aimed to investigate the **highest-priority points of concern for research processes and infrastructure** that were revealed by the Phase 2 Delphi study and to suggest possible innovations to address these issues, exploring their practical feasibility and describing possible barriers to change.

These analyses were completed as planned and are presented in detail in this section of this report. Key recommendations are summarised, considering their relevance to different stakeholder groups. This discussion includes a tabular comparison of the various awards currently offered by UK not-for-profit animal-directed funding organisations that support canine health and welfare research, and a tabular comparison of the information fields for eight full grant application forms from animal-directed funders that offer larger (>£20K) grants to support canine health and welfare research.

The current report constitutes a major output from Phase 3. It will be made publicly available for the benefit of all stakeholder groups in canine health and welfare and its research.

Phase 3 research will also generate another output, a third peer-reviewed publication from the overall UK Canine Research Funding Analysis Project. This paper, currently in preparation, investigates a priority issue that emerged from the Delphi workshop: the widely accepted difficulty of establishing and developing a research career. Drawing on the historical database developed in Phase 1, it explores the employment outcomes for the cohort of master's and PhD students that were funded by UK-based wide-scope or animal-directed funders to conduct research into canine health or welfare between 2012 and 2018. **This study will provide valuable insight into career progression for veterinary and non-veterinary early career researchers in this sector, informing future priority-setting for both funders and researchers.**

3A. Research approaches and methodologies

Table 6 (page 26), simplified from the Phase 2 project output paper, summarises the highest priorities for change in research approaches and methodologies, as determined by the Phase 2 Delphi study. **These highest-priority approaches and methodologies generally put a strong focus on foregrounding real-world considerations in the design and execution of canine health and welfare research and on prioritising research that engages with the human factors in canine welfare.**

These priorities are divided into three categories:

- **Research design**
- **Investigative approach**
- **Research engagement**

These insights are discussed in more detail below, where they are used to suggest areas of future focus and how change could be implemented by funders and researchers.

Table 6. Highest overall priorities for change in research approaches and methodologies in canine health and welfare, adapted from Skipper et al, 2024b.

Research element	Increased focus for change	
Research design	i.	Research designed to fit sector needs, foregrounding dogs
	ii.	Research designed with a focus on welfare
	iii.	Research designed with embedded practical impact, where appropriate
	iv.	Research designed with embedded human behavioural change interventions, where relevant
	v.	Supporting pilot research projects to lever potential change
Investigative approach	i.	Social science research
	ii.	Humanities research
	iii.	Anthrozoological research
	iv.	Clinical research: prospective studies
	v.	Clinical research: randomised controlled trials
	vi.	Clinical research: complex health issues
Research engagement	Effective research outreach communication to different groups, including public engagement where appropriate	

Research design: future priorities

Discussion at the Delphi workshop identified certain elements of research design as highest priorities for future change – i.e. that future research proposals and funder selection processes should prioritise these factors, where contextually appropriate.

i. Research designed to fit sector needs, foregrounding dogs

Phase 1 of the current research project has shown that canine-focused research is heavily dependent on funding from the animal-directed sector.

This is particularly true for certain real-world canine-specific problems, such as shelter welfare and conformation-related disease: moreover, many such problems were rated highest-priority issues in the Phase 2 Delphi study.

Therefore, it would be advisable for animal-directed funders to generally prioritise projects that address these highest-priority real-world issues, potentially using the 'Benefit for the dog' and 'Pathway to impact' metrics developed in the current research project, together with other measures of topic relevance, to differentiate between submitted proposals.

However, some canine-relevant funding is primarily intended to develop undergraduate student researchers (for example, BSAVA PetSavers and BVA AWF student projects) or intentionally has a human focus (for example, SCAS foregrounds the benefits of animal companionship to people). **Such funding should be recognised to have a different primary remit.**

Therefore, all animal-directed funders should ensure when assessing research proposals that the primary beneficiary of each funded project is explicitly stated and justified. For canine-focused research, this would normally be the dog, unless funding has another explicit purpose. Similarly, researchers should clearly state who the main beneficiaries of a proposed research project will be; this would normally be the dog, possibly alongside other species, unless requested funding has another primary purpose.

ii. Research designed with a focus on welfare

Many funded research projects in the canine health and welfare sector already have a strong focus on welfare. There are some useful projects (for example, laboratory-based investigations of biomarkers) where improving canine welfare is not a direct foreground concern. Nevertheless, there is a strong ethical argument for retaining visibility of welfare as an ultimate purpose while evaluating potential research projects.

One straightforward way to do this, which is already used by most funders, is to explicitly include a specific question on a full grant application form, requiring researchers to state how

their project will improve animal welfare. **This requirement could be made standard for all canine research funding applications.**

iii. Research designed with embedded practical impact

Most animal-directed funders' grant application forms now explicitly require researchers to outline their intended pathways to impact.

However, the current research project has shown that not all research leads to meaningful direct impact, as revealed by the 'Pathway to impact' metric developed in Phase 1. Some valuable research is inherently distanced from real-world impact (for example, pilot proof-of-concept projects or basic science approaches, e.g., research into physiological processes). Animal-directed funders nevertheless sometimes choose to fund such projects.

Even when planned research has clear real-world relevance, pathways to impact vary. For example, a successful clinical trial for a new drug may have immediate direct impact, if clinicians then readily change their treatment protocols. Yet if this drug treats a rare disease, the research may only benefit a few dogs. In contrast, research which investigates why people buy puppies on impulse concerns a major real-world problem that affects many dogs. However, such research cannot directly change human behaviour, and so inevitably has an indirect pathway to impact.

Nevertheless, there is a strong argument for designing implementation and impact into research projects from the outset, where possible, to maximise the value of the research, particularly when considering the 'real world' problems that dominate the highest-priority points of concern for future canine health and welfare research funding.

Therefore, funders should request researchers to include clear details of their plans for impact within each proposal. Researchers whose projects have limited or indirect impact should directly engage with this circumstance by explaining how their research will advance canine health and welfare. Funders could use the current project's 'Pathway to impact' metric to identify research proposals with a more straightforward route to impact, while retaining the flexibility to fund valuable projects which inherently have less direct pathways to impact, if desired.

Moreover, both researchers and funders have a responsibility to ensure that funded projects are completed as planned (barring exceptional circumstances). **Therefore, funding contracts should include measures to ensure accountability from researchers, such as the staged release of funding, contingent on the receipt of satisfactory updates from researchers at appropriate intervals.**

iv. Research and human behavioural change interventions

Many highest-priority issues identified in the current research concern aspects of the human-canine relationship; there is already ample evidence that human behaviour is a major contributing factor to many problems with canine health and welfare.

Therefore, there is a strong argument for supporting embedded human behavioural change research and interventions as an integral part of appropriate research projects.

However, such interventions need to be specific, targeted and considered, as there is a real danger of 'human behavioural change' becoming a vague buzzword that does not translate into effective on-the-ground measures that improve canine welfare.

Therefore, both funders and researchers should ensure that research that includes human behavioural change as part of its pathway to impact does so in a specific, appropriate and achievable way.

Funders could also consider commissioning or supporting research that pilots how to apply human behavioural change techniques to the canine health and welfare sector, which could have wide scalable value and transferrable impact across projects,

v. Supporting pilot (or pioneering) research projects

Currently, three funders (Dogs Trust, PetPlan Charitable Trust and SCAS) provide specific 'pump priming' funding awards (≤ £20K). These vary in their remit by funder; some have specific guiding themes. All have the intention of supporting pilot research in new fields with potential to lead to significant benefit for the dog. Such research may be highly productive but inherently entails a high degree of uncertainty about the eventual output.

Funders who support pilot research should therefore continue to appropriately balance this with more substantial support for more proven research opportunities.

Investigative approaches: greater deployment

Discussion at the Delphi workshop identified certain investigative approaches as highest-priority for increased deployment, where appropriate. **This does not imply that other investigative approaches are not valuable, simply that the highlighted approaches may currently be underutilised.** These approaches were:

Humanities and social science research

Participants at the Delphi workshop rated humanities, social science and anthrozoology as highest-priority investigative approaches for increased funding.

i. Social science

Previous social science research has generally been well received by stakeholders across the canine health and welfare sector, because so many high-priority welfare issues have been identified as problems that are directly caused by human beliefs and actions. **Increased funding for social science research would advance understandings of previously relatively underfunded high-priority topics, such as the criminology of the dog supply chain or issues with breeding reform legislation.**

Researchers at the Delphi workshop noted that social science research on canine welfare relies heavily on online surveys, because they are low-cost, quick and relatively easily achievable, even for less experienced researchers. However, other qualitative social science approaches, such as focus groups and in-person interviews, can provide different insights and should not be neglected**. Increased funding for social science research would allow a wider range of research methodologies to be deployed.**

ii. Humanities

Humanities disciplines with relevance to canine health and welfare include ethics, law, history, human geography and cultural studies. Humanities research can explore questions such as ‘what is a good death?’ or ‘how does the cultural significance of a breed influence attitudes to its welfare?’

At the Delphi workshop, there was a striking divide between participants who were already aware of humanities research in canine health and welfare, who were generally very positive about its value to address ‘the problems that science alone can’t solve’, and those who were unfamiliar with the humanities, who generally had a confused or limited understanding of their scope and potential relevance to canine health and welfare.

Animal-directed funders have not generally previously funded substantial humanities-based research projects. Some wide-scope funders have previously funded canine-relevant humanities research; for example, a research project that explored the history of breed-related disease in pedigree dogs to better understand the practices and beliefs that affect pedigree dog health today.

Interdisciplinary projects that include humanities approaches can offer deeper understandings of certain important issues; for example, the epidemiology of endemic canine rabies, where human attitudes towards street dogs influence patterns of disease.

Therefore, animal-directed funders should be aware of the potential value of humanities research approaches.

iii. Anthrozoology

Anthrozoology is the study of human-animal interactions, drawing on both humanities and sciences, and can therefore be an appropriate way to investigate various aspects of the human-canine relationship. Anthrozoological research is particularly relevant to understanding issues such as societal issues with canine behaviour (e.g. dog bite attacks) or how humans manage and control canine lives (e.g. end of life care practices).

Phase 2 of the current project identified the increased use of research approaches that focus on real-world problems and human factors as key future priorities to improve canine health and welfare. Anthrozoological research may be very effective in addressing these priorities.

Therefore, animal-directed funders should be aware of the potential value of anthrozoological research approaches.

Clinical research

Participants at the Delphi workshop also rated certain types of clinical research as highest-priority investigative approaches for increased funding. These were:

iv. Prospective studies

Prospective studies are studies that identify a cohort of research subjects and then gather data on them, as opposed to studies that look retrospectively at historical data that has already been collected. Prospective studies provide strong scientific evidence, although they are expensive and slow to execute.

A well-designed prospective study should be considered more highly for funding if it addresses a high-priority clinical need (the 'Benefit for the dog' index from Phase 1 can be used to prioritise clinical problems).

v. Randomised controlled trials

Randomised controlled trials, where patients are randomly allocated to different treatment groups and their outcomes compared, are widely recognised as providing strong evidence for or against the efficacy of a particular therapeutic intervention.

However, such research is expensive, which may constitute a barrier to its deployment in the veterinary sector.

Simulated trials that analyse retrospective population-level data are increasingly regarded as a useful alternative for causal inference, where feasible.

Well-designed randomised controlled trials (or simulated trials) that address a high clinical need may therefore constitute justified use of funds.

vi. Complex health issues

Many complex clinical issues have a high welfare impact, because they affect many dogs and also often have severe adverse effects on canine wellbeing: for example, obesity, arthritis and behavioural disorders.

Such complex topics could be a fruitful ground for larger-scale collaborative research that combines multi-centre or multi-disciplinary expertise and is potentially supported by several animal-directed funders (see further discussion of this under 'amber' priorities for change in section 3B).

Alternatively, researchers could unlock considerable funding resources by framing such research in One Health terms that involve comparison between human and canine medicine, thus rendering them more eligible for wide-scope funding (e.g. UKRI research councils such as the MRC).

In summary, **complex clinical issues justify major funding and therefore are prime candidates for larger research projects supported collaboratively by animal-directed and/or wide-scope funders, possibly also involving collaboration between researchers at different institutions and/or in different research fields.**

Research engagement

Few animal-directed funders publish full details of the research they have funded and what outputs have resulted, although this transparency is standard practice in the wide-scope funding sector (for example, UKRI funding is all publicly searchable at https://gtr.ukri.org/). This obscures the extent and value of the animal-directed funder sector's overall contribution to canine health and welfare research.

Research can only maximally improve canine health and welfare when its findings are disseminated to all appropriate stakeholders through effective research outreach communication, including wider public engagement where appropriate.

While some research topics (e.g. clinical trials) will largely be of interest to a specific specialist audience, many topics are of interest to the wider canine sector. For example, many responsible breeders take a keen interest in evidence-based recommendations for routine neutering, and will inform puppy purchasers of up-to-date advice.

Moreover, stakeholders from the wider canine health and welfare sector may offer alternative perspectives that can usefully inform research design. For example, animal caregivers may have different priorities from clinicians when managing complex or chronic clinical disease.

Greater emphasis on stakeholder engagement throughout and after the research process may thus amplify the benefit of many research projects.

3B. Research funding processes and infrastructure

These insights are displayed in Table 7 (page 35). Within this table, priorities for change in research funding processes and infrastructure are colour-coded on a 'traffic light' system, corresponding to the ease and feasibility of introducing these changes to the animal-directed funding sector. Part 3B of this report discusses the 'green' and 'amber' insights in detail, considering a range of possible innovations to improve the effectiveness of future funding processes in this sector.

Research funding processes that could be improved by individual animal-directed funders, or through light-touch collaboration between funders, are coded **green**.

- **'Green' priorities for change concern actions that individual funding organisations could take to improve funding processes for researchers, independently or through informal cooperation between funders. They are divided into those that streamline grant applications for senior researchers and those that support early career researchers in beginning and advancing a research career.**

Research funding processes that could potentially be improved through substantial collaboration between animal-directed stakeholder organisations are coded **amber**.

- **'Amber' priorities for change could potentially have significant impact within the canine health and welfare research sector, but would require active formal collaboration between multiple stakeholders and significant ongoing commitment in order to succeed. They include major novel initiatives such as the establishment of centralised collaborative platforms for research planning, recruitment, outreach and dissemination.**

Research funding processes that are not within the control of the animal-directed funding sector are coded **red**.

- **'Red' priorities for change would have major impact within the canine health and welfare sector - for example, if wide-scope funders were to award more funding to canine health research. However, since the animal-directed sector cannot directly influence such decisions, they are not discussed further in this report.**

Table 7. Highest priorities for future change in research processes and research funding infrastructure for canine health and welfare, taken from Skipper et al, 2024b.

Priority point of concern	Delphi participants' comments on benefits and feasibility of change
Burden of writing individual grants for each funder	Researchers would welcome any simplification of this time-consuming process through standardisation or simplification of application procedures.
Better feedback if grant proposal rejected	Researchers think this impacts welfare because they don't know how to improve proposals; also not transparent. Funders consider it too time-consuming.
More support for early career researchers	Early career structure is a major issue for researchers; arguably therefore also a problem for canine welfare. Funding and mentorship within bids/grants would help.
Networking, accessibility and outreach initiatives for researchers, especially early career researchers	These barriers reduce diversity and lose talent, which may impact canine welfare. Funder initiatives could address this – but might 'poach' research ideas or cause false hope in those not later funded.
Collaboration between funders to support 'big' projects with greater scope and impact	Obvious benefits but may divert funds from worthwhile smaller projects. Possible difficulties with politics or logistics of collaboration.
Collaborations between research centres investigating same topic, facilitating larger or 'better powered' projects	Obvious benefits but politically and logistically difficult, especially with regard to intellectual property.
Better visibility of past funding patterns, ideally through collaborative centralised live database	Improving this would be useful, especially to researchers. However, concerns re cost, logistical and political feasibility: major issues with intellectual property and/or data protection legislation. UKRI councils do this already.
Centralised discussion of priorities and funding gaps to develop collaborative strategic plans for future funding	An appealing concept, but potential issues with implementation, particularly power-sharing and logistics of shared discussion platform.
Centralised visibility of future opportunities for collaboration, for funders AND researchers	Obvious benefits but would require substantial upfront collaborative investment to develop suitable infrastructure.
Reducing gaps and barriers, increasing overall collaboration and communication between sectors	Overcoming misconceptions and barriers between sectors and stakeholder groups that impede research.
Overall lack of funding/too few funders	These are all major issues with canine health and welfare research. However, changing them is beyond the control of the canine-focused sector.
Canine sector is low priority for government and wide-scope funders	
Largest (UKRI and similar) grants usually restricted to One Health/public health	
More transparent and accessible industry funding	

‘Green’ priorities for change: ‘light touch’ actions to improve systems.

‘Green’ priorities for change all concern improving research funding systems for the direct benefit of researchers. These operative improvements would increase efficiency and researcher wellbeing within the canine health and welfare research sector and thus indirectly improve its outcomes for dogs.

‘Green’ changes could be implemented by individual funding organisations acting alone or through relatively ‘light touch’ informal cooperation between funders. This does not require engagement with major barriers to organisational collaboration, such as legal involvement to define intellectual property restrictions, and so is less challenging to introduce than more formalised collaboration.

These changes involve reducing the administrative burden of grant applications for senior researchers and providing better career support for less experienced researchers. This would potentially enable senior researchers to develop a greater quality and range of research proposals and support more talented researchers entering the sector, thus also improving the options available to funders.

The ‘green’ priorities for change are:

i. **Simplifying grant applications by standardising forms where possible**
ii. **Improving feedback when grant applications are rejected**
iii. **More support for early career researchers**
iv. **Networking, accessibility and outreach initiatives for new researchers**

These are discussed in turn below.

i. Simplifying grant applications by standardising forms where possible

Researchers at the Delphi workshop agreed that the workload of reframing and reformatting grant applications to satisfy the different requirements of multiple funders is a major obstacle which limits the number and quality of research projects that they propose. This restricts the range of research projects that funders see and hence limits potential benefit for dogs.

There is considerable variation in the size, scope and purpose of grants offered by UK animal-directed funders. Table 8 (pages 37-41) displays these data. It would therefore be impractical (and probably undesirable) to fully standardise the grant application process across the animal-directed funding sector. However, two possible innovations could simplify the application process relatively easily:

- **Wider adoption of short preliminary application forms for larger grants**
- **Simplification and full or partial standardisation of full application forms**

These suggested changes are discussed in more detail after the table.

Royal Veterinary College
University of London

Table 8. Summary of grants offered by animal-directed funders (as of summer 2024), indicating remit and restrictions for each scheme

Organisation	Scheme	Recipient	Amount	Species	Subject
Studentships					
Undergraduate/masters short projects (no stipend)					
BSAVA	Student research projects (SRPs)	Undergraduate UK veterinary/VN/bioveterinary students	£3,200.00	Companion animals	Clinical research
BVA AWF	Student grant scheme	Students on veterinary and animal welfare degree courses, or other courses if in scope	"Small" - costs of project, if extracurricular then stipend for student at min wage for up to 12 weeks	No restriction	Veterinary-relevant practical projects on animal welfare (not H-A bond etc unless 'clear practical relevance')
SCAS	Undergraduate student project	Undergraduates - no further restrictions given	< £1,500	No restriction	Human-animal bond - current theme 'one health, one welfare'
UFAW	Animal Welfare Student Scholarship	Undergraduate or MSc students studying at a UFAWLink university	£2800 max	Any species	Any aspect of animal behaviour that is compromised by human factors
Master/PhD studentships (including stipends)					

BSAVA	MDR (Master's by Research)	Postgrad students (can be vets)	£42,000.00	Companion animals	Clinical research
BSAVA	PhD studentship	Postgrad students (can be vets)	£80,000.00	Companion animals	Clinical research
Dogs Trust	DT Postgraduate Student Award	To support MRes or PhD project in relevant area	Up to £100,000	Dogs	Standard applications - suggested canine-relevant themes - 'preventing problems becoming a crisis', epidemiology of canine disease, chronic diseases including obesity.
Non-studentships					
Pilot studies/short research projects					
BSAVA	Clinical Research Projects (CRPs)	Can be clinician or academic	£20,000.00	Companion animals	Clinical research
BSAVA	Joint funded CRPs	Can be clinician or academic; some funding partners have restrictions on who's eligible	£10,000 (matched by a partner organisation)	Companion animals	Clinical research
Dogs Trust	Pump priming awards	"Researchers"	Up to £20,000	Dogs	To gain preliminary data in a relevant area

PetPlan	Pump priming awards	Unrestricted	Up to £12,500	Dogs, cats, horses, rabbits	Studies on natural disease conditions of accepted clinical importance in companion animals, to prevent their occurrence, provide a cure or eliminate suffering
SCAS	Pump priming research awards	Unrestricted	< £10,000	No restriction	Human-animal bond - current theme 'one health, one welfare'
UFAW	Small Project and Travel Awards	Unrestricted	< £3,500	Any species	Any aspect of animal behaviour that is compromised by human factors
Larger projects (>£20,000)					
Battersea	Unrestricted		Unrestricted	Dogs and cats	Research that delivers change for these species
BSAVA	Research Fellowships	ECRs (can be vets)	£70,000.00	Companion animals	Clinical research
BVA AWF	Research call	PI should have minimum of 2 years' research experience	£30,000.00	Any species	Themed annual funding calls
Dogs Trust	Experienced Investigator Awards	2-3 year project	Up to £200,000, 2-3 years	Dogs	Standard applications - suggested canine-relevant themes - 'preventing problems becoming a crisis', epidemiology of canine disease, chronic diseases including obesity.

KCCT	Currently restructuring	Unrestricted	No set limits	Dogs	Innovative research projects into inherited diseases in dogs and other canine health problems
PetPlan	Initial scientific awards	Unrestricted	no set limit, roughly £150,000, 1-3 year projects	Dogs, cats, horses, rabbits	Studies on natural disease conditions of accepted clinical importance in companion animals, to prevent their occurrence, provide a cure or eliminate suffering
UFAW	Research and Project Awards	Unrestricted	>£3500	Any species	"high quality research that is likely to lead to significant improvements in animal welfare"
Waltham	Research funding call	Unrestricted	<£25,000	Any companion animal species	"A Better World for Pets" (2023)
No open funding calls					
Blue Cross					
CamVet					
Guide Dogs					
PDSA					
RSPCA					
Woodgreen					
Corporates					
Some advertise research funding but only available to internal researchers or collaborations					

Wider adoption of preliminary application forms for larger grants

Eight animal-directed funders (Battersea, BSAVA PetSavers, BVA AWF, Dogs Trust, KCCT, PetPlan Charitable Trust, UFAW, and Waltham Foundation) currently offer larger grants (>£20K). However, only four of these (Battersea, BVA AWF, Dogs Trust and PetPlan Charitable Trust) currently offer a two-stage application process with preliminary and full application forms.

If all animal-directed funders moved to a two-stage system, this would reduce the initial administrative burden for both funders and researchers. A preliminary form could be standardised across funders, so that a researcher could resubmit a rejected application elsewhere with no additional workload.

This would benefit funders by providing visibility of more potential projects.

Preliminary forms are short and simple to complete, so that substantial standardisation across the sector should be easily achievable. However, this system would require funders to evaluate preliminary applications promptly, so that rejected candidates could apply elsewhere and shortlisted candidates could submit a full application within a reasonable timeframe. This would minimise uncertainty and delay for researchers trying to plan future work.

Simplification and standardisation of full application forms where possible

The larger canine-relevant grants offered by animal-directed funders are not all directly comparable, because they differ in their size and focus (e.g. whether they are exclusively clinical, what researcher career stage is eligible, if specified, etc). It would therefore be impractical to develop a single full application form suitable for use by all animal-directed funders.

Nevertheless, there are many discrepancies between funders' full application forms that inadvertently add to the burden of grant writing for researchers. Table 9 (pages 44-52) provides a detailed direct comparison between these full application forms.

Therefore, **some simplification and standardisation across all funders would be possible and desirable.** Areas of particular discrepancy are noted below.

a) Most funders require a **lay summary**, but these vary in length between 100 and 500 words. **A standardised and shorter lay summary could be included in both preliminary and full applications.**

b) Requested stipulations for **referees** are very variable. Most funders do not ask for referees. Among those that do, there is no standardisation of what constitutes a conflict of interest, or of whether the applicant should pre-confirm availability with the nominated referees or simply suggest some suitable names that the funder could approach. Dogs Trust has a very strict policy here, asking for four referees in

the same field who have never collaborated with the applicant/s. This might be very difficult to achieve in a niche field or might require the applicant to suggest potential referees who either had little knowledge of that field or who were potential rivals. **A standardised approach to conflicts of interest and number of referees could be adopted across the sector; for example, naming three possible referees who have not collaborated or worked with the applicant within the last five years.**

c) There is great variation in the requested **career details of Principal Investigators**. Here, Dogs Trust offers a very practical solution, allowing applicants to provide a link to their university online biography. **This simplification could usefully be adopted more widely.**

d) The details required for itemised **expenses** vary considerably between funders: for example, consumables are only mentioned by some. **Proposed project budget templates could be standardised, even if some funders exclude some categories.**

e) Most funders support and fund **open access publication** of research outputs, but not all mention it and PetPlan Charitable Trust explicitly do not fund this cost. Given the importance of open access to dissemination and thus impact of research, **this could be standardised to include full funding for open access publication.**

Table 9. Comparison of required information for application forms (as of summer 2024) for larger (>£20K) grants awarded by eight UK animal-directed funders								
	Battersea	**BSAVA**	**BVA AWF**	**Dogs Trust**	**KCCT**	**PetPlan**	**UFAW**	**Waltham**
Project title	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lay summary	Yes	Yes; to cover problem/knowledge gap, hypothesis and impact. No word count.	250 words	500 words	100 words	100 words	100 words (doesn't specify lay)	Not required
Principal Investigator	Title, name, qualifications, institution, department, contact details	Title, name, qualifications, institution, department, contact details, details of contract/post status (for ECR)	Name, organisation, position, contact details	Title, name, qualifications, institution, department, contact details	Name, qualifications, position, department, contact details	Name, qualifications, position, department, contact details	Title, name, qualifications, position, contact details	Title, name, affiliation, contact details; must have PhD or equivalent
PI relevant experience	Details of employment, expertise, current research, experience, prior funding	Details of PhD or Master's degree and of subsequent research experience; CV for applicant	Not mentioned	2 page CV or link to institutional biographic page	Not mentioned	Present and previous position, grant awards from last 10 years	Not a separate heading	250 words
PI relevant publications	Yes	Yes	Not mentioned	Implicit in above	Not mentioned	5 most recent	Not a separate heading	Up to 5
PI % time on project	Not mentioned	Yes; discuss other clinical, research and teaching commitments	Not mentioned	Yes	Yes	Not mentioned	Not mentioned	Not mentioned

Has PI been funded by this organisation before?	Implicit in other questions	Yes	Not mentioned	Not mentioned	Not mentioned	Implicit in awards listing	Yes	Not mentioned
Details for co-applicants	Yes	Title, name, qualifications, institution, contact details: this is the mentor as this is for an ECR research project; CV and other information (see below) needed for mentor	Not mentioned	Yes	Yes	Implicit in details of applicant box	Include on extra page if necessary	Title, name, job title, affiliation
Addresses where project will be carried out if different from PI address	Not separately mentioned	Would be at grantholder's address as they would be doing the work themselves	Not mentioned	Not separately mentioned	Not mentioned	Not mentioned	Yes	Yes
Length of project	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2 years maximum
Start date	Yes	Yes	Within 6 months from grant of award	Yes	Yes	Yes	Yes	Not mentioned
Project abstract	100 words project description	See lay summary		See layman's summary	250 words	Not a separate heading	Not a separate heading	500 words
Project objectives headline	Not requested as separate headline	Research question in 50 words	Aims and objectives, 100 words	Not requested as separate headline	Not requested as separate headline	Not requested as separate headline	Not requested as separate headline	50 words

Pathway to impact headline	Not requested as separate headline	Not requested as separate headline	Not requested as separate headline	Not requested as separate headline	Not requested as separate headline	"Potential Benefits" - likely impact on UK veterinary practice and its timescale - 100 words	Not requested as separate headline	"How does this research directly or indirectly support A BETTER WORLD FOR PETS?"
Total amount requested	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Summary of all project costs	Yes	Yes	Yes	Yes	Yes, broken down by year	Yes	Yes, broken down by year	2 page max breakdown and justification
Detailed costings: staff	Yes	Up to 30% of grant total	Yes	Yes	Yes	Yes	Yes	Not mentioned
Detailed costings: animals (husbandry etc)	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned separately	Yes	Yes
Detailed costings: travel	Yes	Only if justified	Yes	Yes	Yes	Yes	Yes	Only funded for essential fieldwork
Detailed costings: equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not funded
Detailed costings: consumables	headings relevant to non-research projects	Yes	Not mentioned	Yes	Not mentioned	Yes	Yes	Not mentioned

Detailed costings: publication	not mentioned	Not mentioned	Yes (open access)	Yes	Yes	Not normally included	Yes	Not mentioned
Detailed costings: other	contingency	Yes, to included technical support	Yes	not mentioned	Not mentioned	Yes	Yes	Not mentioned
Detailed costings: overheads	Yes	not mentioned	Not funded	not mentioned	Not mentioned	Not mentioned	Not mentioned (website says not usually funded)	Max 10% of total amount
Details if submitted elsewhere	Not mentioned	Yes (as in other funders)	Yes - co-funders, amounts and timescales for confirmation	Yes	Yes	Yes; welcomes co-funding	Yes	Not mentioned
Submitted elsewhere previously?	Not mentioned	Not otherwise mentioned	Not otherwise mentioned	Within last 2 years	Within last 2 years. Result?			Not mentioned
Project proposal	No word limits stated, one free text field 'Research Proposal'	Structured form with word limits per section	Structured form with word limits per section	Up to 3 pages of A4 under headings below	Free text fields on form under headings given below	Description - no more than 2,000 words	Free text on form - 3 pages maximum	5 pages maximum
Aims and objectives	Implicit in research proposal - 'details of proposed research, activities and timelines'	200 words	See above - requested as 100 words max	Provide in bullet format	"Including hypothesis, the expected results and the impact the findings will have on welfare"	Specific heading, to include research question	Yes	Yes

Preceding work	State relevance to previous work and how this research fills a needed gap	500 words plus references: why this research question, what is already known, knowledge gap to be addressed	300 words - critical examination of existing knowledge, why study is timely, gaps to fill	To include rationale/justification for proposed area of study	"Work which has led up to the application"	Specific heading	Yes	Background - situate topic in its academic and wider context
Method	To include in 'research proposal'	1000 words; to include techniques, type of study etc, what will be measured and by whom	250 words - methods, how will satisfy aims, how to gather data	"Protocol and methods to be used"	"Protocol and methods used"	Ensure detailed description of study and ensure applicants have appropriate expertise	Experimental design and methods	Procedure - detail and justify the methodology
Participants	not a separate heading	study population plus any control, including how they will be recruited, inclusion criteria, dealing with bias, etc	Not specifically mentioned		Not a separate heading	Not a separate heading	Not a separate heading	Describe and justify number statistically if applicable
Data analysis	Explain data generation, availability, sharing, safeguarding etc	Sample size, analysis etc, how data will be processed, what stats will be used. 1000 words for various results sections.	250 words - analysis and interpretation, how approach will achieve objectives, stats deployed, etc.		Not a separate heading	Not a separate heading, but project description should include assurance that statistical advice has been obtained on study size and design	Not a separate heading	Describe, justify and link to design and procedure
Likely output and disseminatio n	Engagement, dissemination and collaboration all mentioned under research proposal	150 words for public engagement relevant to application	Proposed knowledge exchange activities; how project can inform future research		Not a separate heading	"Outline where the results will be published/presented"	Publications etc; separate section on planned dissemination to target audiences	Not a separate heading

Possible problems	Risk assessment and conflicts of interest	Risks to animals (300 words). Several sections on inducements to participation, data protection, conflicts of interest (including other sources of funding), adverse effects, risk management	Obstacles to completion and how they will be mitigated	Not mentioned	Not mentioned	How will clinical material be obtained, if needed?	Problems that might prevent completion	Not mentioned
Impact	Impact to animal welfare, to research and to development of applicant/s	Benefits to animals in study/in future (300 words)	Relevance to animal welfare - 250 words	Describe pathway for positive impact on dog welfare	Not a separate heading	"Benefits to be gained from this project"	Likely benefit to animl welfare	Explain novelty, management and progress, key outcomes, benefits and possible applications
References	Not mentioned	see above	yes, not in word count		Yes	Yes	Yes	Yes
Project timeline	Included under 'research proposal'	not a separate heading	Yes - Gantt chart with milestones	Mentioned under impact	Not a separate heading	Not a separate heading	Not a separate heading	1 page
Involvement of human participants	not a separate heading	section on risk and informed consent	Not specifically mentioned	Explain DT participation if not collaborative project	Not a separate heading	Not mentioned	Not a separate heading	Describe numbers, recruitment, risks, data security, benefit/value or research - 2 pages max

Involvement of animal participants	not a separate heading	section on animal welfare	Not specifically mentioned	Explain DT participation if not collaborative project	Not a separate heading	Discussion in Ts and Cs, not a separate heading in form	Full details of choice, species, sample size etc	Source, numbers, husbandry, benefits, risks, fate - 2 pages max
Home Office licence	Not mentioned	Will not be funded		Will not be funded	"Must be vigorously justified" (not normally funded)	Will not be funded	Provide details of ethical permissions etc	Not specifically mentioned
Intellectual property	Not mentioned	Not specifically mentioned	Not specifically mentioned	Not mentioned	"Please comment as appropriate"	Discussed in Ts and Cs	Discussed in Ts and Cs	Not mentioned
Ethical approval	Ethical standards mentioned under research proposal	Yes	Yes	Yes	Yes	Discussed in Ts and Cs	Yes	Required
Other (funder specific)		Details of all previous funding received in last 5 years for grantholder, relevant past training, section on how grant will support career development for grantholder. Section for mentor to complete on their experience and mentorship experience		Details of DT staff (research team and others), dogs, data,and/or samples required if collaborative project with DT	"Where relevant, have you obtained support from within the breed concerned? Please comment as appropriate"	CVs (information above) for all applicants; usually won't fund breed specific studies	Details of supervision if a PhD project	None

Referees	Not mentioned	3 potential peer reviewers with no conflict of interest (same institution, advice, friendship, collaboration within 2 years)	Not mentioned	4 referees in same field who might peer review and who have never collaborated with applicant/s	Not mentioned	Require 4, will ask 2	Not mentioned	Not mentioned
Signatures needed	Online form - not specific - I presume PI?	Applicant, HOD, mentor	Not on form!	PI, HOD, officer responsible for grant admin	PI, HOD, officer responsible for grant admin	PI, HOD, officer responsible for grant admin	PI, HOD, officer responsible for grant admin	PI and institutional representative

ii. Improving feedback when grant proposals are rejected

Researchers at the Delphi workshop said that most rejected grant applications currently receive no funders' feedback, although some funders do permit or invite resubmission for certain proposals.

Researchers and funders differ in their views on the feedback issue. Researchers argue that rejection without feedback is problematic, because researchers don't know why they were rejected and therefore cannot modify their proposals accordingly before resubmission to the same or other funders. **This means that funding applications are not improved through feedback cycles, missing the opportunity to develop stronger applications that could have greater benefit for the dog if eventually funded.**

However, funders state that providing feedback is impractically time-consuming, because funding committees rely on the expertise of volunteer assessors and have limited supporting secretarial infrastructure.

If a two-stage application process were universally adopted for larger awards, as described above, this should reduce the number of proposals that reach the second stage and hence lighten the funding body's burden if providing written feedback for full applications.

The 'Benefit for the dog' and 'Pathway to impact' scoring matrices devised during the current research project could be implemented as a decision-making tool for preliminary or full applications, which could be shared with applicants post-hoc with no extra administrative burden.

Researchers stressed that even brief feedback would be valuable to them. **Funders could consider providing just one or two sentences of feedback, perhaps generated during their funding committee meeting using a standardised rejection template.**

iii. More support for early career researchers

Lack of opportunities for early career researchers is a major current issue in academia, extending far beyond the canine health and welfare sector.

Issues include (but are not limited to) low salary/stipend compared to other types of work, especially for clinical researchers; limited funding opportunities, particularly for post-doctoral researchers; precarity and the need to obtain multiple successive short-term contracts to progress a career; grants that exclude salary provision and hence are not accessible for all possible applicants; lack of formal support for career development programmes.

- Four animal-directed funders (BSAVA PetSavers, BVA AWF, SCAS and UFAW) offer small awards to support undergraduate student projects (<= £3200).
- Two funders (BSAVA PetSavers and Dogs Trust) offer dedicated awards for master's and/or PhD studentships, which include stipend funding.
- Only one funder (BSAVA PetSavers) offers an Early Career Research Fellowship: this is restricted to clinical work.

Very few grants are large enough to cover a **salary for postdoctoral researchers**, and some of those that are (BSAVA PetSavers, PetPlan Charitable Trust) are exclusively clinical. **This constitutes a barrier to career progression for early career researchers, as discussed later. This particularly impacts those who work in non-clinical research, despite the high perceived value of such research in advancing canine welfare, as established in the Phase 2 output from this project.**

Large grant awards in this sector are often very flexible and so are sometimes used to support early career researchers. However, such opportunities are therefore limited and sporadic.

Overall, therefore, it is certainly true that early career researcher support in UK canine health and welfare research is extremely limited and likely to remain constrained by overall budgetary limitations. Any deliberate attempt to address this problem would be welcome, even though only a few people could benefit directly, because it would raise the profile of this issue across and beyond the canine health and welfare sector.

Funders that do not already do so could consider allocating specific funds to support postgraduate and postdoctoral researchers. They could also consider announcing the recipients of such awards, as currently there is often little visibility for early career researchers who are supported in this way. This could also extend to early career researchers who are funded as part of large grant awards, but whose involvement is often hidden unless and until they are included in eventual publication outputs.

The issue of career progression in canine health and welfare research is investigated further in the third project output paper, currently in preparation, as discussed above (page 25).

iv. Networking, accessibility and outreach initiatives for new researchers

In addition to the lack of sector-specific funding discussed above, access to and progression within research career pathways throughout the academic sector is particularly difficult for some talented potential applicants, such as those from non-traditional backgrounds or with caring responsibilities (3). This was repeatedly raised as a concern at the Delphi workshop.

Supporting entry into research for a wider pool of applicants maximises the available talent that is recruited, ultimately increasing the benefit for dogs. Various measures could be helpful here, although all these possibilities require investment and commitment by the funding bodies, including provision for logistical operations and ongoing support.

A centralised online or face-to-face discussion forum could facilitate access to research networks for potential researchers (online is more accessible and cheaper). If an online platform were developed, it could be incorporated into a larger centralised platform for research collaboration (discussed later in the amber section).

A regular 'get into research' online event aimed at undergraduate students or early career researchers could support outreach and provide exposure and experience for

potential participants. Such an event could include a speed-dating or other networking element.

Alternatively, animal-directed funders could host in-person outreach and networking events, either within larger sector events such as conferences or through 'open days' at their own premises.

Funders could also consider providing travel-specific funding schemes for early-career researchers, to widen access to these networking opportunities and thus expand the talent pool available for future research projects.

'Amber' priorities for change: formal multi-stakeholder collaborations

The 'amber' priorities for change in Table 7 concern priorities for change in research processes and infrastructure that depend on collaboration between multiple stakeholders, particularly funding organisations.

Collaboration obviously cannot be achieved by any one organisation acting independently; it must involve an agreed relationship between two or more parties. This multilateral need for formal cooperation itself inevitably constitutes an additional barrier to change, hence the 'amber' coding.

Nevertheless, there are considerable potential benefits for all stakeholders in improving collaboration with, and transparency of, research funding opportunities.

Figure 4 depicts the networks that connect these opportunities for change.

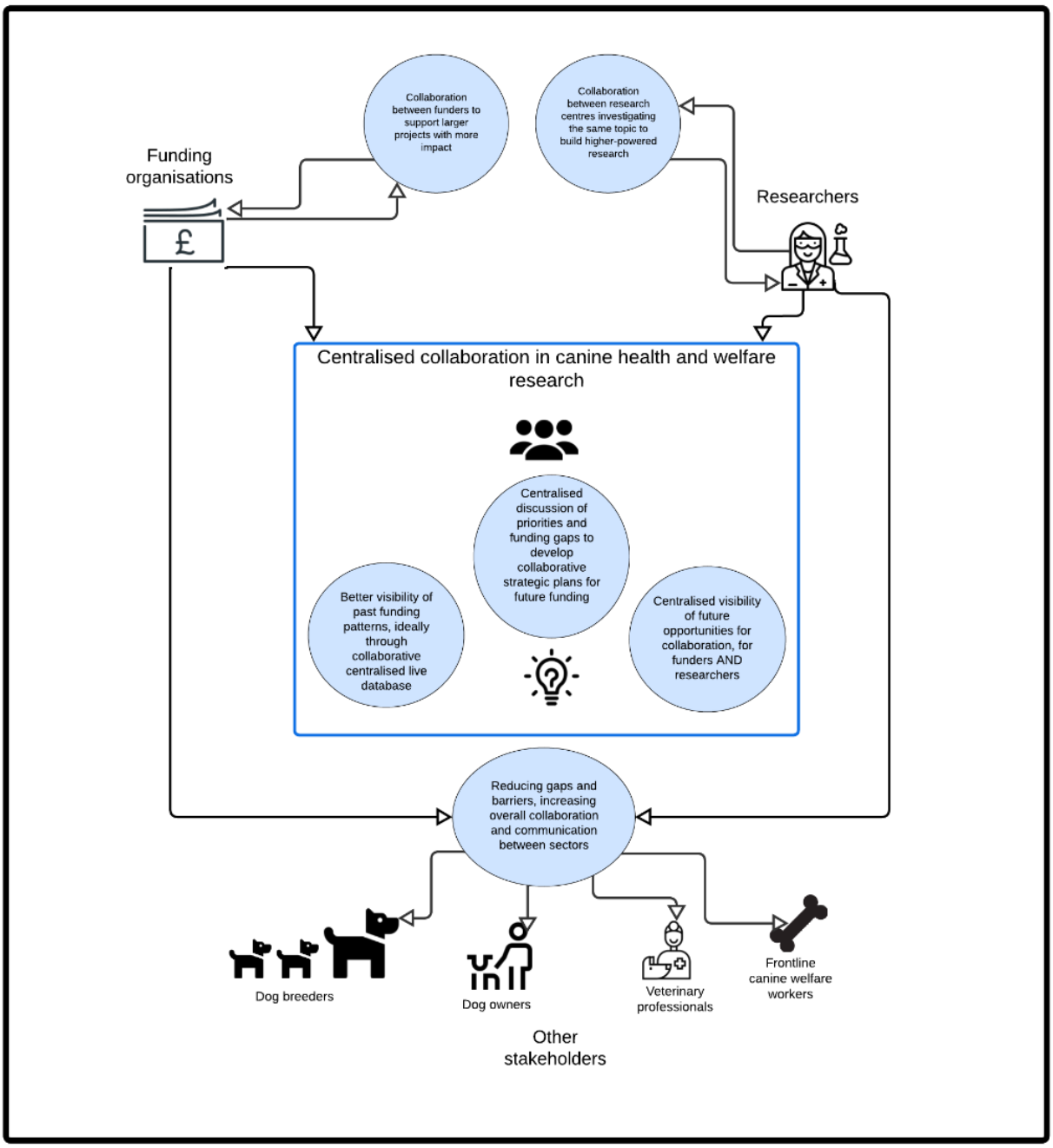


Figure 4. Diagram showing potential collaborations between stakeholders that can create change in research processes and research funding infrastructure to advance canine health and welfare ('amber' collaborative priorities).

The following ‘amber’ collaborative priorities for future change in research processes and research funding infrastructure for canine health and welfare emerged from the Phase 2 Delphi study:

i. **Collaboration between funders to support 'big' projects**
ii. **Collaborations between research centres investigating the same topic**
iii. **Visualising of past funding patterns: a collaborative centralised database**
iv. **Centralised visibility of research opportunities, facilitating collaboration**
v. **Collaborative discussion of research priorities and funding gaps**
vi. **Reducing gaps and barriers between sector stakeholders**

These are discussed in more detail below.

i. Collaboration between funders to support 'big' projects

If several funders collaborate to support the same research project, research with greater scope and impact can result. Many large research projects (for example, VetCompass at the RVC) are supported in series or parallel by multiple grants obtained separately or through ad-hoc arrangements with different funders. Also, informal collaborations between funders already support some research projects that might not otherwise be funded at all (for example, the current project, originally jointly commissioned and supported by four funders).

However, the amount of funding in the canine health and welfare sector available at any point in time is finite. Informal collaborations redirect rather than increase the total available funding and may be limited by the differing priorities of each funding organisation. Collaborative funding is therefore likely to remain sporadic.

Nevertheless, more collaborative funding initiatives could be deployed on an ad-hoc basis, particularly to support costly or complex projects with significant potential benefit for the dog.

Larger-scale formal partnerships (for example, between animal-directed and wide-scope funders) could also support projects with greater impact and extend their scope within and beyond the canine sector.

ii. Collaborations between research centres investigating the same topic

Collaborations between research centres investigating the same topic enable larger or more ambitious research projects. However, animal-directed funders often have insufficient resources to support large-scale research projects (no animal-directed funder advertises any award > £200K). Large-scale projects that include collaboration between research centres are therefore more likely to be supported by better-resourced wide-scope funders such as UKRI research councils.

Therefore, ventures involving collaboration between research centres are perhaps more suited to research that can be framed in terms of One Health or One Medicine, as relevant to dogs and humans or other species, which may be more attractive to wide-scope funders.

iii. Visualising past funding patterns: a collaborative centralised database

There is currently no dedicated central platform that tracks past funding distribution across the canine health and welfare research sector. In contrast, wide-scope funders (UKRI councils and the Wellcome Trust) have websites with excellent public visibility of past grant awards, which are regularly maintained and easily searchable (https://gtr.ukri.org/; https://wellcome.org/grant-funding/funded-people-and-projects).

Most animal-directed funders do not publish their funding patterns in this way, with the exception of BVA AWF, which has comprehensive data publicly available on its website. Some funders share their headline data with the UK open data site 360Giving (https://www.threesixtygiving.org/). This database is detailed and searchable but is challenging to navigate due to the volume of data held and because it is not limited to research funding.

Funders may be reluctant to make specific funding information public, due to concerns about intellectual property, reputational risks and data sharing.

There would also be substantial costs associated with a centralised dedicated database for animal-directed funding, as discussed further below.

The exact remint of this and other collaborative centralised initiatives would need to be determined. The current study has only investigated canine health and welfare research. However, most (but not all) in-scope UK animal-directed funders also support research that concerns a range of other species. **Therefore, agreement would be needed about the exact scope of any such venture.**

Nevertheless, increased transparency about research funding provision in the animal-directed funding sector, either by individual funding organisations or (ideally) through a central dedicated database, would provide greater visibility of funding decisions and research outcomes for all stakeholders, arguably supporting more informed future research proposals and funding decisions.

iv. Centralised visibility of research opportunities, facilitating collaboration

There is currently no centralised site that hosts all canine-relevant funding calls, let alone one that provides open visibility of future multi-stakeholder opportunities for collaboration.

At present, research funding calls are usually advertised on funding organisation websites and may be circulated elsewhere (e.g. LinkedIn). This enables informed researchers to spot funding opportunities, but devolves the burden of awareness to each individual researcher

and means that those with less sector knowledge may inadvertently overlook suitable funding opportunities.

A centralised platform for announcing funding calls could involve a central website, email distribution list, LinkedIn group, etc. It could also circulate opportunities for collaboration initiated by various stakeholders.

If strategic centralised collaboration were initiated to direct future resources towards agreed research priorities and funding gaps, as discussed below, then collaborative funding calls could be circulated as part of that process.

Another possible innovation is a **common portal for grant applications**, where researchers could upload a preliminary proposal for simultaneous consideration by multiple funders. This has clear merits – less time-cost for researchers, visibility of more possible projects for funders – but also obvious issues, such as the costs of developing the portal itself, potential problems around intellectual property theft, and how interest and commitment would be negotiated between stakeholders.

Different options for centralised communication routes vary in the extent of their logistical demands (financial outlay, data security, ongoing maintenance, etc). However, any such network or platform would require some sort of sustained administrative (and possibly financial) support commitment to succeed, yet would need to be seen as independent to avoid concerns about partisanship and power imbalances, posing a potential political problem.

Any centralised communication platform would require buy-in from most relevant funders to obtain sufficient traction to be useful, which might also be politically difficult.

A central website with a searchable database of past funding, with dedicated members' areas accessible by funders, researchers and other stakeholders, could fulfil many suggested functions for increased collaboration in this sector. However, this could be prohibitively expensive – a ballpark setup cost would be tens to hundreds of thousands of pounds, depending on system complexity, with more moderate ongoing maintenance costs thereafter.

Despite these significant obstacles, any level of centralised visibility of funding and collaboration opportunities would help support optimal deployment of research resources to advance canine health and welfare. Such initiatives could be trialled with a low-cost pilot programme with limited scope, and extended thereafter if this generated sufficient sector support.

v. Collaborative discussion of research priorities and funding gaps

At the inception of this UK Canine Research Funding Analysis Project, its four commissioning funders identified a key aim. They sought evidence to identify key research priorities and funding gaps, to strategically direct the future allocation of canine health and welfare research funding through collaboration between stakeholders from across the canine health and welfare sector. By their support for the current research project, the funders have therefore indicated at least some potential interest in future centralised priority-setting.

The current research project has created an initial evidence base for future collaborative priority-setting, by providing historical analysis of past funding patterns in canine health and welfare research and by exploring stakeholders' priorities for future work through the modified Delphi study.

However, without the development of suitable infrastructure for future collaborative priority-setting, the work from the current project will translate into meaningful action less effectively and will inevitably become less relevant over time.

Animal-directed funding organisations can, of course, continue to liaise informally with each other, as they did when commissioning the current research project. However, such links can be fragile and are currently limited to funding organisations. This inevitably limits the input from researchers, other than when they serve on funding committees and thus contribute to funding decisions. Moreover, other stakeholders, such as canine caregivers, rescue workers or clinical veterinary staff, may have useful front-line perspectives that will be excluded from these discussions.

To sustain a useful legacy from the current research project, it is therefore highly recommended that a structured and collaborative space that includes multiple stakeholder groups is developed to facilitate future strategic priority-setting in canine health and welfare research funding.

One such platform in the medical world is the James Lind Alliance.

The James Lind Alliance

The James Lind Alliance (**https://www.jla.nihr.ac.uk/**) is a non-profit human medical organisation, funded by the National Institute for Health and Care Research, which brings together patients, carers and clinicians in 'priority setting partnerships' (PSPs) to reach joint consensus on future research priorities for particular health issues.

James Lind Alliance PSPs work together 'to identify and prioritise the unanswered questions or evidence uncertainties that they agree are most important for research to address.' This approach is intended to ensure that funders and researchers include the perspectives of those whose lives are most affected by the health issues that they are investigating, thus avoiding a top-down research bias that may not address the matters of greatest concern to the affected population.

PSPs are set up to address specific health issues; for example, 'Lyme Disease', 'Miscarriage' or 'Schizophrenia'. Each PSP brings patients, carers and clinicians together to discuss the topic of concern. The discussion is clinically focused, and deliberately excludes pharmaceutical and non-clinical research interests (other than seeking researcher input on the feasibility of certain pathways) to ensure that patients' interests remain centred.

Within a PSP for a specific health issue, participants reach consensus agreement of the top ten evidence uncertainties to address. An evidence uncertainty is when EITHER there is no recent systematic review of research evidence relating to a specific

health issue, or there IS a recent systematic review, and it reveals uncertainty. Trained James Lind Alliance advisors support PSPs as neutral self-employed facilitators to ensure the process follows the James Lind Alliance method and that all stakeholders are fairly represented. A PSP typically takes 12-18 months to complete. Further details can be found in the James Lind Alliance Guidebook | James Lind Alliance (nihr.ac.uk).

The first James Lind Alliance PSP was completed in 2007. Past participants report that the process can have a transformative impact in shifting priorities among clinicians and researchers and in empowering patient groups. For example, the PSP on Lyme disease identified multiple evidence uncertainties, many raised by patients, despite an initial clinical view that there were no uncertainties. This shifted subsequent policy at the Department of Health.

Is the James Lind Alliance PSP method suitable for the veterinary sector? There is one prior instance of its use in companion animal medicine, at the Centre for Evidence-Based Veterinary Medicine at the University of Nottingham in 2014. Dr Rachel Dean carried out a James Lind Alliance PSP to consider evidence uncertainties and research priorities for feline chronic kidney disease, including cat owners and veterinarians and using a James Lind Alliance advisor. The top ten resulting priorities mainly reflected the practical concerns of feline caregivers, such as 'what is the best alternative diet for cats with chronic kidney disease if they won't eat the veterinary kidney diets?' or 'do subcutaneous fluids improve the lives of cats with chronic kidney disease?' (See https://www.nottingham.ac.uk/cevm/practice-based-research/small-animal/chronic-kidney-disease-in-cats for more details).

This successful study shows that the James Lind Alliance approach has potential for determining priorities in canine health and welfare. However, cost is a constraint. Trained James Lind Alliance advisors are skilled professionals who are appropriately paid for several days' work per PSP. With room hire, reimbursement for participants' expenses and post-meeting data analysis as additional expenses, a medical PSP can incur substantial costs (tens of thousands of pounds), which may be beyond the resources of the veterinary sector.

The Phase 2 Delphi workshop in the current project had some parallels to a James Lind Alliance PSP, in that it brought multiple stakeholders together to determine research priorities in canine health and welfare through a broader consensus than would have arisen from funders and researchers alone.

Other canine research projects have included priority-setting initiatives – for example, Rowena Packer investigated caregiver priorities as part of her research on canine epilepsy at the Royal Veterinary College (4).

The canine health and welfare sector could devise a system inspired by the James Lind Alliance PSP model that enabled caregivers, clinicians and researchers to collaborate in determining future priorities for research into specific canine health issues. A centralised resource similar to the James Lind Alliance would have great potential impact for canine health and welfare.

However, as with other similar suggested sector innovations, if such initiatives are to become established routes to determine future priorities in canine health, rather than one-off projects, they will need substantial ongoing logistical and financial investment from multiple stakeholder organisations, which may be challenging to obtain.

If cost precludes the setup of a centralised James Lind Alliance-style platform for priority-setting in the canine sector, then smaller ad-hoc meetings on particular canine health issues, potentially using online platforms to maximise broad stakeholder involvement, could possibly bring similar benefits more affordably.

vi. Reducing gaps and barriers between sector stakeholders

As shown in Figure 1 and emphasised throughout this report, funders and researchers are not the only stakeholders in canine health and welfare research. Engagement with other stakeholders, such as clinical veterinary staff, animal caregivers, front-line rescue workers, dog breeders and dog trainers is (as shown by the James Lind Alliance approach) important to ensure that future research prioritisation responds to and accommodates the perspectives of these groups, thus maximising its relevance to canine health and welfare.

Similarly, as discussed elsewhere in this report, it is important to ensure that research outputs are effectively circulated to all stakeholders to maximise their uptake and value.

To some extent, this happens organically or through targeted press releases; for example, informed pet owners and clinical veterinarians are both concerned about the potential health issues associated with canine neutering, so that research to clarify this matter spreads widely over social media soon after publication.

Links between funding organisations and researchers can be reinforced by engagement that goes beyond financial support. For example, when researchers are granted access to organisational internal data (as with this research project) or facilities (as when researchers study canine behaviour in Dogs Trust rehoming centres), the resulting outputs are both more visible and more relevant to participating stakeholders, increasing the likelihood that they will have useful practical impact.

Every effort at collaboration and communication may potentially help to reduce barriers between stakeholder groups, so that many of the points previously considered may also be of benefit here.

Nevertheless, more formalised routes for the reciprocal and multidirectional dissemination of knowledge through stakeholder networks would ensure that new research both shapes and is shaped by the practical concerns of people who live and work with dogs directly, thus maximising its benefit and impact for the dog.

‘Red’ priorities for change (out of scope)

- As discussed in Phase 2 of this report, some issues with research infrastructure are beyond the control of the canine health and welfare sector. Such topics are listed (coded red) in Table 7. They include the overarching lack of funding for this sector and its low prioritisation by relatively well-resourced wide-scope funders such as UK Government research councils.
- The operations of wide-scope and industrial funding streams are obviously beyond the control of animal-directed funders, and so are not discussed further here.
- **Researchers who hope to obtain wide-scope funding for research into canine health and welfare may be more likely to succeed if they can frame their work as relevant beyond the canine sector (e.g. to advance knowledge in a One Health or multispecies context) or if they can access medical humanities funding streams, which may be receptive to veterinary applications.**

Conclusions

This two-year research project has provided a comprehensive, broad-based and genuinely novel analysis of past funding patterns, future funding priorities, possible changes in research processes and possible innovations in research funding systems for the UK not-for-profit canine health and welfare research funding sector. Because the analysis is wide-ranging and multifaceted, a very wide range of possible innovations have been described, from small adjustments that could be relatively easily made by individual funding organisations acting alone to major sector-wide initiatives that would require substantial investment and commitment across multiple funding organisations to reform this often-inefficient system.

While it is unlikely that all the suggestions in this report will be adopted, or even that all these recommendations will be considered desirable by all readers and users, the very range and variety of the insights offered here mean that all stakeholders who want to improve the value of research in advancing canine health and welfare are likely to find some content useful and relevant to their particular situation.

Those of us who work within the canine health and welfare sector are accustomed to complaining about how little research funding is available when compared to human medical research. While the evidence generated by the current work confirms that this is certainly true, the differences between the canine and human sectors are not all to our detriment as advocates for canine welfare. A recent article that discusses the ‘broken’ situation in UK human medical clinical research notes major inefficiencies within, and disconnect between, medical research centres at universities and NHS hospitals, with both of these systems currently in structural and financial crisis to the extent that some funded studies are delayed by years or never happen at all (5). The current research project has shown that, while the occasional canine-focused research study is abandoned for specific reasons, such instances are rare. We may not have so much money relatively at our disposal within the canine research world, but by and large, canine studies that receive funding do then take place promptly, mostly producing published outputs (1). Moreover, the decentralised structure and organisational autonomy that characterises our sector is both a curse and a blessing; while lack of collaboration and communication may hamper the optimal deployment of limited resources, every stakeholder organisation in this sector is free to act independently or with others to improve the efficacity of UK research in improving canine lives, so that the findings in this report can be partially implemented by any organisation that finds them helpful.

We hope that this report will aid its readership in making changes that advance the relevance and effectiveness of canine health and welfare research for the benefit of dogs everywhere.

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