Rabbit Welfare Strategy

PIF Pet Industry Federation

RSPCA

BVZS British Veterinary Zoological Society

University of BRISTOL

RABBIT WELFARE Association & Fund

Authors

This strategy was developed by a core working party consisting of:

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Supporters

The organisations who have signed up to the complete strategy are:

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A Summary and aims of the strategy

Rabbits are the third most popular mammalian pet in the UK. However, they are also commonly believed to be one of the most neglected species, with owner knowledge about how to meet their welfare needs lagging behind that of dogs and cats (PDSA, 2011; Wensley et al., 2021). To have high welfare a rabbit must be healthy, and must also be psychologically fulfilled.

As research and knowledge about rabbit welfare is increasing, it is vital to adopt a coordinated approach with all key stakeholders (those organisations and representatives of groups with an interest in rabbits) working together to promote positive welfare. Therefore, below we describe a long-term strategy, devised by the Rabbit Welfare Group (RWG); including representatives of rabbit fanciers, the pet industry, academia, veterinary community, rabbit-specific and general animal welfare charities, and rehoming organisations. The strategy is agreed by the supporters (listed on the inside cover), as a viable way to address current issues and maximise improvement in rabbit welfare in the future.

The strategy aims to achieve the following:

- Improve rabbit welfare by considering each of the five welfare needs;
- Use current evidence-based information where it exists and current consensus expert opinion where it does not;
- Define and promote good practice through education and information dissemination;
- Encourage owners and potential owners to acquire up-to-date knowledge on optimal rabbit care, in order to best meet their rabbits' welfare needs;
- Work with the retail trade to encourage the sale of welfare compatible products, promote and improve the training of staff and provide optimal advice to customers on how best to meet their rabbits' needs (in line with Licensing of Activities involving Animals (2018) legislation);
- Work with breeders and sellers to best prepare rabbits for a happy healthy life as a companion animal;
- Promote research where knowledge gaps exist and encourage the sharing of new knowledge and data, which could lead to improvements in rabbit welfare;
- Work collaboratively to overcome specific emerging welfare problems e.g. unregulated online sales of rabbits;
- Encourage the development of appropriate secondary legislation including Codes of Practice;

To achieve these aims, the strategy has identified ten strands, or priority areas. The first six priorities address the five welfare needs and seek to derive evidence-based good practice:

1. **Define and promote good housing and husbandry**
2. **Determine and promote optimal dietary advice**
3. **Describe welfare compatible social living for rabbits – reducing the number of rabbits living solitarily**
4. **Examine and promote best practice for breeding and rearing rabbits well suited to life as a companion**
5. **Highlight ways to reduce preventable disease in rabbits**
6. **Promote timely and optimal treatment to rabbits with compromised health or welfare**

Whilst the remaining four priorities seek to maximise implementation and welfare improvement:

7. **Develop guidelines for good practice for owners and all those with an interest in rabbits**
8. **Review skills and training for those working with rabbits.**
9. **Seek to balance supply and demand to reduce the number of unwanted rabbits**
10. **Set up systems to regularly monitor health and welfare**

The background research and justification for each is described in Sections E and F. Where applicable, we have derived a statement of "good practice" – shown in purple boxes - based on current evidence-based knowledge, to which all RWG members subscribe and support dissemination.

Within each of the ten priority areas, there are between five and nine actions, some of which can be actioned immediately involving consolidation or promotion of good practice, and others are longer-term, aimed at improving welfare knowledge and/or standards. The time frames of each are categorised as immediate, medium or long-term based upon perceived urgency and feasibility (see Section H for suggested time-frames). It is planned that each of the priority areas will be adopted by a working party, composed of relevant representatives and headed by an RWG member who will assume responsibility for implementation, and monitoring of progress in the specific priority area. This document concludes with an action plan describing these.

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B A vision for Rabbit Welfare

The organisations listed on the front and inside cover endorse this vision for how rabbits should be bred, kept and cared for in the UK.

To achieve this vision, we believe it is necessary for each of the following condition to be met

- **All rabbits** have access to an appropriate diet, known to optimise animal health and minimise the risk of disease. This includes having continual access to both good quality fibre-based material (e.g. hay or fresh grass) to eat and fresh, clean water.
- **All rabbits** live in an environment which meets their physical, social and behavioural needs (i.e. to run, jump, graze, dig, rest and stand up on their hind legs without their ears touching the roof of their enclosure).
- **All rabbits** are sold or rehomed to be kept in compatible pairs or groups.
- **All rabbits** are bred, reared and kept in a way known to maximise their chances of being healthy and minimise their chances of developing fear of handling and other stimuli.
- **All rabbits** are given regular preventive health care as recommended by veterinary experts, e.g. vaccinated against myxomatosis and RVHD 1 and 2 (according to current vaccine licence recommendations), treated for internal and external parasites and neutered unless specifically required for breeding.
- **All rabbits** are given appropriate and timely veterinary treatment to protect them from pain, disease and suffering.
- **All those working with rabbits** (including vets, retailers, breeders, rehoming organisations) undertake effective training programmes and have resources available to them on current good practice in housing and husbandry, the promotion of health and welfare, and the management of disease and welfare risks.
- **All rabbit health and welfare advice** and recommendations are based on international scientific knowledge and professional experience. The veterinary profession offers up-to-date expertise in recognition, management and prevention of disease and practises to promote good welfare.
- **The number of rabbits relinquished**, and thus requiring rehoming (both privately and via rescue organisations), is minimised.

This strategy includes actions aimed at facilitating each group of stakeholders to meet these conditions.

The Rabbit Welfare Group seeks for this vision to be reflected in a DEFRA Code of Practice for rabbits in England (codes and guidance for rabbits already exist in Wales, Scotland and Northern Ireland).

C Background: Why do we need a strategy for rabbit welfare?

Rabbits have historically served as food and as laboratory animals, but now the majority are kept as family pets, although many are still housed singly in hutches, outside. In 2020, rabbits were the third most popular companion animal in the UK, with around 1 million being kept (PDSA, 2020). However, they have also been described as the most neglected species (compared to dogs and cats; PDSA, 2011), suffering from a range of potential welfare problems.

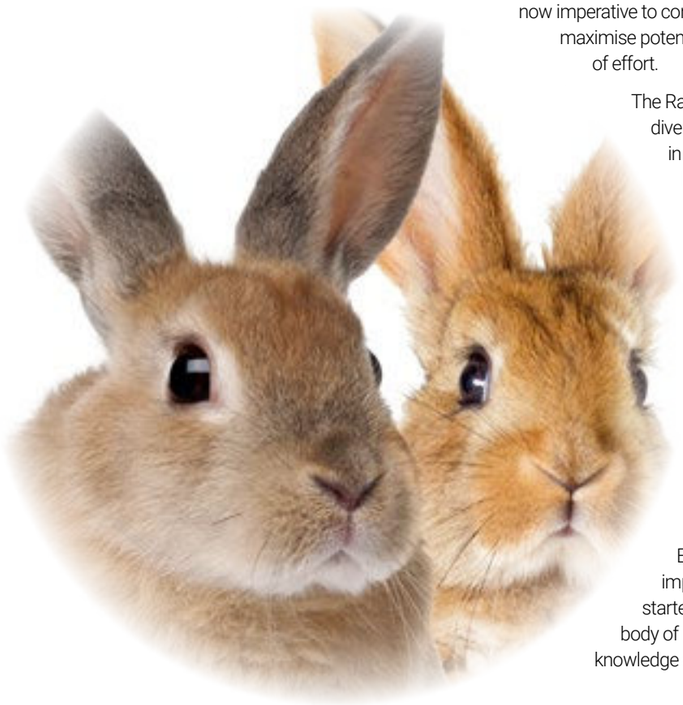
Under the Animal Welfare Act (AWA: DEFRA) of 2006, all owners, and those legally responsible for companion rabbits have a duty of care to provide for the animal's needs. Those needs are defined to be:

- **A** a suitable environment
- **B** a suitable diet,
- **C** to be able to exhibit normal behaviour patterns,
- **D** to be housed with, or apart from, other animals,
- **E** to be protected from pain, suffering, injury and disease.

Secondary legislation in the form of Codes of Practice (CoP) for rabbits exists in Wales and Northern Ireland, and guidance in Scotland. This is aimed at aiding interpretation of, and compliance with, welfare legislation. As of 2021 there is no equivalent for England. Introduction of such Codes is an aim of this strategy. However, studies show that only 66% of pet owners are aware of Codes of Practice (PDSA, 2019) so, if any such codes are to significantly improve animal welfare, they would need to be accompanied by other comprehensive programmes of implementation and education.

Welfare science has started to inform how best to meet the five welfare needs for many animal species, although for companion animals, in particular rabbits, this is in its infancy, and more is still required. Recent research on rabbit welfare (e.g. Mullan and Main, 2006, 2007; Schepers et al., 2009; PDSA, 2011; Rooney et al., 2012, 2014; Prebble and Meredith, 2014; Prebble et al., 2015a, b; Meredith and Prebble, 2017) has highlighted that many pet rabbits do not have at least one of their needs met. Studies have started to provide an evidence-base from which to determine optimal care protocols. Research has also helped identify and prioritise those issues most important to improving rabbit welfare (Rooney et al., 2012; Rioja-Lang et al., 2019; 2020; see below).

To improve the welfare of companion animals kept and cared for by a diverse and differentially motivated populous, is no easy task. It requires a concerted and joined up approach involving a range of stakeholders. There are numerous independent bodies and charities working hard to improve rabbit welfare, and several collaborative efforts have already been initiated with great success e.g. Rabbit Awareness Week. However, it is now imperative to concentrate on the most important welfare issues, to both maximise potential improvement to rabbit welfare, and to avoid duplication of effort.



The Rabbit Welfare Group (RWG) was formed to represent the diversity of stakeholder organisations (groups with an interest in rabbits) including rabbit fanciers (showers and small-scale breeders), the pet care industry, academia, the veterinary community, rabbit-specific and general animal welfare charities, and rehoming organisations. To improve rabbit welfare, we believe collaborative strategic plans must be implemented, hence the Rabbit Welfare Strategy, which includes ten priority areas and a range of actions with both short and long-term measurable goals, was devised.

The RWG evolved from ongoing initiatives including those by the Companion Animal Sector Council (CASC). It was formed in response to a surge of interest in rabbit welfare research since 2010. A multi-dimensional study at University of Bristol, closely followed by a large-scale dietary study by University of Edinburgh, provided new impetus for a concerted effort to improve rabbit welfare. Therefore, the RWG was initiated and started to devise a strategy for rabbit welfare based on this new body of research. This has since been extended to incorporate new knowledge and recent research.

Rabbit Welfare Strategy

Recent research

Historically there was little study of pet rabbits, but increasingly they are being surveyed and empirical evidence accumulated, highlighting that the welfare needs of many companion rabbits are not being met. Several recent studies have suggested that traditional housing and husbandry practices may have a detrimental impact on pet rabbit welfare. A study of 912 questionnaire respondents and 66 observed rabbits in the Netherlands saw several indices of poor welfare were linked to aspects of housing and husbandry, including small hutches, solitary housing, poor socialisation, inadequate and inappropriate diets, and a lack of veterinary care (Schepers et al., 2009).
In the UK, Mullan and Main (2006) surveyed and visited 102 rabbits in the southwest of England. They found that a fifth were kept in hutches smaller than the minimum cage dimensions recommended for laboratory or farmed rabbits (Home Office, 2003), nearly half of the rabbits studied were housed alone, and the most common health problem was dental disease, of which the majority of owners were unaware.

In 2011, the PDSA, carried out their first UK-wide survey, reported as the PDSA Animal Wellbeing Report, and subsequently updated annually (Wensley et al., 2021). This uses internet-based techniques to capture data on how pets, including rabbits (as well as dogs and cats) are kept and some health surveillance data including the proportion of rabbits neutered and vaccinated. In 2011, the survey reached 1,132 rabbit owners and reported potential welfare concerns relating to each of the five welfare needs (Animal Welfare Act 2006). Whilst improvements have been made over the subsequent ten years, many concerns remain. For example, in 2019, 25% of the 587 rabbit owners surveyed reported to house their rabbits in hutches considered too small. This survey relies on owner-reported data and hence may be a considerable underestimate of the extent of the problem.

A series of studies at the University of Lincoln investigated spatial requirements for rabbits. Dixon et al. (2010) found increased locomotion following space restriction of pet rabbits. When housed individually in floor pens of 0.88 m², 1.68m² and 3.35m², an activity rebound was observed in the first two hours after rabbits were moved from the smallest to the largest pen size. This finding was interpreted to indicate that 0.88 m² is insufficient for a singly-housed rabbit to adequately express active behaviours and thus compromises welfare (Dixon et al., 2010).

The team similarly investigated the effect of pen height and found that rabbits performed more rearing behaviour in pens with no ceiling or high (0.75m) ceilings compared to low ceilings (0.45m); and medium sized rabbits exhibited a rebound effect in hopping, rearing and alert behaviours when moving from a low ceiling pen to a high, or no ceiling pen (Dixon and Cooper, 2010).

Subsequently a team at the University of Bristol carried out a large-scale study. They surveyed 1254 rabbit owners and researchers then visited the homes of 321 of these rabbits providing a benchmark of the prevalence and severity of a range of welfare issues. The methods can be repeated in future, to objectively assess whether improvements have been made. This again highlighted a large number of common welfare issues (Rooney et al., 2014), which the researchers were able to prioritise according to the severity, prevalence and potential impact on the UK pet rabbit population (Rooney et al., 2012). The importance of these issues has subsequently been confirmed using Delphi techniques (a process based on the results of multiple rounds of questionnaires sent to a panel of experts; Rioja-Lang et al., 2019). The Bristol team also carried out a controlled study of the spatial needs of pairs of rabbits (Rooney et al., submitted), comparing the physiology and behaviour of pairs of rabbits kept in hutches of 0.73m² and 1.86m², with differing access to an exercise run (see section F1).

An in-depth study of dietary effects on Dutch rabbits over a 17-month period was carried out by the University of Edinburgh. They compared four groups of rabbits fed extruded nuggets with hay (EH), muesli with hay (MH), hay only (HO) or muesli only (MO); examining the effects of diet on health and wellbeing, and resulted in a series of peer reviewed publications (e.g. Prebble and Meredith, 2014; Prebble et al., 2015a and b; Meredith et al., 2015; see F2).

The results of these research programmes are integral to the strategy presented here and have been followed by a growing number of projects examining specific aspects of rabbit welfare, whose results are also incorporated. A year-long study comparing nuggets and muesli both with hay and chewing blocks, has been reported in the popular media, but as of 2022 is yet to be published in a peer reviewed journal (Woodmansey, 2018). Interrogations of veterinary databases have yielded important information about causes of morbidity and mortality in pet rabbits (O'Neill et al., 2020). Surveys of owners have explored links between knowledge levels and ownership style (Welch et al., 2017) and differences in handling styles (Oxley et al., 2019). Experimental trials have also investigated ways to reduce handling stress (Unwin et al., 2020; McIndoe et al., 2022). Researchers have explored motivations for trends in breed types (Harvey et al., 2019), whilst also identifying breed predispositions for specific disorders (Johnson and Burn, 2019; O'Neill et al., 2020). Observational studies have shown the importance of pair housing (Burn and Shields, 2020), and surveys of veterinary professionals documented shortfalls in veterinary knowledge and confidence when treating rabbits (Keown et al., 2011; Benato et al., 2020a and b; Wills and Holt, 2020). The results of each of these are reported and feed into recommendations presented within sections 1-6 of this report.

D Scope of the strategy – complexities in rabbit welfare improvement

The strategy starts from the standpoint that all contributing authors and supporting organisations believe that:

"All rabbits deserve to be given the best chance of living a good life in which they can experience positive welfare. To achieve this, breeders should strive to prioritise health and welfare when selecting breeding stock and rear young rabbits in such a way that ensures each animal is physically and psychologically healthy. Sellers should meet the welfare needs of the rabbits in their care and make available high-quality information for prospective owners to do the same. Organisations should advocate responsible rehoming, breeding and sales; breeding and selling only physically and psychologically healthy rabbits. They should also inform those who care for them of their legal duty, by so doing it is hoped that neglect through ignorance and relinquishment rates will be reduced."

This document is relevant to companion rabbits in all situations, including those kept for showing or for breeding, or as pets. Although rabbits used for all purposes have the same basic needs, rabbits kept in laboratories are protected by legislation, (Animals (Scientific Procedures) Act 1986); whose stipulations include the minimum floor area per animal for rabbits of differing weights kept in groups or singly, and a minimum height requirement. Similarly, rabbits kept on a large scale for meat production are protected by the Welfare of Farmed Animals (England) Regulations Schedule 9 (DEFRA, 2007). This includes numerous clauses including that accommodation should allow sufficient area so that all rabbits can lie on their sides (other than at times when nesting boxes are used), and rabbits over 12 weeks require as an absolute minimum, a floor area of 0.18 m² per rabbit. The current strategy is devised for companion animals in England and Wales, (who are covered by the Animal Welfare Act, 2006: see below), but many of the aims and problems encountered will have global relevance.

Whilst historically pet rabbits were predominantly excess show animals, sold into pet shops, (and this route of supply does still exist), more recently specialist commercial breeders have started to breed specifically for the pet trade. Surveys showed a large proportion of UK rabbits are procured from pet outlets (39.1% Rooney et al., 2014; 34% PDSA, 2021), and at least 5% of owners voluntarily mentioned purchasing their rabbit from a single commercial outlet (Rooney et al., 2014), which sources rabbits from contracted breeders. This means that breeders and outlets potentially have significant power to affect the welfare of rabbits, by education provided to new owners, explicitly and implicitly by the way they exhibit stock; by how they prepare the rabbit for life as a companion; and by how they care for the animals whilst in their possession. Therefore, the strategy includes actions aimed at breeders, pet retailers and those licensing and regulating pet outlets.

Under the Pet Animals Act, 1951, anyone selling pets in the course of a business requires a licence, whilst breeders haven't historically been licensed. However, this legislation has been superseded in England with the Animal Welfare Licensing of Activities Involving Animals (England) Regulations (2018). Now those breeding rabbits to be sold as pets, or with a view to them being later resold as pets, and meeting the criteria of a business, have also to be licensed. Breeders' activities, whether they meet the business criteria or not, are crucial to effective protection of rabbit welfare and hence they are included within this strategy.

Other stakeholders who have a potentially important role to play in protecting rabbit welfare and whose activities need to be considered within the strategy include: owners, veterinary practitioners, farm parks and animal encounters (such as petting zoos), exhibitors, colleges, zoos and all establishments keeping rabbits. Figure 1 illustrates the diversity of stakeholders in the production, distribution and ownership of rabbits, who all have a potential role to play.

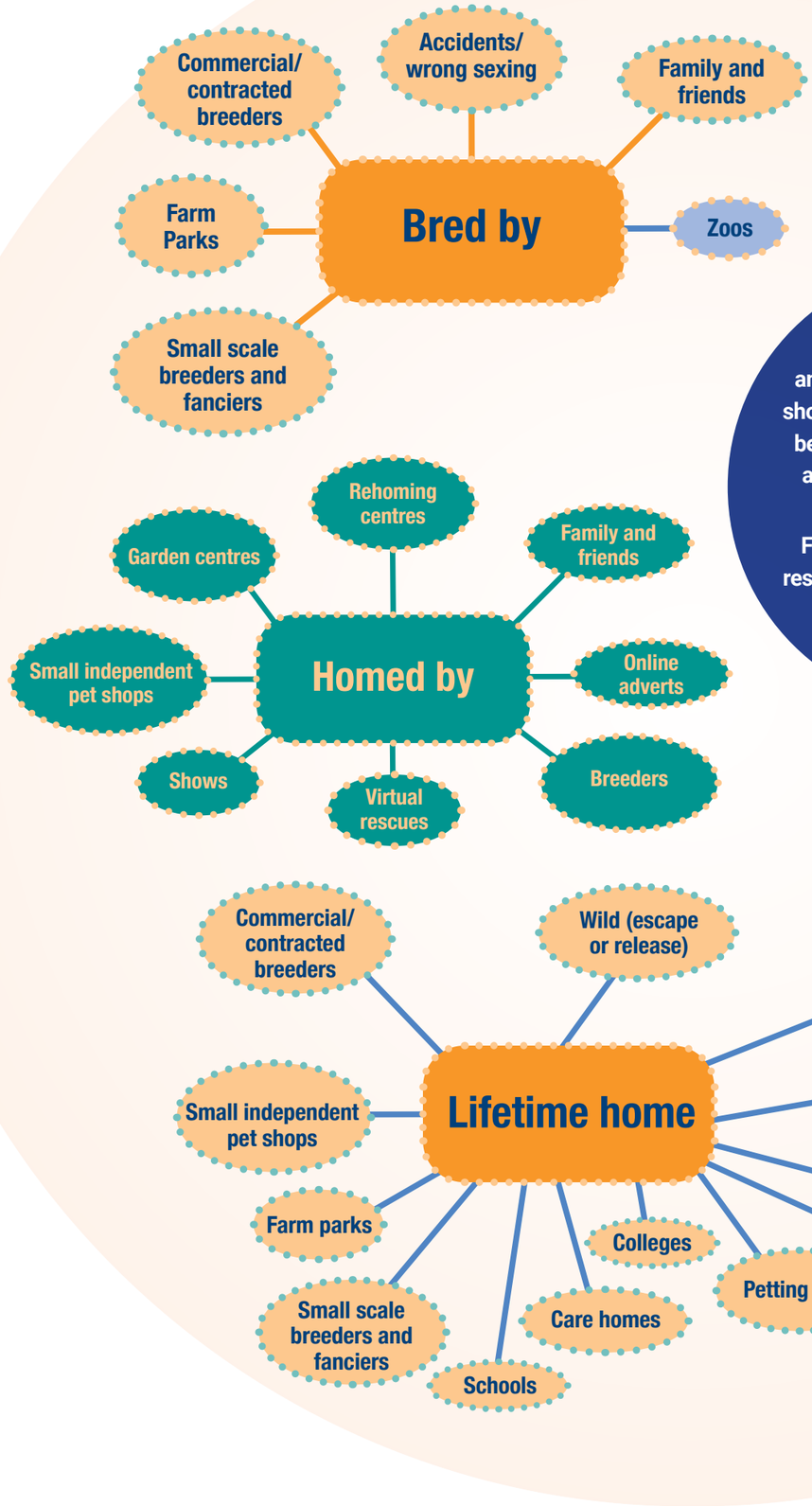


Figure 1.
Sources of breeding, homing and lifetime homes; blue bubbles show rabbit populations considered beyond the scope of this strategy as they are covered by separate legislation.
Further details of the respective responsibilities of each stakeholder groups are presented in Appendix 1.

E Structure of the strategy: priorities based on new research

This welfare strategy aims to address both health and psychological aspects of welfare. It prioritises the most likely issues to impact rabbit welfare and also potential routes of implementation.

Recent research, as described in Section B, has highlighted a large number of welfare issues pertinent to pet rabbits in the UK. Faced with a multiplicity of welfare issues and often limited resources, charities and other organisations have historically targeted specific issues based on subjective opinion of their relative importance. The University of Bristol carried out a study in which they used a combination of expert opinion and empirical methods to quantify and prioritise 46 welfare issues (Rooney et al., 2012). They asked 18 stakeholders to rate the severity, of each of the issues on a 1-5 scale, and using their ratings, combined with information on the likely duration and the prevalence of each issue, they prioritised the issues according to three criteria, those:

a) causing the greatest suffering to a given rabbit at a given time;

b) causing the most severe issues to a given animal throughout its life; and

c) causing the greatest net suffering to the rabbit population in general.

The top five issues identified using each method are shown in Table 1.

Table 1 Reproduced from Rooney et al., 2012:

SEVERITY **causing the greatest suffering to a given rabbit at a given time**	Myxomatosis Rabbit Viral Haemorrhagic Disease (RVHD 1 and 2) Digestive problems (e.g. gut blockage) Dental disease – overgrown molar teeth leading to ulceration Living with an incompatible rabbit which fights and/or causes fear
DURATION / SEVERITY **causing the most severe issues to a given animal throughout its life**	Living with an incompatible rabbit which fights and/or causes fear No access to forage or hay Living space < 0.6m² (e.g. 1m x 0.6m) per rabbit Absence of an exercise area, apart from traditional hutch or cage Living with another rabbit which persistently exhibits chasing and mounting behaviour
NUMBERS / DURATION / SEVERITY **causing the greatest net suffering to the rabbit population in general**	Solitary living without company of other rabbits Unpredictable daily routine e.g. access to run varying with weather Lack of daily human contact for a friendly rabbit No opportunity to dig No opportunity to graze

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Within this welfare strategy, we have included actions aimed at addressing each of the top five ranking issues, according to each of these prioritisation methods (Table 1). A similar prioritisation exercise was taken by a team at Edinburgh University (Rioja-Lang et al., 2019), in which a Delphi survey prioritised welfare issues according to severity and duration and then according to prevalence. This survey included risk factors as well as welfare outcomes.

When considering severity and duration, they prioritised:

- lack of socialisation/handling,
- failure to vaccinate,
- reduced life expectancy,
- lack of owner/vet knowledge and
- regarding rabbits as cheap/replaceable.

When considering prevalence, they prioritised:

- Inadequate housing,
- lack of socialisation;
- inadequacy of diet,
- lack of pre-purchase research and
- reduced life expectancy.

There was considerable overlap in the outcomes of both prioritisation studies, and hence the strategy reflects the results of both.

Since the issues identified include those impacting on each of the five basic welfare needs, the strategy is structured such that the first six “priorities” address each of the five welfare needs laid out in the Animal Welfare Act (2006), (the need to be protected from pain, suffering, injury and disease generated two priorities, one to prevent disease and one to treat injury and disease promptly; Priorities 1-6 Section F). For each welfare need, we have derived a statement of “good practice“ – shown in purple boxes - based on current evidence-based knowledge, to which all stakeholders subscribe and support dissemination.

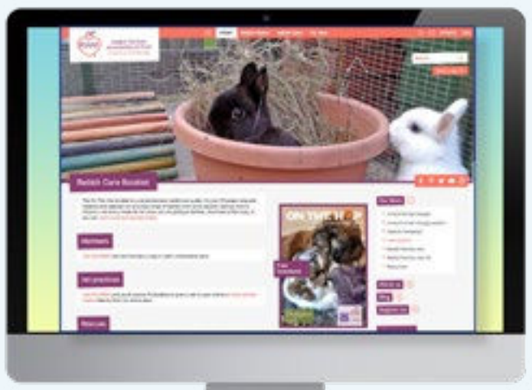
The remaining four priorities have been derived by the strategy group and are aimed at maximising welfare improvement. With the challenges of a diverse stakeholder and owner community (see Section D), maximising the potential routes for implementation and education is critical. Therefore, the latter priorities include the derivation of guidelines, reviewing skills and training for all those impacting rabbit welfare. In addition, they include attempting to balance supply and demand and thereby minimising the number of rabbits affected by welfare issues, and finally and critically important, monitoring the rabbit population and collecting data on which to measure the effectiveness of any initiatives or actions.

Within each of the ten priority areas, there are between five and nine actions aimed at addressing the priorities shown in purple boxes. The time frames of each are categorised as immediate, medium or long-term within the action plan presented in Section H , based upon perceived urgency and feasibility. It is planned that each of the priority areas will be adopted by a working party, composed of relevant representatives and headed by an RWG member who will assume responsibility for implementation, and monitoring of progress in the specific priority area.

F Priorities to address five welfare needs: deriving evidence-based good practice

Currently there is a great deal of information and advice produced by charities and other companion animal-related organisations about rabbit ownership, much of which is available online. Examples of this include the RWAF website, leaflets, helpline and magazines, RSPCA, PDSA, Blue Cross, and Pet Advertising Advisory Group, (websites and printed information and several national rabbit campaigns e.g. Rabbit Awareness Week). These aim to raise awareness and increase understanding of rabbits' welfare needs and promote positive behaviour change in owners. But, based on the large numbers of rabbits in rehoming centres, and the variability in owner knowledge (Welch et al., 2017), it is clear that the messages are not always reaching their target audience.

Information available to owners and prospective owners, for example on the internet, is of varying quality and messages presented are not always consistent nor evidence-based. There are differences of opinion as to precise requirements of rabbits and some advice is based only on single-breed studies of rabbits kept in laboratories. In recent years, more research has been conducted specifically focusing on pet rabbits, and it is vital that the findings are communicated. To maximise the potential for owner education, we believe consistency in messaging and a joined-up approach would be beneficial. Therefore, within this strategy we have compiled current scientific knowledge and where scientific knowledge is lacking, consensus expert opinion (purple boxes section 1-6), to derive current good practice advice relating to each welfare need. Dissemination of this information will be an immediate goal and is listed as one of the aims for each priority (purple box), whilst developing further advice, in light of new findings, and supporting research where current knowledge gaps are present, will occur longer term.



Rabbit Welfare Strategy

1 Define and promote good housing and husbandry

Like their wild counterparts, pet rabbits are most active at dawn and dusk. Research by University of Bristol has shown that very few owners provide continual access to an exercise area (Rooney et al., 2014) and the majority provide access at times which do not match those when rabbits are most active (Rooney et. al., submitted).

A survey of experts rated "Living in a space < 0.6m² (e.g. 1m x 0.6m) per rabbit," and the "Absence of an exercise area apart from traditional hutch or cage", as two of the five most important welfare issues causing the most severe issues to a given rabbit throughout its life. Whilst "Lack of opportunity to dig and graze" and the provision of "Unpredictable daily routines e.g. access to run varying with weather" were deemed to cause the greatest net suffering to the rabbit population overall (Rooney et al., 2012; see Table 1, Section E). The Delphi survey by University of Edinburgh (Rioja-Lang et al., 2019) rated inadequate housing as the most prevalent welfare issue for rabbits, whilst a survey in the Netherlands (Schepers, 2009) saw that most rabbits lived in hutches less than 0.5m², and PDSA (2020) described 26% of rabbits in UK as being kept in inadequate housing (small hutches with minimal or no run space).

Previous research has investigated the effect of spatial restriction on singly-housed pet rabbits, and suggested that enclosures of floor area 0.88 m² were inadequate to meet rabbit's behavioural needs (Dixon et al., 2010). However, since rabbits are a social species, guidance given here is based on a pair of rabbits kept together. If kept in a hutch/cage of the most popular size (e.g. 0.73m²), and given only three hours access to a run per day, the welfare of rabbit pairs has been shown to be compromised. Even if kept in larger accommodation (1.86m²), access to a run is still valued and promotes exercise and behaviours indicative of positive welfare states (Rooney et al., submitted). Therefore, whenever possible, rabbits should be housed with continual access to exercise areas.

If permitted, many paired rabbits will spend much of the day 3-5 body lengths away from their companion (Rooney et al., submitted), so the accommodation should be adequately large to allow this at all times of day and night. For most medium sized pairs of rabbits, accommodation of 3m x 2m (L x W) would allow for this requirement.

The height of the enclosure is also important, as inadequate height restricts the rabbit's ability to rear up and show natural alert type behaviours. An experimental study suggested that at least some of the enclosure needs to be at 0.75m or more, for medium sized rabbits (Dixon and Cooper, 2010). However, rabbits are generally afraid of wide, open spaces, so the provision of some enclosed areas with a roof is also important.

Rabbits often choose to rest in, or near to, enclosed areas or boxes (Seaman et al., 2008), but in some groups, individuals may guard the entrances, so expert opinion suggests multiple entrances should be provided. The presence of platforms and ledges, in enclosures sufficiently tall, encourages rearing and standing-up behaviours (Rooney et al., 2012), and many rabbits will engage in digging behaviours if permitted. They also interact with objects and toys in their enclosure (Da Silva et al., 2021), and likely benefit from environmental enrichment.

Current understanding of good practice

- Rabbits should be kept in accommodation which meets their behavioural, as well as their health needs.
- Welfare compatible housing should allow natural behaviours:

i) Running, jumping, rearing on hind legs, hiding, grazing and digging;

ii) Opportunities to perform these behaviours at the times of day when rabbits are naturally most active;

iii) Predictability of routine and control of the environment.

- Accommodation should include enclosed resting/denning areas, with multiple entrances, and areas and substrates which allow them to graze and dig, and objects or toys to interact with.
- Any living accommodation should be big enough to allow the rabbits to perform their full range of natural behaviours, to stand up on their back legs without their ears touching the top and to lie down fully stretched out comfortably in all directions (without touching the sides of the accommodation or another rabbit). For medium sized pairs of rabbits this should be at least 3m x x2m (L x W) and at least 1m tall.
- Any exercise area should provide continual safe access and should be tall enough to allow the rabbits to stretch up to full height and to run, rather than just hop.

To address Priority area 1 "Define and promote good housing and husbandry", the following initiatives will occur:

1a) Develop a working group to examine best practice in housing and husbandry

1b) Develop a programme of work to support and promote current best practice in housing and care to current and prospective owners

1c) Regularly review scientific evidence and current charity and supplier recommendations

1d) Review the value of, and barriers to, adopting integrated living accommodation compared to separate runs and houses, and explore the impact of housing indoors, compared to outdoors

1e) Explore and improve availability of suitable, and adequately sized housing in retail outlets, pet shops etc.

1f) Maximise the education potential of pet care outlets, charities and rabbit shows by supporting them to:
- Exhibit rabbits in appropriate housing
- Provide advice to prospective owners
- Ensure availability of optimal housing at point of sale

1g) Explore and define welfare compatible accommodation used for rabbits used for breeding

2 Determine and promote optimal dietary advice

Rabbits have evolved to eat a high fibre, low energy herbivorous diet. Long fibre (grass and hay) is essential for healthy peristalsis (Slade and Forbes, 2008) and to promote dental health (Jekl and Redrobe, 2013); as well as preventing dental disease by allowing tooth wear via abrasion. Water intake is greater in rabbits on higher fibre diets (Prebble and Meredith, 2014), which may help prevent urinary tract problems (Harcourt-Brown, 2011). Access to grass and hay also fulfils a behavioural need to spend large amounts of time grazing. Wild rabbits eat many different plant species (Marques and Mathias, 2001), so a variety of green leafy vegetables is also important to pet rabbits (Molina et al., 2015).

Many of the health and welfare issues, which are common in the pet rabbit population, have been linked to inappropriate diets. Rabbits are highly motivated to eat energy-dense concentrated foods, but when fed to excess, this has been shown to result in them spending inadequate time foraging on low energy hay or grass (Prebble et al., 2015b) and consequently rabbits show an increased risk of obesity (Sayers, 2010; Prebble et al., 2015a) and other health problems highlighted above.

The feeding of 'muesli' type foods has been linked to an increased incidence of dental disease and poor body condition (Mullan and Main, 2006). This is likely due to selective feeding, whereby rabbits often leave the concentrate pellets, which include vitamins and minerals in favour of the high-energy sweet components (Harcourt-Brown, 1996; Mullan and Main, 2006; Rooney et al., 2014).

In recent years, there has been an in-depth programme of experimental research on 32 Dutch rabbits, by the University of Edinburgh. The study compared rabbits fed just hay, limited muesli and ad lib hay (a single brand was tested), limited nuggets and ad lib hay with those fed just muesli. The study lacked a nugget only group.

The findings support popular expert opinion, on the value of high hay content, and the potential risks associated with excessive concentrate (especially muesli) feeding. When comparing the four experimental groups of rabbits, those with a large hay component (and even those fed hay exclusively) were seen to have more optimal body condition scores, (Prebble et al., 2015a), reduced risk of dental disease (Meredith et al., 2015) and obesity (Prebble et al., 2015a), and increased water intake (Prebble and Meredith, 2014). The study saw increased tooth length, curvature and widened interdental spaces after 17 months, indicating early dental pathology, in rabbits fed a muesli diet (with or without hay; Meredith et al., 2015).

Weight gain was significantly higher in those rabbits fed just muesli, which were on average obese, whilst those fed concentrate and hay, were overweight-obese. Those fed just hay had an ideal body condition although their weight did not reach that described in the breed standards (Prebble et al., 2015b). Faecal pellets were consistently smaller and lighter in rabbits fed muesli only and they were also more likely to have uneaten caecotrophs (the shiny, mucus covered, dark faecal pellets, produced during the first phase of digestion and usually consumed immediately by healthy rabbits; Meredith and Prebble, 2017). Prebble et al. (2015b) noted that rabbits fed muesli only, were the most inactive, whilst those fed hay (with muesli, nuggets or alone) showed more activity and fewer abnormal behaviours.

This was a unique longitudinal study of 32 rabbits of a single breed. The findings demonstrate the importance of having hay or forage as a large component of a rabbit's diet. They also suggest that the feeding of muesli may be detrimental compared to nuggets, especially in the absence of hay. Although the results are significant and pronounced, rabbits were fed a single popular brand of each food type - nuggets or muesli; so cannot be generalised to all brands. A further, as yet unpublished, study compared 32 rabbits fed either muesli or nuggets with hay and chewing materials over a year period and reported no significant difference in weight, body condition or visually inspected tooth health (Woodmansey, 2018). This highlights the importance of hay as a major diet component, as well as the value of limited concentrate and possibly of providing chewing materials.

Surveys and home visits on a diverse population conducted by the University of Bristol, have also supported the link between dental health, general health and welfare and hay availability. In a survey, those rabbits reported to be given none or only occasional hay or grass were reported to show fewer overall positive behaviours; binkying (running, jumping and twisting in the air; thought to be indicative of a positive welfare state: see Appendix 2 for full list of behaviours, and hopping/jumping than the rest of the population. In addition, those with no opportunity to graze, overall were reported to show health issues, more digestive problems, to binky less frequently, and to dig more often on hard surfaces (Rooney et al., 2012).

When the experimenters visited over 200 rabbits (Rooney et al., 2012), several significant associations between diet and welfare were also found. Rabbits observed to have a current dental issue (e.g. misaligned teeth, uneven wear, or any relevant symptoms e.g. runny eyes or nose or wet fur) generally had less hay present in their home enclosure at the time of the visit, when compared to those without dental issues. Lower reported hay feeding frequency was associated with a greater likelihood of impacted caecotrophs and perineal soiling being observed (Rooney et al., 2012). However, it is difficult to know to what extent that finding is due to rabbits with dental disease finding hay more difficult to eat, i.e. cause and effect cannot be concluded. The provision of adequate hay and/or growing grass is very important, yet many owners would seem to be unaware of this. Some pet outlets do not have a consistent supply of high-quality hay, and some display hay as bedding rather than a food-stuff; consistent messaging, and education therefore remains important.

Obesity is a significant problem within the pet rabbit population and resources aiding recognition of appropriate body condition require promotion (e.g. PFMA, 2015). Although between 10% (PDSA, 2020) and 12% (Rooney et. al., 2014) report their rabbits to be overweight, this is likely an underestimate. Rabbit breeders, showers, veterinarians, pet food manufacturers and scientists should combine efforts to produce resources to help combat this issue.

Current understanding of good practice

A diet should be composed of:

- Constant access to fresh, clean water;
- Ad-lib access to clean, good quality hay that is not part of their bedding .
- A handful of a variety of suitable fresh greens morning and evening; for types considered safe refer to RWAF (2021a).
- No more than a tablespoon (or 25g/kg of body weight) of commercial rabbit nuggets once daily (or twice daily if the rabbit weighs more than 3.5kg).

In addition:

- If concentrate foods are fed, portions should be carefully measured.
- Muesli-type mixtures (containing seeds and grain flakes) have been linked to dental and digestive problems
- Veterinary or pet care advice should be sought before gradually changing to a recommended diet over a period of 14-28 days
- Body weight should be closely monitored to ensure rabbits consume adequate forage (hay or grass).
- If rabbits are pregnant or lactating their diet should be adapted to include more energy, calcium, fat and protein e.g. by a small increase in nuggets.
- Care should also be taken to introduce young rabbits to an optimal diet from a very early age, as food preferences develop soon after weaning (Bilkó et al., 1994).

To address Priority area 2: "Determine and promote optimal dietary advice" the following initiatives will occur:

2a) Develop a working group to examine best practice in rabbit feeding

2b) Develop a programme of work to promote a healthy diet based on current knowledge to current and prospective owners

2c) Review scientific evidence and current recommendations of all stakeholders, charities etc. and ensure consistent messaging

2d) Encourage pet sale suppliers to investigate ways to promote the sale of high-quality hay and/or grass in feeding (not bedding sections) of all pet care outlets and investigate ways to assure year-round continual sources

2e) Promote the education of owners, and carers regarding the importance of forage-based diet and derive guidelines on the value of different foodstuffs, dangerous plants and other foods

2f) Continue efforts to develop advice and products that overcome selective feeding and unbalanced diets

2g) Promote efforts to reduce obesity in the rabbit population and educate owners and carers to identify appropriate weight using body condition score.

3 Describe welfare compatible social living for rabbits - reducing the number of rabbits living solitarily

Rabbits are social animals, having evolved to live in large social groups (Marsh et al., 2011). They will work hard to gain access to conspecifics (Seaman et al., 2008) showing they value social contact. Many studies have demonstrated the positive effects of socially housing laboratory rabbits (e.g. Chu et al., 2004). Most pet rabbits which are kept in pairs spend a large amount of their time in social behaviours (Mullan and Main, 2007), whilst owners report higher levels of negative behaviours and more signs of ill health in pet rabbits which are kept alone (Rooney et al., 2012). A recent study of rabbits in rehoming centres saw those housed in pairs exhibited less bar biting, higher body temperatures and recovered more quickly from the stress of handling compared to those housed alone (Burn and Shields, 2020).

Housing rabbits with a compatible companion is now widely recommended (e.g. Welsh Assembly Government, 2009; RSPCA, 2021), yet surveys show that in the UK in 2012, only 41.9% (Rooney et al., 2014) lived with another rabbit(s). By 2020, this had increased to 58% (PDSA, 2020), yet still 42% live alone.

It has been highlighted numerous times that solitary living is a significant problem for pet rabbits, and in their prioritisation of welfare issues, Rooney et al. (2012) confirmed that the single issue deemed by experts as likely to cause the greatest net suffering to the rabbit population is "Solitary living without company of other rabbits". Efforts to increase the proportion of rabbits afforded the opportunity to live together compatibly are imperative. In this strategy, therefore, we promote the housing of rabbits in compatible pairs or groupings.

To be welfare enhancing, it is vital that pairings or groupings are compatible. However, large numbers of rabbits live in incompatible groupings which regularly fight, mount, chase or hide from one another (Rooney et al., 2012; Stapleton, 2021). The importance of this was highlighted as both "Living with an incompatible rabbit which fights and/or causes fear" and "Living with another rabbit which persistently exhibits chasing and mounting behaviour" were amongst the welfare issues rated most important to individual rabbits (Rooney et al., 2012). Therefore, simply housing animals together is insufficient; actions must be taken to maximise the chances that animals are housed in compatible and welfare-enhancing groupings.

Current popular opinion suggests that neutered male-female pairings are most successful, although there is limited, if any, scientific evidence to back this up and recent surveys have found a high proportion of successful same-sex pairings (Rooney et al., 2012). Rabbit rehoming charities advocate differing methods by which to introduce new rabbits to one another and some are evidently very successful, but optimal timing and procedures for mixing and neutering are yet to be confirmed. Large-scale breeders and pet sale outlets could prove integral to finding this information and subsequently to its distribution and implementation. Information on current best practice needs to be widely distributed to sellers and owners of rabbits whose companion has died (e.g. RSPCA, 2021).

Current understanding of good practice

- Non-breeding rabbits should be kept in compatible pairs or groups.
- Living accommodation should be adequately large so that rabbits can rest at least three body lengths from one another (see Section 1).
- There should be sufficient hiding and resting places with multiple entrances, and feeding and watering stations, that each rabbit can use them simultaneously (Section 1).
- Mixing of new pairs and/or widowed animals should be gradual, following current good practice (e.g. RWAF, 2021b), and paying attention to the health and behaviour of both individual rabbits.
- Rabbits should be monitored daily. If chasing, fighting, mounting occurs regularly, professional advice needs to be sought urgently (from a Certified Clinical Animal Behaviourist as accredited and listed by Association for the Study of Animal Behaviour (ASAB) or Animal Behaviour and Training Council (ABTC).

To address Priority area 3: "Describe welfare compatible social living for rabbits – reducing the number of rabbits living solitarily" the following initiatives will occur:

3a) Develop a working group to examine best practice in housing of rabbits in compatible pairs or groupings

3b) Promote sale and rehoming of neutered pairs of rabbits, or rabbits destined to live in pairs (or groups), whenever possible, and explore the value of early neutering to facilitate this

3c) Review

i) current practice - in particular in pet outlets, farm parks, zoos etc since research has already examined pets

ii) existing scientific evidence and

iii) expert opinion on the benefits of pair- and group-living including the value of providing multiple resources and entrances to hiding places etc

3d) Investigate best practices for the introduction of rabbits, including optimal time to maximise the chances of compatible groupings, and produce and widely disseminate, resources describing optimal protocols for introduction, ways to avoid and reconcile relationship breakdowns

3e) Produce evidence-based training resources for owners, sales staff and rehoming centres to:

i) identify appropriate rabbit-rabbit behaviours, and

ii) spot indicators of incompatibility

3f) Examine feasible routes by which showing and breeding animals could benefit from housing systems that facilitate social interaction.

Rabbit Welfare Strategy

4 Examine and promote best practice for breeding and rearing rabbits well suited to life as a companion

Fear of handling is very common in pet rabbits. When the University of Bristol carried out a study of 220 rabbits in their own homes, they found that of the 58.1% of survey respondents who volunteered for their rabbit to be observed at home, over 12% could not be handled for 2 minutes by their owner. When observers recorded the behaviour of the rabbits, many were significantly less relaxed than their owners reported; with only 34% of rabbits visited being recorded as "calm" when handled by their owner (Rooney et al., 2012). Given that most rabbits are handled at least weekly, human handling is likely a significant stressor and hence a welfare concern. A survey of experts, similarly identified lack of socialisation/handling as the number one welfare priority in terms of severity and duration (Rioja-Lang et al., 2019).

Although the majority of owners now advocate carrying rabbits in a welfare compatible way, some still report "scruffing" or holding the rabbit on its back (Oxley et al., 2019) and picking up and carrying is still common practice (Evans, 2017). Appropriate handling (e.g. on the floor as compared to being picked up; Evans, 2017) can reduce the stress experienced by a rabbit and improve their friendliness towards people. The use of specific restraint methods (e.g. covering eyes or swaddling) is often advocated but their welfare value remains unproven (Oxley et al., 2019; McIndoe et al., 2022), whilst some herbal remedies can help to reduce stress (Unwin et al., 2020). Guidelines for owners, and especially for children, on optimal handling techniques may be valuable. In addition, early introduction to positive handling experiences can reduce fear in a range of species and is also important for rabbits.

Many rabbits are reported to be fearful of loud noises (Rooney et al., 2014) and, since a large proportion live outside, this is potentially a significant stressor. An individual rabbit's likelihood of becoming fearful of both loud noises and handling, for example, is affected by genetics, individual temperament and early life experiences. Factors such as age at weaning and method of exposure to stimuli will also play a role, although, as yet, this is not fully understood for this species. To reduce the welfare impact of fear in rabbits, actions need to involve optimal breeding and rearing, providing appropriate early life experiences and modifying owners' behaviour to reduce exposure to fear provoking stimuli.

Habituation protocols can be successful at ameliorating fear responses in individual rabbits, but as yet their use on a large scale has not been validated. Many rabbit breeders and fanciers are very experienced at producing animals which remain calm during handling. Many implement early handling protocols, which they believe to reduce subsequent fearfulness. Their expertise needs to be utilised in protocol development, the efficacy of which needs to be scientifically tested.

For those rabbits that have become fearful, behavioural advice and rehabilitation training (or behavioural modification) based on the principle of positive reinforcement can help to reduce fearful behaviours (Unwin et al., 2020; Stapleton 2021). Such techniques are widely used for other species, but as yet are uncommon for rabbits.

As with other companion animal species, selection on the basis of appearance rather than health and behaviour, may have led to certain diseases becoming more prevalent in specific breeds (CAWC, 2006). Research tells us that people generally prefer rabbits with shortened skulls (Harvey et al., 2019) and the exaggeration of physical features can compromise welfare. For example long or lop ears which are immobile are more prone to peri-aural pathology, and dental problems (Johnson and Burn, 2019); whilst brachycephaly is linked to dental malocclusion (Roux, 2005). The extent to such problems in rabbits is currently undocumented. Quantification of the current state, and identification of the best course of action to reduce the occurrence of problems caused by selective breeding criteria are recommended. These should aim to ensure that the health, welfare, quality of life and temperament of rabbits is prioritised over physical appearance. Ways forward may include reviewing and revising breed standards, breeding rules and judging criteria, in line with similar approaches in the dog and cat showing worlds; funding research studies to investigate the incidence and cause of inherited disorders in rabbits and/or development of DNA tests and education initiatives to warn owners of the risks of short-faced breeds (Harvey et al., 2019; Johnson and Burn, 2019).

Current understanding of good practice

- Many rabbits are fearful of handling, loud noises and other aspects of their environment. Breeders, sellers and owners should gradually introduce rabbits to the stimuli they will experience in their environment. This should be done at such a speed that a rabbit never shows fear and hence gradually habituate rather than sensitise to the stimuli.
- Handling rabbits in a recommended way, well secured and close to your body (see RWAF, 2022) and at ground level rather than lifting them off the ground will likely keep them calmer.
- Rabbit housing should be located away from predators (e.g. dogs, cats, ferrets and birds of prey) and protected from loud noises.

To address Priority area 4 "Examine and promote best practice for breeding and rearing rabbits well suited to life as a companion" the following initiatives will occur:

4a) Develop a working group to examine best practice in breeding/rearing rabbits best suited to life as a companion

4b) Produce guidelines, and education resources which promote best practice for children and adults handling rabbits, based on expert opinion and research findings

4c) In collaboration with rabbit breeders, conduct research to identify optimal protocols for breeders to produce human-friendly, non-fearful rabbits via optimal

- breeding,
- weaning / doe removal,
- age of sale,
- rearing,
- habituation and
- handling - including optimal frequency and age of handling

4d) Work to reduce the number of rabbits that are fearful of handling by promoting testing of socialisation protocols in breeding establishments and investigating the heritability of tameness

4e) Promote the use of behavioural modification, based on reward-based training as a means to reduce fear in rabbits

4f) Review evidence of the prevalence of heritable breed (and colour) -specific diseases and exaggerated features e.g. malocclusion in Netherland dwarfs and lops, including in new emerging breeds

4g) Liaise with scientific experts to identify the routes to reduce the occurrence of breed- specific disorders

4h) Encourage breeders to only breed from healthy stock, ensuring that the health, welfare, quality of life and temperament of rabbits is prioritised

4i) Develop resources to educate future owners of the health risks of exaggerated physical features, and how to select a healthy rabbit

5 Highlight ways to reduce preventable disease in rabbits

Domestic rabbits can live for 8-12 years or more, although this varies with breed as well as diet, environment and care. However, the average age of the UK population when surveyed was only 3.17 years (Rooney et al., 2014); the average of those attending veterinary clinics was 3.2 years and reported death in veterinary records was 4.3 years (O'Neill et al., 2020) suggesting that many rabbits die very prematurely. Whilst early death may not be considered by some to be a welfare issue, some, if not most, of these animals are likely to experience considerable morbidity prior to death, and so minimising illness and disease is imperative to protecting welfare.

Provision of good environments, and optimal diets (as detailed in sections 1-2), will likely ameliorate many health problems, but specific actions to target optimal breeding, health care, veterinary regimes, and specific diseases are also valuable and hence included in this strategy.

Several studies have highlighted dental disease as a prevalent problem for pet rabbits (e.g. Mullan and Main, 2006; O'Neill et al., 2020), but a survey of 1254 owners (Rooney et al., 2014), and analysis of veterinary records (O'Neill et al., 2020) found that several other veterinary complaints are also common including eye problems, digestive problems and parasites. Furthermore, when 220 rabbits were visited in their own homes many health issues were seen to be more common than owners' reports suggested. Thus, the education of owners and carers in prevention and early recognition of disease is important.

Surveys show that many rabbits are not groomed (38.9%), nail checked (16.9%) or teeth checked monthly (46.7%; Rooney et al., 2014), and since overgrown nails was the most commonly recorded disorder at UK veterinary surgeries (O'Neill et al., 2020), improved health surveillance by owners and carers is likely to be beneficial.

When prioritising welfare issues based on severity the University of Bristol study saw the top four issues believed to cause the most suffering at a given time were all health-related - myxomatosis, rabbit calicivirus (Rabbit Viral Haemorrhagic Disease: RVHD1 and 2), digestive problems (e.g. gut blockage), and dental disease (overgrown premolar and molar teeth leading to soft tissue ulceration). Although the first two (and fly strike which was rated sixth), affect a relatively small proportion of the rabbit population (Rooney et al., 2012), they are usually fatal and cause intense suffering prior to death. However, they are easily preventable through vaccination, and/or other preventive health measures. The University of Edinburgh welfare issue prioritisation, similarly identified failure to vaccinate as the second highest welfare priority for individual rabbits based on severity and duration (Rioja-Lang et al., 2019). Vaccination against myxomatosis and RVHD 1 and 2 is recommended for both indoor and outdoor-housed rabbits, yet in the UK, reported percentages of vaccinated rabbits vary between 58% (PDSA, 2020) and 70.8% (Rooney et al., 2014) whilst only 16.7% of rabbits advertised online gave details of vaccination status (Gosling et al., 2018).

Fly strike is where the eggs of flies are laid on the live rabbit, typically on wet and/or diseased flesh, or on faeces. Upon hatching, the maggots eat their way into the rabbit, causing potentially fatal shock, wounds, and pain. Fly strike was the most common recorded cause of death within 267 rabbit deaths in UK veterinary records (O'Neill et al., 2019). It only occurs in rabbits with underlying conditions, so treatment of the condition (if possible, as advanced cases require euthanasia), must go alongside investigation of the cause, or it will simply happen again. Daily visual checks of the typical target area, around the tail base and genitals, can reduce the risk for rabbits during the months of fly activity. This highlights the importance of owners daily checking their rabbits.

Encephalitozoon cuniculi is an internal parasite, which is poorly understood in the rabbit-owning population, and hence does not figure prominently in the surveys, but it likely has a large impact on welfare (Csokai et al., 2009; Rich, 2010; Varga, 2014). Prevention methods and treatment protocols are becoming available but need to be published, and additional research is needed.

Prevention options are possible against flystrike and E. cuniculi, and there are vaccines against Myxomatosis and RVHD 1 and 2. Actions within this strategy are therefore aimed at increasing owner's knowledge of ways to prevent these conditions as well as dental disease, and gastrointestinal problems, and encouraging regular checking of nails and teeth. They also explore the welfare value of regular veterinary visits, since only 72% of rabbits are registered with a vet (PDSA, 2020) and many of those do not attend regular check-ups.

The neutering of rabbits is usually strongly recommended by veterinarians and animal welfare charities for a variety of reasons, including the prevention of a range of diseases, for allowing social housing and population control. Research has shown that owners with more knowledge are more likely to attend veterinary check-ups and also to neuter their rabbits (Welch et al., 2017). Whilst there is ongoing debate questioning the health benefits and therefore the ethics of neutering singly-housed rabbits (Bradbury and Dickens, 2016), the benefits when facilitating pair and group housing are unquestionable. However, further investigations into the optimal time of neutering are still required.

The British Rabbit Council (BRC) ringing scheme has long been used for the identification of rabbits.. Every rabbit exhibited at a show must, at the time of exhibition, be registered in the records of the council as the bona fide property of the exhibitor in whose name it is entered. The rings are made of a light, but durable metal alloy, stamped with the identification of the year in which the rabbit was born, followed by the relevant letter for the breed and a five-digit number. The ring is placed on a rear leg above the hock of the rabbit. In most breeds of rabbit, this occurs at about five or six weeks of age. The rabbit should be sufficiently

well developed for the ring to pass easily over the hock, but then remain securely above it. However, occasional problems arise and can cause significant suffering (e.g. necrosis of the limb) if they become too tight; whilst newer, less robust rings can become chewable and develop rough edges (Saunders pers. comm.). Hence, it is vital that, if rings are used, they are checked regularly.

The use of microchips as a means of identification is now well-established for dogs and cats (for example it has recently been adopted by the greyhound racing industry in preference to tattooing), and several rehoming charities (e.g. RSPCA, Wood Green and Blue Cross) routinely microchip rabbits. Microchipping has been recommended for companion rabbits by several animal welfare organisations and the Welsh Code of Practice (Welsh Assembly Government, 2009). It aims to make rabbits permanently identifiable and helps to quickly return them to their owner if they are lost. To date, the use of microchips is not common amongst companion rabbit keepers, and they remain unused in the showing community. Although the numbers that are currently microchipped are quite low totalling 6.6% of rabbits advertised for sale online (Gosling et al., 2018), they are increasing and PDSA report an increase from 3% in 2011 to 30% in 2020 (PDSA, 2020). There are however potential costs of microchipping including pain and /or discomfort during the process, distress caused by a veterinary visit (although this can be minimised if occurring simultaneously to vaccination or neutering). The recent development of mini-microchips for use on smaller animals may also reduce discomfort. The full welfare costs and benefits require investigation and the feasibility of microchipping all rabbits (for example at time of first veterinary inspection or even at point of sale) assessed. If deemed feasible then there is a need to produce guidelines for owners and breeders on good practice.

Current understanding of good practice

- rabbit behaviour should be monitored every day;
- food intake and faecal production should be monitored daily and in the case of cessation or reduction of either, veterinary attention sought urgently;
- rabbits should be given regular health checks including being inspected daily for signs of fly strike, and twice daily in warmer weather;
- teeth and nails should be checked at least weekly;
- all rabbits should be vaccinated at least annually (as recommended by a veterinarian) against RVHD 1 and 2 and myxomatosis;
- all rabbits not intended for breeding should be neutered;
- all rabbits should be microchipped to allow rabbit tracing should they be lost or injured.

To address Priority area 5: ". Highlight ways to reduce preventable disease in rabbits" the following initiatives will occur:

5a) Develop a working group to examine best practice in reducing preventable disease in rabbits

5b) Devise a coordinated approach to increase owner awareness and knowledge of risk factors for:

i) dental disease

ii) gastrointestinal problems

iv) E. cuniculi, and

v) fly strike

and produce resources to explain to owners how to check for each of these

5c) Encourage vaccination of all rabbits against myxomatosis and Rabbit Viral Haemorrhagic Disease (RVHD1 and 2). Explore mechanisms for pet outlets and veterinary surgeries to work in synchrony to promote and monitor veterinary registration, neutering and vaccination, through systems, for example at point of sale.

5d) Examine feasibility, benefits and cost of neutering prior to sale and investigate and promote optimal time for neutering.

5e) Investigate the number of lost rabbits whose return has been, and those that could be, aided by microchipping

5f) Examine the risks and potential value and practicalities of microchipping all rabbits, and investigate whether ringing presents a significant welfare issue for rabbit destined for showing

5g) Produce guidelines for owners, breeders and sellers on good practices in permanent ID methods.

6 Promote timely and optimal treatment to rabbits with compromised health or welfare

As a prey species, rabbits have evolved to avoid showing obvious signs of illness or distress. Recent research suggests that many owners are unsure of the signs that their rabbit may be unwell or distressed and hence may not seek veterinary help in a timely manner (Jones, 2015). Education of owners to recognise subtle signs of ill health, including gut problems (see Section 5) and to seek veterinary care, may greatly improve rabbit welfare.

Many insurance companies provide affordable treatment plans for dogs and cats, and the uptake of of these is increasing with 57% of UK dogs and 37% of cats insured (PDSA, 2019). Fewer companies insure rabbits, and only a small minority of the rabbits in the UK are insured (11.7%; Rooney et al., 2014; 19% PDSA, 2020). Increasing this proportion may enhance the availability of affordable veterinary care for rabbits, and thus exploration of current barriers warrants attention. Rabbit insurance policies often exclude common conditions such as some dental issues, and often have a maximum cover which is inadequate for the treatment of common, but challenging conditions.

In spite of the rabbit's popularity as a companion animal, veterinary training in rabbit-specific care is often limited. There is currently a noticeable absence of rabbit specialists in core university posts, which may seem surprising. Hence, the use of appropriate anaesthesia, analgesia and other medications for rabbits is not well researched or promoted; with many veterinarians currently lacking knowledge on effective pain relief for rabbits (Keown et al., 2011). A study of 131 first opinion veterinary surgeons, noted lower scores for knowledge of health and disease, confidence in diagnosing and in anaesthetising rabbits as compared to cats and dogs (Wills and Holt, 2020). Surveys of both veterinary surgeons and nurses (Benato et al., 2020a, b) noted room for improvement in the assessment and amelioration of pain in rabbits. What's more Stevens (2015) studied mock client calls to 1362 veterinary practices and found that dietary advice was highly variable and concluded that receptionist knowledge about rabbit health care is also often lacking.

Rabbits are presently classified as "exotics", and as the UK's third most popular mammalian pet, with increasingly well understood, but specific needs, this may be outdated. It would, therefore, be beneficial to investigate the current state and promote improvement in training of veterinary professionals in rabbit care. Inclusion of rabbits as a specialism throughout veterinary schools, with supported positions and permanently core funded staff, journals, textbooks, web forums and e-learning may be a positive step. Alternatively, or in conjunction with this, greater integration of rabbits into the general curriculum, would allow for de-mystification of this species.

Programmes such as that developed by the Rabbit Welfare Association and Fund at the University of Bristol, have funded the training of specialist rabbit veterinary surgeons through residency programs. This can increase rabbit awareness and knowledge, and its continuation forms part of this strategy. The employment of Specialist clinicians at universities (such as the Royal (Dick) School of Veterinary Studies, University of Edinburgh and the Royal Veterinary College) would provide integrated teaching throughout undergraduate courses. Working with the Royal College of Veterinary Surgeons, British Veterinary Nursing Association, British Veterinary Association, British Small Animal Veterinary Association, British Veterinary Zoological Society, and the European College of Zoological Medicine, encouraging commercial CPD providers, and universities to increase training and CPD opportunities may be a valuable step. Graduating veterinary surgeons should appreciate the motivation of many owners to obtain diagnosis and treatment for their rabbits to a similar standard as they would expect for dogs and cats.

In order to better protect the health of rabbits, medication is often required. There are some medicines licensed for rabbits in EU Member States (e.g. the previously imported vaccination against RVHD2), which may be of value in the UK, yet require special authorisation from the Veterinary Medicines Directorate in order to import. Further exploration of the Veterinary Medicines Directorate (VMD) licensing of rabbit-specific medicine may help to provide more rapid and widely affordable health care for rabbits.

Current understanding of good practice

- prompt veterinary treatment should be provided if a rabbit's behaviour changes, or illness or injury is suspected;
- owners should be educated to recognise subtle signs of ill health, including fly strike, and to seek timely veterinary care;
- owners should be encouraged to consider insuring their rabbits, and insurance companies encouraged to provide affordable insurance for the species.
- insurance companies should not unduly limit the value of their product by excluding common conditions nor having an unhelpfully low pay-out limit;
- veterinary training should include more content on rabbit medicine and surgery in the undergraduate curriculum.

To address Priority area 6: "Promote timely and optimal treatment to rabbits with compromised health or welfare" the following initiatives will occur:

6a) Develop a working group to examine best practice treatment for rabbits with compromised health or welfare

6b) Encourage owners to carry out routine health checks (including nails, teeth), as well as daily behaviour, fly strike and locomotion checks. Educate owners on how to spot problems early

6c) Investigate the value of rabbits having veterinary checks every 6 as compared to 12 months

6d) Explore VMD licensing of rabbit-specific medicines and the potential benefit to rabbit welfare

6e) Encourage rabbit-specific training, including that on pain recognition and relief, for veterinarians and veterinary nurses, in initial training and CPD via courses, e-learning, web forums and textbooks

6f) Promote inclusion of rabbits as a specialism by core university supported positions and further development of programmes such as that developed by the RWAF at University of Bristol in funding the training of specialist rabbits vets using residency programmes

G Priorities to maximise implementation and welfare improvement

7 Develop statutory codes of practice for owners and good practice guidance for all those with an interest in rabbits

Section 3 of the Animal Welfare Act (2006) states that all those responsible for rabbits (as other animals protected under the legislation) have a duty of care to take reasonable steps in all circumstances to provide for the needs of their animals to the extent required by good practice. Section 9 of the 2006 Act states that the needs of an animal include five areas:

a. a suitable environment,

b. a suitable diet,

c. to be able to exhibit normal behaviour patterns,

d. to be housed with, or apart from, other animals,

e. to be protected from pain, suffering, injury and disease.

In Northern Ireland (Department of Agriculture, Environment and Rural Affairs, 2013) and Wales (Welsh Assembly Government, 2009) there are published Codes of Practice (CoP) and in Scotland, Pet Rabbit Welfare Guidance (Scottish Government, 2018) describing how to meet those needs, based, in part, on consensus expert opinion and part on evidence-based research.

In England, there exist statutory Codes for all main livestock production species (under farming legislation), as well as for dogs, horses, primates and cats (DEFRA, 2019), but no such Code of Practice currently exists for rabbits, hence attention is timely. Production of a DEFRA-endorsed code, based on the evidence-base (as reviewed in Section E could help guide all those responsible for rabbits to meet their legal duty. The recently derived Good Practice Guidelines (APGAW, 2021) would make a good starting point. The derivation of a statutory code is therefore one aim of this strategy and an online petition of 11,000 signatures (Camp Nibble, 2013), suggested there is strong support for the development of a statutory Code.

Ideally, the code (and ahead of its publishing, good practice guidelines) should be available before the point of sale, not only through breeders, stores selling rabbits and outlets of rabbit-related products, but also websites as internet rabbit sales are growing (Gosling et al., 2018; Neville et al., 2019). Many pet outlets, charities and breeders provide prospective owners with detailed care advice about how to meet the welfare needs of rabbits as required by The Animal Welfare (Licensing of Activities Involving Animals (England) Regulations 2018); (e.g. The Pet Charity, 2019; Pets at Home, 2018). The Pet Advertising Advisory Group (PAAG) also provides advice to help potential owners make informed decisions when buying animals online, but consistency of messaging and inclusion of the most up-to-date evidence-based knowledge is universally required.

Potential owners should also be directed by the breeder, retailer, or rehoming centre (including virtual online rescues), to where they can find evidence-based advice before the point of sale, to allow them to make an informed decision. Retail premises, and websites (as well as other places exhibiting rabbits) provide an opportunity to educate and demonstrate good practice and high standards of housing and husbandry. Research shows that the conditions observed at the point of sale affect the way owners propose to house their rabbits, and many purchasing rabbits lack knowledge of their required care (Edgar and Mullan, 2011). Lack of knowledge and inappropriate expectations by owners as well viewing rabbits as disposable, were some of the major emerging themes when Rioja-Lang et al. (2019) prioritised welfare issues for rabbits. Therefore, it is likely that welfare education campaigns, which engage pet outlets including internet sellers and improve the way they exhibit rabbits, will have the potential to significantly impact upon the rabbit-owning public. Accordingly, they should only stock and promote products appropriate to maintaining rabbit health and welfare, as presently understood (see sections 1-6).

Keepers of rabbits also require the skills to ensure their animals' good health and welfare, including recognising the signs of a rabbit in pain, and having up to date knowledge on how to meet their animal's needs. Such skills might be achieved by a variety of distance learning resources including appropriate books, websites and more formal courses. Education initiatives in schools, if well planned, have also been demonstrated to significantly improve children's attitudes and knowledge of rabbit welfare (e.g. Williams et al., 2022). The Pet Education Resources website (PFMA, 2019) and other similar forums may be suitable hubs for the dissemination of such material and should be investigated. However, ensuring a mechanism for assessing the quality and consistency of such material is imperative.

The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018 sets out a licensing regime for activities that are carried out in the course of a business, including selling animals as pets. Further details, including rabbit-specific points, can be found in DEFRA-issued guidance notes for local authorities. Guidance notes also contain optional 'higher standards' that, if met, contribute towards an operator being awarded a higher star rating for their business and getting a longer licence term (and thus fewer inspections), both of which aim to incentivise better practice. The Regulations and Guidance have a review process in place which provides an opportunity to include all current and future evidence-based knowledge. Hence this strategy includes actions to ensure this guidance is up-to-date and optimal.

To effectively protect rabbit welfare, good practice needs to be understood and implemented, by not only owners and retailers, but by all those responsible for rabbits (see Figure 1). Large numbers of rabbits are kept by farm parks, animal encounters, retailers, boarding establishments, rehoming societies, colleges and schools. How they are housed, cared for, and utilised, can not only impact upon the individual animals, but can serve as a model to employees, students and visiting members of the public, and potentially impact many more rabbits. Whilst some of these activities are covered in the Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018, enhanced guidance to, and potentially also licensing of, such establishments may further benefit rabbit welfare. As the usage of rabbits increases and diversifies, monitoring usage, and deriving guidance for new users, will also be important and needs to be addressed. Finally, some of the misconceptions as to how rabbits should be kept and fed, likely come from misrepresentations by the media (Rioja-Lang et al., 2019). Efforts to change the way in which rabbits are portrayed more generally may also serve to improve rabbit welfare longer-term (e.g. British Veterinary Association, 2018).

To address Priority area 7: "Develop statutory codes of practice for owners and good practice guidance for all those with an interest in rabbits" the following initiatives will occur:

7a) Seek DEFRA endorsement for statutory Codes of Practice for England, based on information in this document and the Good Practice Guidelines (APGAW 2021)

7b) Investigate routes of dissemination of these codes to reach all, including less well-informed owners, and the feasibility of providing rabbit-specific training within schools.

7c) Devise good practice advice for show jumpers, farm parks, retailers, care homes, schools, colleges, boarding establishments etc as well as companion animal owners

7d) Investigate the feasibility of devising compulsory licensing or accrediting of sanctuaries, rehoming centres, farm parks and home boarding establishments

7e) Develop methods for best assessing rabbit welfare during inspections

7f) Set up systems for dissemination of consistent evidence-based information to potential owners, at point of sale and through outlets of rabbit-related products, and by signposting at petting zoos, school and farm parks to maximise their education potential.

7g) Examine welfare implications of any new uses of rabbits

7h) Explore ways to target media companies to portray rabbits in a more welfare compatible way.

8 Review skills and training for those working with rabbits

The competence of people involved with caring for rabbits is an essential element of ensuring rabbit health and welfare. One important sector integral to pet rabbit welfare is pet sales. In the UK, there are over 3,500 pet shops, employing over 15,000 people (PIF, pers comm). Whether a pet shop is independently owned, part of a bigger chain or garden centre with a pet section, appropriately trained staff are required on all the premises. This is vital, not just to ensure the welfare of the rabbits within their care, but to ensure that the knowledge they impart to current and future owners is up to date and correct.

Pet retailers are required to hold a licence from their local authority in order to sell animals. Under both the Animal Welfare (Licensing of Activities Involving Animals) (Wales) Regulations 2021, and the Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018, the licence holder or designated manager and any staff interacting with animals must have competence. This can be demonstrated by holding or being registered for an OFQUAL regulated Level 2 qualification appropriate to rabbits, by having undertaken relevant industry recognised training or an in-store training programme, or based on experience.

Under the Model Conditions for Pet Vending Licensing applicable in both Wales and England (CIEH, 2013), a proprietor should hold, or be working towards, an appropriate City & Guilds or other Level 3 qualification. However, this expectation is differentially enforced by various Local Authorities; and there is no legal requirement for practical skills, for example handling or correctly sexing animals - though whether a person is considered "fit and proper" must be a consideration of the licensing body.

There is a whole range of nationally accredited and recognised qualifications in animal care; college-centred and work-based which aim to ensure competence and transferable skills. One popular example is the City and Guilds Level 3 Award/Certificate in the Principles of Animal Management within a Pet Store. The course includes information on small mammals, such as details of rabbit care, health and behaviour. However, not all those working with rabbits will have completed such a qualification, and even if they have, the amount and quality of information covered relating to rabbits will be very variable.

Organisations have developed a range of their own education resources providing species-specific training, in bite-sized and web-based chunks (e.g. PIF, Pets at Home). There is potential value to reviewing the training resources currently available, aiming to make information consistent across the board, underpinned by a strong evidence-base and up to date information and incorporating the information described in Sections 1-6. The possibility of making formal training compulsory for all pet-store staff, (including part-time staff and those working in pet stores which sell pet-related products, but not livestock), should also be considered.

However, pet sales professionals are not the only sector who would benefit from formalised training. There is potential value to initiating rabbit-specific training for local authority representatives and environmental health officers, as well as licensing officers, many of whom currently lack rabbit-specific knowledge. Hence the strategy aims to review and encourage both informal and formal training leading to qualifications, by engaging with employers to calculate their needs and providing tailor-made training opportunities for staff and volunteers. It also aims to encourage partnerships between those delivering training and those developing qualifications and awards, ensuring that their messaging is consistent and up to date. Investigating the introduction of a voluntary programme of ongoing training for employees and volunteers to increase professionalism, may keep those concerned up to date with current theories and techniques and enhance animal welfare.

It is important also to explore development and accessibility of training resources for staff of zoos, farm parks, schools, colleges, animal encounters, and exhibitors (e.g. show jumpers), care homes (with resident or visiting pets), farm parks, rehoming centres, boarding establishments, and all those dealing with rabbits. The development of training, and the independent assessment of show stewards, marshals and inspectors, may also have great potential value.

To address Priority area 8: "Review skills and training for those with working with rabbits" the following initiatives will occur:

8a) Explore ways to develop consistent evidence-based rabbit-specific training for industry employees and volunteers, local authority representatives, environmental health officers (who inspect pet shops), and licensing officers in rabbit welfare

8b) Investigate the feasibility of compulsory inclusion of evidence-based rabbit specific training for industry employees

8c) Develop training resources for zoo staff, exhibitors, colleges, animal encounters, pet stores, farm parks, rehoming centres, boarding establishments and all those dealing with rabbits

8d) Develop training and accreditation of show stewards, marshals, boarding establishments and rehoming centres

8e) Develop training, education and support materials for distribution by rehomers and retailers, both of rabbits and of rabbit-related products

Rabbit Welfare Strategy

9 Seek to balance supply and demand to reduce the number of unwanted rabbits

The large numbers of rabbits relinquished to rehoming centres each year (around 67,000 in 2012; RWAF, 2021c) suggests that the numbers born exceed those for which there are long-term homes. Some relinquishment is likely unpreventable, due to changes in personal circumstances, but in many cases, it will be a result of rabbits being acquired without sufficient consideration of their long-term needs and suitability as a pet. Reducing impulse buying and encouraging potential owners to fully consider and make informed decisions, before acquiring a rabbit is an important route to improving rabbit welfare.

Potential owners should be deterred from making impulse purchases or buying rabbits when they are not an appropriate pet for the owner's lifestyle, or they cannot meet all of their needs. As pet stores and garden centres are where the most companion rabbits are obtained from (39% Rooney et al., 2014; 34% PDSA, 2020) detailed care advice should be provided or signposted before purchase, so that potential owners can fully consider the implications of owning companion rabbits. The prospective owner should also be informed regarding what questions they need to ask of the breeder, retailer or rehoming centre, to ensure they acquire happy healthy rabbits, well- suited to their intended use (as a companion/breeding or showing animal) and likely to enjoy a good quality of life in that use.

Home-checking and interviewing of potential owners, combined with providing prospective owners with resources to question a supplier or rehomer, may serve to improve the situation, but the practicalities and feasibility require attention. Similarly, the feasibility and value of all outlets following up after sales (including those sold on the internet), to ascertain the numbers of rabbits rejected, and of licensing breeders needs to be assessed.

There are currently thought to be significant numbers of rabbits born due to unplanned matings (Ellis et al., 2017), some of which are a result of incorrect sexing, for example, by pet outlets. The impact of this is yet to be fully assessed. Encouraging pet outlets to train staff to correctly sex rabbits, and owners to neuter all non-breeding stock may have potential value which needs to be assessed. A long-term aim is to work to ensure that supply does not exceed demand, and that breeders only breed as many as there are good homes.

Many rehoming charities struggle to rehome the animals in their care and the demand for new homes far outstrips the availability. Breeders should therefore be encouraged to breed responsibly, to neuter all non-breeding animals to facilitate group-housing and to avoid euthanising healthy unwanted animals. They should also aim to rehome, or care for, any unwanted litters and any animals at the end of their breeding lives. Many breeders achieve this currently, but some may not. Pet outlets are increasingly becoming involved in rehoming unwanted stock, and this role needs to be further developed.

It is essential to develop ways to continually or periodically collect data on the numbers of rabbits born, the numbers requiring rehoming, the average life span, population structure, occurrence of "impulse buys" and sourcing of pet rabbits. It is only by collecting this information that we can monitor the effectiveness of future initiatives.

One source of rabbit acquisition, which is currently very difficult to monitor and control is internet sales. Several recent surveys suggest that its role is significant and expanding (Gosling et al., 2018; Neville et al., 2019). The DEFRA endorsed, Pet Advertising Advisory Group (paag.org.uk) has started working on this topic, monitoring websites and agreeing minimum standards. Its efforts should be supported and supplemented and it is important to investigate possibilities of licensing by local authorities of regular, online and internet breeders.

To address Priority area 9: "Seek to balance supply and demand to reduce the number of unwanted rabbits" the following initiatives will occur:

9a) Explore and develop ways to continually or periodically collect data on the numbers of rabbits born, numbers requiring rehoming, population structure, number of impulse buys and sourcing, to allow monitoring of future efforts

9b) Encourage responsible breeding which aims to only produce as many rabbits as there are available good homes and avoids culling healthy animals by rehoming all ex-breeders

9c) Scope the need and feasibility of licensing by local authorities of regular, online, internet breeders and suppliers, working together to combat this emerging problem

9d) Investigate the scale and impact of incorrect sexing on the number of rabbits

9e) Improve point of sale advice, in order to reduce impulse buys. Investigate the possibility of introducing a requirement of multiple viewings and a minimum period between view and purchase

9f) Encourage owners to neuter all non-breeding stock, to avoid accidental matings

9g) Encourage pet outlets to play a role in rehoming unwanted pets, via adverts or in store promotion

9h) Investigate the feasibility of interviewing and home checking all prospective owners and promote this if appropriate

9i) Devise and provide owners with resources to question suppliers, rehomers, or breeders to ensure good welfare of animals prior to acquisition

10 Set up systems to regularly monitor health and welfare

Critical to any strategy is that it is regularly reviewed. Progress on agreed goals should be objectively and transparently assessed and revised. Therefore, this strategy will be reviewed for progress against the objectives once a year (by the secretariat) and the strategy revised as required. Thorough review and revision will occur every 3 -5 years.

The priorities identified in this strategy are aimed at improving the welfare of rabbits, reducing suffering, morbidity and mortality. Hence, monitoring the UK rabbit population quantitatively is important, to assess the effectiveness of any interventions and measures taken. Ongoing systems to monitor the way rabbits are housed and cared for, the number of rabbits relinquished each year, motivations for purchase and relinquishment, as well as disease prevalence and life span are required.

To test the effectiveness of education and awareness initiatives within the strategy, it is important to monitor a representative sample of pet rabbits, for example monitoring changes in the environments in which rabbits are housed. We must not simply poll those reported to the RSPCA for cruelty, nor those signed up to rabbit enthusiast groups, as either will give a skewed sample, hence collecting information on a diverse and representative rabbit owner sample is important.

There are already established effective methods to poll the UK rabbit population (PDSA, 2011; 2020; Rooney et al., 2014; Wensley et al., 2021) so supporting their perpetuation may be an effective way of achieving this, and there is benefit to collecting objective data as well as owner-reported (see Rooney et al., 2014). Systems of collecting data on veterinary surveillance and morbidity data of a whole range of companion animal species have recently been developed (e.g. Savsnet and VetCompass) and have produced valuable assessments of causes of morbidity and mortality (e.g. O'Neill et al., 2020). Exploring ways to optimise the use of this data, to avoid any skew (due to only certain practices donating data) and to share information to best improve rabbit welfare, is important.

To address Priority area 10: "Set up systems to regularly monitor health and welfare" the following initiatives will occur:

10a) Develop systems to monitor the number of rabbits relinquished each year and the reasons for purchase and relinquishment

10b) Support and endorse the PDSA, RSPCA and any other surveys to quantify welfare problems and hence measure success of welfare efforts and education campaigns

10c) Review progress of the objectives in this strategy once a year (by secretariat)

10d) Monitor the effectiveness of interventions and measures taken

10e) Review and revise the strategy as required but thoroughly every 3-5 years

Rabbit Welfare Strategy

H Rabbit Welfare Action plan

The action plan below summarises the top ten priority areas for action; within each there are short, medium and long-term goals. Responsibilities will be assigned to individual organisations and bodies for each activity and recommendation. The table should be reviewed, and amended, as issues evolve taking into account changes in knowledge, technological advances and veterinary expertise.

Red:	**begin work immediately and review progress in 2023;**
Amber:	**aim to be underway in 2023 and review progress in 2024**
Green:	**ongoing, aspiration to achieve a lasting change in behaviour or dependent upon results of an amber action so unable to initiate until after 2023 – review progress annually**

Action	Time frame
Priority 1. Define and promote good housing and husbandry	
1a) Develop a working group to examine best practice in housing and husbandry	
1b) Develop a programme of work to support and promote housing and care with the current most up to date knowledge about rabbit welfare	
1c) Regularly review scientific evidence and current charity and supplier recommendations	
1d) Review the value of, and barriers to, adopting integrated living accommodation compared to separate runs and houses, and explore the impact of housing indoors compared to outdoors	
1e) Explore and improve the availability of suitable, and adequately sized housing in retail outlets, pet shops etc.	
1f) Maximise the education potential of pet care outlets, charities, rabbit shows by supporting them to: • Exhibit rabbits in appropriate housing • Provide advice to prospective owners • Ensure availability of optimal housing at point of sale	
1g) Explore and define welfare compatible accommodation used for rabbits used for breeding	

Priority 2. Determine and promote optimal dietary advice	
2a) Develop a working group to examine best practice in rabbit feeding.	
2b) Develop a programme of work to promote a healthy diet based on current knowledge to current and prospective owners	
2c) Review scientific evidence and current recommendations of all stakeholders, charities etc. and ensure consistent messaging	
2d) Encourage pet sale suppliers to investigate ways to promote the sale of high quality hay and/or grass in feeding (not bedding sections) of all pet care outlets, and investigate ways to assure year-round continual sources	
2e) Promote the education of owners, and carers regarding the importance of forage-based diet and derive guidelines on the value of different foodstuffs, dangerous plants and other foods	
2f) Continue efforts to develop advice and products that overcome selective feeding and unbalanced diets	
2g) Promote efforts to reduce obesity in the rabbit population and educate owners and carers to identify appropriate weight using body condition score	

Action	Time frame
Priority 3. Describe welfare compatible social living for rabbits – reducing the number of rabbits living solitarily	
3a) Develop a working group to examine best practice in housing of rabbits in compatible pairs or groupings	
3b) Promote sale and rehoming of neutered pairs of rabbits, or rabbits destined to live in pairs (or groups), whenever possible, and explore the value of early neutering to facilitate this	
3c) Review **i)** current practice - in particular in pet outlets, farm parks, zoos etc since research has already examined pets **ii)** existing scientific evidence and **iii)** expert opinion on benefits of pair- and group-living including the value of providing multiple resources and entrances to hiding places etc	
3d) Investigate best practices for the introduction of rabbits, including optimal time maximise the chances of compatible groupings, and produce and widely disseminate, resources describing optimal protocols for introduction, ways to avoid and reconcile relationship breakdowns	
3e) Produce evidence-based training resources for owners, sales staff and rehoming centres to: **i)** identify appropriate rabbit-rabbit behaviours, and **ii)** spot indicators of incompatibility	
3f) Examine feasible routes by which showing and breeding animals could benefit from housing systems that facilitate social interaction	

Priority 4. Examine and promote best practice for breeding and rearing rabbits well suited to life as a companion	
4a) Develop a working group to examine best practice in breeding/rearing rabbits best suited to life as a companion	
4b) Produce guidelines, and education resources which promote best practice for children and adults handling rabbits, based on expert opinion and research findings	
4c) In collaboration with rabbit breeders, conduct research to identify optimal protocols for breeders to produce human-friendly, non-fearful rabbits via optimal ● breeding, ● weaning / doe removal, ● age of sale, ● rearing, ● habituation and ● handling - including optimal frequency and age of handling	
4d) Work to reduce the number of rabbits that are fearful of handling by promoting testing of socialisation protocols in breeding establishments, and investigating the heritability of tameness	
4e) Promote the use of behavioural modification, based on reward-based training as a means to reduce fear in rabbits	
4f) Review evidence of the prevalence of heritable breed (and colour)-specific diseases and exaggerated features e.g. malocclusion in Netherland dwarfs and lops, including in new emerging breeds	
4g) Liaise with scientific experts to identify the routes to reduce the occurrence of breed- specific disorders	
4h) Encourage breeders to only breed from healthy stock, ensuring that the health, welfare, quality of life and temperament of rabbits is prioritised	
4i) Develop resources to educate future owners of the health risks of exaggerated physical features, and how to select a healthy rabbit	

Action	Time frame
Priority 5. Highlight ways to reduce preventable disease in rabbits	
5a) Develop a working group to examine best practice in decreasing preventable disease in rabbits	
5b) Devise a coordinated approach to increase owner awareness and knowledge of risk factors for **i)** dental disease **ii)** gastrointestinal problems **iii)** E. cuniculi, and **vi)** fly strike and produce resources to explain to owners how to check for each of these.	
5c) Encourage vaccination of all rabbits against myxomatosis and Rabbit Viral Haemorrhagic Disease (RVHD1 and 2). Explore mechanisms for pet outlets and veterinary surgeries to work in synchrony to promote and monitor veterinary registration, neutering and vaccination, through systems, for example at point of sale	
5d) Examine feasibility, benefits and cost of neutering prior to sale and investigate and promote optimal time for neutering	
5e) Investigate the number of lost rabbits whose return has been, and those that could be, aided by microchipping	
5f) Examine the risks and potential value and practicalities of microchipping all rabbits, and investigate whether ringing presents a significant welfare issue for rabbit destined for showing	
5g) Produce guidelines for owner, breeder and seller on good practices in permanent ID methods	

Priority 6. Promote timely and optimal treatment to rabbits with compromised health or welfare	
6a) Develop a working group to examine best practice treatment for rabbits with compromised health or welfare.	
6b) Encourage owners to carry out routine health checks (including nails, teeth), as well as daily behaviour, fly strike and locomotion checks. Educate owners on how to spot problems early	
6c) Investigate the value of rabbits having veterinary checks every 6 as compared to 12 months	
6d) Explore VMD licensing of rabbit specific medicines, and the potential benefit to rabbit welfare	
6e) Encourage rabbit-specific training, including that on pain recognition and relief, for veterinarians and veterinary nurses, in initial training and CPD via courses, e-learning, web forums and textbooks	
6f) Promote inclusion of rabbits as a specialism by core university supported positions and further development of programmes such as that developed by the RWAF at University of Bristol in funding the training of specialist rabbits vets using residency programmes	

Action	Time frame
Priority 7. Develop statutory codes of practice for owners and good practice guidance for all those with an interest in rabbits	
7a) Seek DEFRA endorsement for statutory Codes of Practice for England, based on information in this document and the Good Practice Guidelines (APGAW 2021)	
7b) Investigate routes of dissemination of these codes to reach all, including less well-informed owners, and the feasibility of providing rabbit-specific training within schools	
7c) Devise good practice advice for show jumpers, farm parks, retailers, care homes, schools, colleges, boarding establishments etc as well as companion animal owners	
7d) Investigate the feasibility of devising compulsory licensing or accrediting of sanctuaries, rehoming centres, farm parks and home boarding establishments	
7e) Develop methods for best assessing rabbit welfare during inspections	
7f) Set up systems for dissemination of consistent evidence-based information to potential owners, at point of sale and through outlets of rabbit-related products, and by signposting at petting zoos, school and farm parks to maximise their education potential	
7g) Examine welfare implications of any new uses of rabbits	
7h) Explore ways to target media companies to portray rabbits in a more welfare compatible way	

Priority 8. Review skills and training for those working with rabbits	
8a) Explore ways to develop consistent evidence-based rabbit-specific training for industry employees and volunteers, local authority representatives, environmental health officers (who inspect pet shops), and licensing officers in rabbit welfare	
8b) Investigate the feasibility of compulsory inclusion of evidence-based rabbit specific training for industry employees	
8c) Develop training resources for zoo staff, exhibitors, colleges, animal encounters, pet stores, farm parks, rehoming centres, boarding establishments and all those dealing with rabbits	
8d) Develop training and accreditation of show stewards, marshals, boarding establishments and rehoming centres	
8e) Develop training, education and support materials for distribution by rehomers and retailers, both of rabbits and of rabbit-related products	

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Action	Time frame
Priority 9. Seek to balance supply and demand to reduce the number of unwanted rabbits	
9a) Explore and develop ways to continually or periodically collect data on the numbers of rabbits born, numbers requiring rehoming, population structure, number of impulse buys and sourcing, to allow monitoring of future efforts	
9b) Encourage responsible breeding which aims to only produce as many rabbits as there are available good home and avoids culling healthy animals by rehoming all ex-breeders	
9c) Scope the need and feasibility of licensing by local authorities of regular, online, internet breeders and suppliers, working together to combat this emerging problem	
9d) Investigate the scope and impact of incorrect sexing on the number of rabbits	
9e) Improve point of sale advice, in order to reduce impulse buys. Investigate the possibility of introducing a requirement of multiple viewings and a minimum period between view and purchase	
9f) Encourage owners to neuter all non-breeding stock, to avoid accidental matings	
9g) Encourage pet outlets to play a role in rehoming unwanted pets, via adverts or in store promotion	
9h) Investigate the feasibility of interviewing and home checking all prospective owners and promote this if appropriate	
9i) Devise and provide owners with resources to question suppliers, rehomers, or breeders to ensure good welfare of animals prior to acquisition	

Priority 10. Set up systems to regularly monitor health and welfare	
10a) Develop systems to monitor the number of rabbits relinquished each year and the reasons for purchase and relinquishment	
10b) Support and endorse the PDSA, RSPCA and any other surveys to quantify welfare problems and hence measure success of welfare efforts and education campaigns	
10c) Review progress of the objectives in this strategy once a year (by secretariat)	
10d) Monitor the effectiveness of interventions and measures taken	
10e) Review and revise the strategy as required but thoroughly every 3-5 years	
10f) Encourage sharing of data between interested parties for the mutual benefit of improving rabbit welfare	

I Appendices

Appendix 1. Responsibilities of various stakeholders

All keepers (including parents and legal guardians of children under 16)

- consider whether they can meet rabbit's welfare needs for the whole of the animals' lives (up to 12 years or more) and whether rabbits are the best choice for their lifestyle and financial situation, before obtaining them
- explore insurance and microchipping and obtain whenever possible
- acquire and retain up to date knowledge on how best to meet the rabbit's health and behavioural needs, providing a suitable environment, diet and companionship
- acquire their rabbits from a responsible source, asking appropriate questions to ensure this is the case
- care for the rabbits throughout their entire life and ensure a humane death
- arrange for suitable care when away even if only overnight
- be familiar with, and provide, the appropriate preventive health measures, including, dental care, vaccination, and neutering
- regularly monitor both behaviour and health (at least daily) so as to recognise early stages of ill health and seek veterinary assistance promptly if required
- recognise when quality of life deteriorates and seek veterinary advice if necessary

Breeders & Showing Associations (in addition to those of an owner)

- maximise the potential of shows to educate owners (and future owners) about rabbit welfare
- inform all those attending shows with rabbits of their welfare needs (including during transportation) and how best to meet them
- ensure that housing, husbandry and feeding during shows meet rabbits' welfare needs at all times
- ensure that handling during shows is done in the most welfare compatible way
- encourage members to prioritise the welfare of all rabbits (both parents and offspring) at all life stages
- encourage members to breed rabbits with the maximum chances of being healthy, and of suitable temperaments to be able to enjoy a good quality of life as pet, show or breeding animals
- ensure that during rearing, rabbits have had the necessary experiences (habituation or socialisation) to maximise the chances of them being healthy, happy and suited to the environment in which they will live
- work to ensure that supply does not exceed demand (i.e. only to breed litters for which good homes are assured) and aim to rehome, or care for, any unwanted litters and any animals at the end of their breeding lives,
- encourage members to avoid euthanising unwanted animals (e.g. by rehoming unwanted litters and animals at the end of their breeding lives or keeping old breeding stock as pets). If breeders have no option but to euthanise or cull animals, they must ensure that this is always done humanely and preferably carried out by a vet
- liaise with scientific experts to identify the best ways forward to address the welfare problems (including inherited disorders and exaggerated physical features) caused by selective breeding
- encourage members to avoid selection based primarily on appearance, but ensure that the health, and temperament, and potential for a high quality of life of rabbits are prioritised
- recommend housing and husbandry that best meet rabbits' welfare needs.
- urge members to ensure rabbits are able to perform all normal species-typical behaviour (e.g. hiding, exercising and interacting with other friendly rabbits)
- promote all rabbits having regular routine health checks with a vet, receive vaccinations against myxomatosis and Rabbit Viral Haemorrhagic Disease (RVHD 1&2) at least annually or at the recommended frequency, and see a vet whenever they are suspected to be ill, injured or in pain.

Pet Trade

- supply happy, healthy, well socialised animals most likely to have the temperament and necessary experiences (habituation) to be well suited to a life as a companion rabbit, thereby maximising the chances of a good quality of life,
- inspect suppliers prior to purchase or contracting to ensure high welfare standards
- only sell rabbits in compatible pairs or to live in compatible pairs (unless a rabbit has a medical or behavioural reason that dictates otherwise)
- source only from breeders who operate to defined standards and optimise the health and well-being of both parents and offspring
- promote training of all staff in current evidence-based rabbit health, welfare and care
- work to reduce impulse buying and encourage well-considered responsible ownership
- supply free, accurate, and evidence-based information, preferably before the point of sale, to allow potential owners to make an informed decision about whether they will be able to meet the rabbits' welfare needs for the whole of the animal's life
- provide consistent and evidence-based care advice verbally and/or care sheets, and sign-posting to relevant websites
- stock and promote products appropriate to maintaining rabbit health and welfare as presently understood and accepted
- share information and work collaboratively in order to promote good health and welfare of rabbits

Animal Welfare Charities

- campaign for improvements in rabbit welfare
- provide and disseminate consistent, accurate information based on up to date, evidence-based knowledge to help owners and carers maximise rabbit health and welfare
- share information and work collaboratively in order to promote good health and welfare of rabbits

Rehoming Centres

- provide an example to potential adopters of good practice housing, companionship and diet
- promote good vaccination, preventive treatment (e.g. by providing a health plan) and neutering practices
- only rehome rabbits in compatible pairs, or to live in compatible pairs (unless a rabbit has a medical or behavioural reason that dictates otherwise)
- work to rehabilitate rabbits showing any signs of physical or behavioural problems in order to maximise their chances of a happy future life
- provide training to staff and volunteers to maximise their knowledge of how best to care for rabbits and to disseminate such knowledge to future owners
- provide future owners with education materials or sign-post them to suitable materials to maximise their ability to care for their rabbit(s)
- only rehome rabbits to owners likely to be able to provide for all the rabbit's welfare needs for the rest of their life

Veterinary professionals

- source appropriate rabbit-specific information and be familiar with up-to-date evidence-based knowledge on husbandry and care as well as veterinary care,
- maintain up to-date knowledge by engaging in appropriate CPD as per RCVS guidelines
- disseminate knowledge to owners, carers and colleagues in order to optimise rabbit care
- always act in the best welfare interests of the animal at all times, as per the RCVS declaration
- working with the veterinary practice, encourage owners and keepers to have, and adhere to, regular veterinary health check plans for all rabbits under their care

Rabbit Welfare Strategy

Appendix 2. Behaviours indicative of a positive welfare state

Behaviours indicative of negative welfare 	**Dig on hard surface** **Grunt** **Head sway** **Thump hind legs** **Pull out own fur** **Grind teeth** **Bite or scratch people** **Lick self intensely** **Spray urine** **Gnaw or pull parts of housing**
Behaviours indicative of positive welfare	**Binky** **Play with object** **Roll on back** **Play with toys** **Lie down fully stretched out** **Stand up on hind legs**

Rabbit Welfare Strategy

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PIF Pet Industry Federation

RSPCA

BVZS British Veterinary Zoological Society

University of BRISTOL

RABBIT WELFARE Association & Fund