

Guide Dogs

Guide Dogs is committed to ensuring that the research activities we undertake are scientifically sound, will help inform and improve our business and are cost effective. We are indebted to our Canine Research Scientific Advisory Group who provide us with their professional advice and guidance to ensure we meet this commitment.

In particular, Guide Dogs would like to thank:

Dr Samantha Lindley

Professor Jeff Sampson – Kennel Club

Professor James Wood – University of Cambridge

Professor Gary England – University of Nottingham

We would also like to take this opportunity to thank those who have acted as peer reviewers for us, whose expertise enables us to ensure we continue to fund research of the highest quality.

To find out more about our research and funding programmes, contact **Kate Neal on 0118 983 8189** or email kate.neal@guidedogs.org.uk

Publications

Guide Dogs is committed to sharing its research with the public, its stakeholders, and the wider Scientific Community.

Guide Dogs has published the following articles:

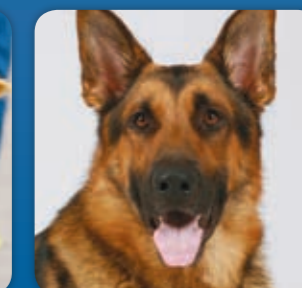
Brooks, A., Moxon, R. and England, G.C.W. (2010). Incidence and impact of dog attacks on guide dogs in the UK. *Veterinary Record* 166, 778-781.

Moxon, R., Copley, D. and England, G.C.W. (2010). Quality assurance of canine vaginal cytology: A preliminary study. *Theriogenology* 74, 479-485.

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Guide Dogs Canine Research

Update 2010



Guide Dogs



The priority of our canine research programme is to maintain the health, quality of life and wellbeing of our dogs so that we can continue to produce successful partnerships that will support blind and partially sighted people on their journey to independent mobility.

Over the last year, our in-house team of canine researchers have focused on wellbeing issues such as environmental enrichment and kennel design preferences. We have continued to improve the health of our dogs by ensuring that obesity levels within the working guide dog population remain low.

We have also looked at issues that affect our guide dogs whilst at work – including the effect of firework noise and ways any anxiety can be minimised; and monitoring the number of dog attacks on our working guide dogs, looking at why such attacks happen and the best ways to prevent them.

We have also commissioned an exciting new project with the University of Nottingham, which will analyse data on our dogs' behaviour to identify and test the genetic and environmental factors that increase the likelihood of dogs being withdrawn from our training programme for behavioural reasons. This project could have a significant impact on how the behaviour of dogs is measured – which would benefit not only Guide Dogs, but other working dog organisations and dog breeders internationally.

The scope of our canine research programme will continue to be reviewed to ensure it meets the ever changing needs of our clients and supports our Operations departments whilst remaining committed to the health and welfare of our dogs. I look forward to keeping you updated on our future findings.

David Anderson

Co-opted Trustee
Member of the Guide Dogs' Research Committee

Introduction

The driving force behind our canine research programme is to ensure we maintain the health and wellbeing of our dogs. As part of this programme, we aim to ensure that our training and welfare practices are grounded in scientific evidence and where possible are tailored to the individual needs of the dog. In turn, our ultimate objective is to produce high quality dogs which are best suited to the particular needs of their blind and partially sighted owners.

“...The objective of the canine research programme is to inform, preserve and enhance performance in our dogs that maintains their quality of life and ensures their suitability to the particular mobility needs of their blind or partially sighted owner...”

Our canine research will continue to improve the efficiency of the selection of breeding stock (stud dogs and brood bitches) and breeding practices to maximise production and diversity; and we will act on research to make recommendations that support the ongoing development of the quality and efficiency of the guide dog service.

Over the next 5 years, we will carry out robust, valid and ethical research within the areas of dog health and wellbeing, breeding efficiency, temperament, training and maintaining longevity of a guide dog's working life.

We will also undertake research that will help our existing and potential clients, as well as the training of our dogs, by looking at:

- The human-animal bond and its impact on working performance;
- The impact of change and different handlers on the dog's performance, learning and behaviours;
- How to make our services accessible to a diverse client group, particularly those with multiple disabilities and the breeding

and training of dual role dogs, for example for deaf-blind clients;

- The identification and evaluation of best practice, to support operational targets.

We will also promote our research for the benefit of assistance dogs and the wider dog population to influence the training and education of veterinary students and professionals. In turn, this will help promote better practice and services for blind and partially sighted people and the use of dogs in our society.

“...Our ongoing Canine Research Plan continues to provide Guide Dogs with information which can be used to adjust and refine methodologies and processes used when breeding, when caring for and when training our dogs. The exciting work planned for next year and work already underway will see us investigate a wide range of topics requested by the various departments in operations and our clients. By working collaboratively with other business partners we endeavour to deliver high quality data at an affordable price, ensuring canine research fits the needs of the business and continues to add significant value...”

David Grice, Senior Operations Project Manager says:

This review gives an overview of some of the priority areas of research that we are undertaking or have recently completed. The research falls into three main areas:

- Health and welfare;
- Factors impacting the effectiveness of the partnership;
- Improving processes and procedures.



“...In addition to the consequences for the dog, obesity can also cause loss of client mobility, shortened working life expectancies and a financial burden on the Association. As it is accepted that canine obesity results from poor husbandry by the owner the research has focused on educating and supporting staff, clients and volunteers as the key to prevention...” Sarah Miller, Dog Care and Welfare Manager:

Recently completed projects:

The obesity survey

Canine obesity is a growing problem in the UK, with some reports suggesting that up to 50 per cent of dogs and cats are overweight.

As a precautionary measure, we undertook a survey of our guide dogs to confirm the number of working guide dogs that are classified as obese. Results indicated that only a small number (8 per cent) of our working dogs were overweight, which is defined as 15 per cent or above their working weight. This is well below that of the average UK dog population.

Health problems such as diabetes, orthopaedic disease and skin conditions are more prevalent in obese dogs which can impact on how well the dog functions at work. As a consequence, we have formed a task force to look at preventative measures that enable guide dog owners to identify when their dog is becoming overweight, and understand how to keep it fit and healthy. This has included the development of a body conditioning scoring system for guide dog owners to use to monitor their own dog's weight themselves. We have also reviewed feeding guidelines to ensure the quantities of food offered to dogs during training are consistent and suitable for individual dogs.

We will continue to monitor the weight of our dogs and work with our guide dog owners to ensure their dogs remain at peak health and fitness levels.

Environmental enrichment and its effect on behaviour of guide dogs in training

Enriching the environment of dogs housed in kennels at our Guide Dog Training Schools can improve their quality of life, wellbeing and behaviour by providing opportunities for physical and mental stimulation, relaxation and social interaction, and allowing them to display natural behaviours.

We have introduced further environmental complexity and a menu of activities – including pack play sessions, climbing frame, gnawing, chill-out, massage, grooming and a maze – at all four training schools.

To enable us to find out how effective these activities are at improving well being, staff monitored the occurrence of inappropriate behaviours in 158 dogs at four training schools and staff perceptions of environmental enrichment (EE) over a period of time.

Results indicate that staff perceive EE to be enjoyable (willingness to participate in each activity was high), of great benefit to the dog and helpful in building a relationship, achieving training aims and learning about the dog. The activities also appear to help the dog adjust to new environments and routines.

EE activities appear to have no adverse effect on dogs' behaviour, as 'problem behaviours' such as jumping up and barking, scavenging, chewing and stealing toys were rarely observed by staff. In fact, the results suggest that the more activities dogs are exposed to or participate in, the less likely they are to display certain behaviours.

The next step will be to roll out EE to dogs in the care of our client services department, including 750 trainee dogs per year, and around 4,500 working guide dogs. This will involve identifying facilities and creating a range of activities that will best support the quality of life of dogs in district team offices, those who stay with volunteer boarders or in private/commercial kennels and working or retired guide dogs living with clients.

Kennel preferences of dogs exposed to five kennels with different environmental modifications

The kennels at the new Forfar and Atherton Guide Dog Training Schools are 'open' in design, so dogs can see and interact with each other and staff, which is reported to improve wellbeing. The research team wanted to find out if dogs would like to be provided with a private 'sanctuary' area in the kennel, where they can retreat to relax.

Eleven group or pair housed dogs spent two days in each of five kennels, which had different designs: a control with no adaptations; one with a deep bedding box; one with a covered area in the corner; one with a screen at the back; and one with a deep bedding box, covered area and rear screening.

Video recordings were made of the dogs in the kennels, and observers noted how they used the kennel space during rest periods, to give a good indication of their preferred relaxation area. The dogs' 'favourite' kennels appeared to be the one with a deep bedding box and the one with rear screening. They did not make extensive use of the covered areas.

We are now looking at ways to incorporate deep bedding boxes and/or rear screening features into kennels to ensure our dogs are the most comfortable they can be whilst in kennels and these features, will be considered in any future kennel designs.



Ongoing research:

Geographic retinal dysplasia (GRD) in guide dogs

Retinal dysplasia occurs when the two primitive layers of the retina do not form together properly. In geographic retinal dysplasia there are large areas of defective retinal development and, in the severe form, retinal detachment occurs. Until recently, GRD has not been seen in guide dog stock, only in outside-bred Labrador retrievers. Recently, however, we have identified a small number of working guide dogs with this condition. We will be working with the Animal Health Trust to investigate better quantification of the clinical disease, whether a genetic test for the condition can be developed, and the likely mode of inheritance.

Progressive retinal atrophy (PRA) in the Golden Retriever

Progressive retinal atrophy is an inherited eye disease seen in Labrador retrievers where the genetic mutation (known as PRCD) is well recognised, and a genetic test is available to provide a method of screening. Guide Dogs uses this test to screen breeding stock and manage the breeding programme.

Over the last two years, Golden Retrievers have been identified with a clinical manifestation that is almost identical to the Labrador PRA. However, these Golden Retrievers are PRCD-negative, suggesting that they have a different genetic mutation to the Labrador. Guide Dogs manages PRA in Labradors but there is currently no similar genetic test for Golden Retrievers. We will be working with the Animal Health Trust to establish the gene mutation that causes PRA by screening the Golden Retriever guide dog population.

The findings from these two studies will help inform our breeding programme.



Recently completed projects:

The incidence and effect of dog attacks on guide dogs

This study examined information on 100 domestic dog attacks on guide dogs to determine the number, severity and financial implications of these attacks across the UK. The study informed us that:

On average, three dog attacks occurred each month throughout a 30-month period. The majority of aggressors (85.7 per cent) and victims (62 per cent) were male.

97 per cent of attacks occurred in a public place, 90 per cent of the locations were familiar to the guide dog and 61 per cent of guide dogs were working in harness when the attacks occurred.

People sustained injuries in 19 per cent of the attacks; guide dogs were injured in 53 per cent of the attacks and required veterinary attention after 41 per cent of the attacks.

Almost 50 per cent of the guide dog owners reported that their physical or emotional wellbeing had been affected because of the attack. Two guide dogs were withdrawn from the programme due to effects on their behaviour as a consequence of the attacks.

Details of witnesses to attacks were collected on several occasions but, despite the injuries to dogs, and the physical and emotional impact on handlers, only 16 per cent of incidents were reported to the police. Almost one third of the incidents reported to the police resulted in charges or prosecutions being brought, although this represents only five per cent of the total number of attacks. Further work is now being undertaken to try and identify why these attacks occur, what can be done about them and what guidance can be provided to owners to better protect both their dogs and themselves.

Greeting behaviour in dogs

This literature review aimed to investigate the normal greeting behaviours that are displayed by the domestic dog when encountering an unknown dog, and relate these to guide dogs working in harness. This study followed on from our investigation into dog attacks on guide dogs.

The domestic dog uses various methods of communication, predominantly auditory, olfactory and visual but also physical contact. Greeting behaviour in the domestic dog involves a series of interactions, and the ability to display and interpret these signals differs between breeds due to variations in physical appearance.

When a guide dog working in harness approaches, or is approached by an unknown dog, it is possible that the guide dog's expected or trained behaviour does not allow it to display appropriate greeting behaviour, which may be interpreted as a challenge by certain other dogs.

Literature relating to the greeting behaviour of dogs when at least one dog is restrained by a lead is not well described and suggests a potential area for research. This will contribute to the research we will be undertaking to help us identify ways of reducing the number of future attacks on our guide dogs.

Inappropriate spending in working guide dogs

Nearly eight per cent of guide dog owners say they have had difficulties with their dogs displaying 'inappropriate' spending (toileting) behaviours. This can result in dogs needing extra training or re-training, or even being withdrawn from working. In 2008 one training dog was rejected for this reason, while nine dogs were withdrawn after qualifying – resulting in delays in securing successful partnerships and representing a significant financial cost to Guide Dogs.

This project aimed to look at the extent and nature of the problem, investigate why dogs might develop inappropriate spending habits and recommend ways to reduce the problem.

The investigations established that:

Staff and guide dog owners hold a number of different views about what constitutes inappropriate spending behaviour. The majority of clients and staff consider that dogs should ideally spend one to two times daily. However, data from a study into feeding regimes show the number of times per day dogs spend varies naturally within and between dogs, with the spending frequency of approximately half of dogs varying by two or more defecations per day. Due to this natural biological variation, the expectations of clients and staff on expected spending frequency and expectancy could be unrealistic.

The feeding regimes study also found no link between feeding dogs once or twice per day, in the frequency, weight or quality of defecations.

Although cases of diarrhoea may temporarily affect the spending routine, no sound evidence was found to link health problems with inappropriate spending routines.

74 per cent of dogs reported to have spending problems had previous spending issues noted during puppy walking, or training, or both – suggesting that the poor routine may not result from the changeover period between puppy walking and training.

Different commands and different tones of voice are being used to encourage dogs to spend, which suggests a lack of consistency throughout the stages of training and work.

No relationship was identified between inappropriate spending and any inherited factor.

As a result of this study and to improve management of spending issues we will:

- Communicate information about the natural variation in dog spending routines, and the need to be flexible.
- Provide guide dog owners/applicants with guidance on feeding times and developing suitable spending routines.
- Clarify the definition of 'inappropriate spending' and develop policies to define appropriate spending routine, ways of identifying what is normal/abnormal and ways of dealing with inappropriate spending.
- Develop a consistent approach to the way staff and clients are trained to encourage dogs to spend.

Research into inappropriate spending will continue, with proposals currently being drawn up to:

- Investigate any relationship between the spending surface provided at puppy walking and the establishment and maintenance of routines.
- Determine the effect of training leash relief from a very early age on establishing and maintaining routines.

“...Spending is an area where there are strongly held beliefs in terms of the reasons for problems as well as a wide variety of problem solving methods. The research we have done and the future research planned is a start to establishing more evidence based ways of working. The long term aim is to reduce the numbers of guide dog owners experiencing spending issues with their dogs and also to reduce the amount of time that establishing good routines currently takes at all stages of training...” David Hurst, National Puppy Walking Manager



The effect of downtime on learning

The effective learning of skills, and the retention of information in the long-term memory, is key to successful dog training. Animals can retain large volumes of information, but if the memory is not used and refreshed regularly, the information may be 'lost' over time.

A review of existing research and publications was undertaken to try and establish the extent to which the passage of time affects memory in dogs.

Existing research is limited but it does suggest that:

- Long breaks from training, such as several weeks, should be avoided, as this allows a dog to either partially or completely forget what it has learnt in the previous training session.
- Dogs need fewer training sessions to learn a skill if they are given weekly training sessions rather than daily training sessions. This may not be practical in guide dog training, however, as there is a limited timeframe in which to train each dog.
- It may be beneficial not to 'overdo' certain aspects of obedience during the early stages of training. If trained less frequently, learning may be achieved in fewer training sessions, freeing up time for activities such as free-running which could complement the dog's training.

Ways of incorporating these findings into our training programme to improve existing practices are now being investigated.

The effect of changes in handler on training in dogs

This project reviewed existing research into whether a dog's learning ability during training is affected by a change in handler.

Research was found to be limited, but studies do suggest that training performance can be affected by the stress of changing handler and disrupting the bond between dog and trainer. Training performance may be limited until stress levels are reduced and the dog has adapted and bonded with its new handler.

It has also been shown that communication within training can be affected by an unfamiliar handler, as dogs often respond to communication cues from their handler. There is likely to be a temporary impairment in the dog's performance as it gets used to the new handler.

While the performance of the dog may not be affected long term, how long the decline in training performance lasts will vary greatly between dogs and depend on the strength of the bond formed with the new handler and the emotional state of the dog.

Studies have shown the effects of changing handler can be reduced by activities to promote the bond between the dog and new handler before training commences, such as play. It is also important that trainers are consistent in the commands and training techniques they use. This research will be fed back into our training to improve current practices.

Travel sickness in dogs

True motion sickness results from the senses telling the brain that the body is in a different position in space than the brain expects it to be. However, for most dogs travel sickness relates to the stress associated with travel, not the motion of the car. Signs of travel sickness include hyper-salivation, panting, swallowing, lip-licking, restlessness, anxiety, trembling, retching and vomiting.

This project reviewed existing research and articles about canine travel sickness to gather information about available treatments and how to reduce travel sickness when it occurs in guide dogs.

As a result of the research, Guide Dogs now has comprehensive information on travel sickness and its treatments, including:

- Steps that can be taken to help the dog be more comfortable when travelling.
- Tips for helping dogs acclimatise to car travel gradually, and ensuring they have positive associations with car travel.
- A list of products available under veterinary prescription for the management of travel sickness, with details of what they do, how they work, their effectiveness, side effects, dosage and cost.
- A list of herbal and natural products marketed as remedies for travel sickness.

We now ensure that dogs are slowly and considerately introduced to car travel, to prevent anxiety and allow acclimatisation. Dogs displaying signs of car sickness may also undergo a behavioural modification programme.

This information is being circulated to staff so they can start putting it into practice, and give guidance to puppy walkers and guide dog owners whose dogs may be suffering.

Canine cognitive dysfunction syndrome

Cognitive dysfunction syndrome (CDS) in dogs is similar to Alzheimer's disease in humans. As dogs age, mental processes such as perception, learning and decision-making can gradually deteriorate. Signs of CDS include behavioural changes, disorientation, increased anxiety and impaired memory. Signs have been observed in dogs as young as seven – meaning working guide dogs could display signs of CDS for several years before retirement. This could affect their standard of work and ability to guide.

The research team reviewed existing research and articles on CDS to gather information on the disorder, its symptoms, treatments and preventative measures that can be taken to slow cognitive decline.

The findings highlighted the benefits of environmental enrichment (EE), for example exercise and stimulating play, on slowing down the brain's ageing process and thus the progress of CDS. This suggests it is important to provide EE to working guide dogs, to preserve their cognitive abilities and lengthen their working life.

Dietary supplements and specially formulated diets have also been proven to have a positive effect on dogs showing signs of CDS. The research suggests that giving approved supplements to working guide dogs showing early signs of CDS may alleviate symptoms, and that certain treatments are available that may also help increase the working life and wellbeing of dogs with signs of CDS.

This information will be used to educate staff about CDS, the impact it may have on a guide dog's standard of work, and how to identify signs in the early stages so steps can be taken to slow progression. Recognising the signs may also contribute towards an earlier decision to retire a dog.

New research for 2010:

The epidemiology of the behaviour of guide dogs *University of Nottingham Veterinary School*

Two thirds of dogs rejected from Guide Dogs' training programme are withdrawn because of unsuitable behaviour. Understanding why such behaviour develops is one of the biggest challenges we face in producing top quality dogs for our clients.

Guide Dogs has approved a five-year scientific research project, to be carried out at Nottingham University, that will analyse data on our dogs' behaviour to identify and test the genetic and environmental factors that increase the likelihood of dogs being withdrawn for behavioural reasons.

The aim is to identify behaviour and behavioural links that can be used to predict whether a dog is likely to qualify or be withdrawn. We can then develop improved behavioural assessment processes that enable dogs with a higher likelihood of withdrawal to be identified early. Such dogs can then either be withdrawn, or we can intervene to address the problem.

This should improve dog quality, be beneficial to dogs' wellbeing and save Guide Dogs significant costs and resources.

Puppy profiling research

As an early part of the epidemiology of guide dog behaviour work, the project team at Nottingham University has been looking at data from a pilot version of puppy profiling.

Approximately 500 puppies' reactions to 11 stimuli were trialled to assess confidence and responsiveness. Preliminary analysis suggests that seven of these stimuli show some predictive value. In particular, three of the stimuli scores, used together, provided a valuable insight into the potential for qualification or withdrawal.

Encouraged by these results, the team hope to further develop puppy profiling to produce a business tool to enhance the assessment and placement of puppies.

Estimated Breeding Values (EBV's) *The Animal Health Trust*

Historically we have selected dogs for breeding based primarily on their health and temperament and more recently we have found the use of DNA tests increasingly helpful in making breeding decisions. These tests have tended to be for single gene health disorders.

“...The demands on a working guide dog have never been higher than today. With a working environment that is ever more difficult and with our reaching out to provide guide dogs to a wider range of users, comes a need to constantly improve the behavioural suitability of our dogs to meet these challenges. This research aims to provide invaluable support to our breeding and training programmes, to improve the selection of dogs for guide dog work and to produce dogs that are tailored more closely to meet the individual needs of our clients than ever before...”

Simon Blythe, Canine Research Manager

A significant proportion of diseases are considered complex and are caused by multiple genes interacting with the environment, which has led to breeding decisions becoming increasingly complex.

In partnership with The Animal Health Trust, a 4 year research project into the use of Estimated Breeding Values (EBV's) within the Guide Dogs Breeding Programme has been agreed, with the majority of funding sourced externally.

The overall aims are to enable evaluation of risk more effectively in breeding decisions and to ensure the long term health of the programme through management of genetic diversity.

An EBV is an objective numerical assessment of the genetic status of an individual dog and allows different dogs to be compared on an equal basis. EBV's use a range of information including health, temperament, pedigree, relationships within breeds and advanced statistical techniques to determine a value for a given dog.

EBV's should enable us to assess more efficiently and accurately underlying genetic risk for complex diseases. This will enable us to make better use of all the information available to us and to determine the most effective breeding strategies to ensure we continue to breed the best dogs we possibly can.

“...EBV's are commonly used in the breeding of cattle and other large animals and are successfully used at some Guide Dog Schools in the USA. With more and more information available to us, an EBV system/approach may prove invaluable as an additional tool in making the best possible breeding decisions...”

Matthew Bottomley, Breeding Centre Manager

Completed Research:

Quality assurance of laboratory tests

The project aimed to investigate the variation in assessment of vaginal cytology and semen quality within and between technicians, as this could affect the reliability of results obtained and the way results are interpreted.

Five technicians analysed 16 vaginal smears and semen samples collected from 10 dogs. Assessments of vaginal cytology were found to be highly reliable. Evaluation of three semen quality parameters (morphology, motility and concentration) was subject to greater variation.

The results suggest that an internal quality control program, like those used in human reproduction laboratories, might benefit Guide Dogs by increasing the accuracy and precision of results obtained. This has now been designed and established within our breeding centre.

Comparison of different methods of measuring progesterone to determine the optimal time to breed

There are a number of hormones that help to regulate the oestrus (heat) cycle and pregnancy in dogs. Understanding how the hormone levels change can help in determining the best time to breed from our dogs. One hormone that can be used to help determine the optimal time for breeding is progesterone and the aim of the project was to compare two biochemical techniques to determine which one was more reliable and accurate in measuring plasma progesterone. The two techniques were different types of enzyme linked immunoassay (ELISA). The study took into account the financial considerations, turnaround time and accuracy of results from each ELISA.

Sixty samples taken from our breeding stock were analysed using the two ELISA kits, and also externally by radioimmunoassay (RIA), another more sensitive technique that uses radioactive substances. Both ELISA tests were found to be relatively reliable and accurate when they were compared to the RIA results. Based on the number of samples analysed by Guide Dogs each week, the quantitative ELISA was the least expensive to run.

Specifically for Guide Dogs, the study recommends using a quantitative ELISA based on its reliability, cost and efficiency.

“...It is common practice to measure progesterone to determine the best time to mate, however there are a variety of commercial tests available and so this study investigated which would be most appropriate for Guide Dogs in terms of reliability, speed and cost. The findings will improve the efficiency of the breeding centre, but also have implications for veterinary surgeons in practice who also undertake this test...”

Professor Gary England, Chief Veterinary Consultant

Ongoing research:

Quality of canine semen

Aim: to determine whether there have been any changes in semen quality in Guide Dogs' stud dogs over the last 20 years. Data exists from 1988 onwards and is currently being reformatted and updated to allow the assessment of changes in semen quality over time. The results of this work will inform our breeding programme.

