Information for Participants

Contents

List of delegates 2
Introduction to the workshop 3
Program 5
Delegate biographies 8
Assessment approach 13
Introduction to each context 16
   Diet 16
   Housing 19
   Weaning 23
   Foundation training 24
   Medical interventions 25
   Elective procedures 28
   Care procedures 29
   Restraint for management 31
   Road transport 32
   Activity: Competition 34
   Activity: Work 35
   Activity: Breeding 38
## List of delegates

<table>
<thead>
<tr>
<th>Delegate</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Jeannine Berger (USA)</td>
<td><a href="mailto:jberger@sfspca.org">jberger@sfspca.org</a></td>
</tr>
<tr>
<td>Dr Nic de Brauwere (UK)</td>
<td><a href="mailto:nde-brauwere@redwings.co.uk">nde-brauwere@redwings.co.uk</a></td>
</tr>
<tr>
<td>Ms Liane Crowther (UK)</td>
<td><a href="mailto:lcrowther@rvc.ac.uk">lcrowther@rvc.ac.uk</a></td>
</tr>
<tr>
<td>Orla Doherty (Ireland)</td>
<td><a href="mailto:animalbehaviourclinic@gmail.com">animalbehaviourclinic@gmail.com</a></td>
</tr>
<tr>
<td>Ms Julie Fiedler (Australia)</td>
<td><a href="mailto:horsesa@horsesa.asn.au">horsesa@horsesa.asn.au</a></td>
</tr>
<tr>
<td>Ms Anna Harrison (UK)</td>
<td><a href="mailto:anna.harrison@thedonkeysanctuary.org.uk">anna.harrison@thedonkeysanctuary.org.uk</a></td>
</tr>
<tr>
<td>Dr Bidda Jones (Australia)</td>
<td><a href="mailto:bjones@rspca.org.au">bjones@rspca.org.au</a></td>
</tr>
<tr>
<td>Ms Claudia Jones (Australia)</td>
<td><a href="mailto:cjones@rspcansw.org.au">cjones@rspcansw.org.au</a></td>
</tr>
<tr>
<td>Prof Sue McDonnell (USA)</td>
<td><a href="mailto:suemcd@vet.upenn.edu">suemcd@vet.upenn.edu</a></td>
</tr>
<tr>
<td>Prof Paul McGreevy (Australia)</td>
<td><a href="mailto:paul.mcgreevy@sydney.edu.au">paul.mcgreevy@sydney.edu.au</a></td>
</tr>
<tr>
<td>Dr Andrew McLean (Australia)</td>
<td><a href="mailto:andrewmclean@esi-education.com">andrewmclean@esi-education.com</a></td>
</tr>
<tr>
<td>Lindsay Nakonechny (Canada)</td>
<td><a href="mailto:lnakonec@uoguelph.ca">lnakonec@uoguelph.ca</a></td>
</tr>
<tr>
<td>Prof Christine Nicol (UK)</td>
<td><a href="mailto:c.j.nicol@bris.ac.uk">c.j.nicol@bris.ac.uk</a></td>
</tr>
<tr>
<td>Prof John Webster (UK)</td>
<td><a href="mailto:john.webster@bristol.ac.uk">john.webster@bristol.ac.uk</a></td>
</tr>
<tr>
<td>Prof Sara Wolfensohn (UK)</td>
<td><a href="mailto:s.wolfensohn@surrey.ac.uk">s.wolfensohn@surrey.ac.uk</a></td>
</tr>
<tr>
<td>Dr James Yeates (UK)</td>
<td><a href="mailto:james.yeates@rspca.org.uk">james.yeates@rspca.org.uk</a></td>
</tr>
</tbody>
</table>
Introduction to the workshop

Welcome to the Dorothy Russell Havemeyer Foundation Equine Welfare Workshop. We are assembled here on Galiano Island with a common interest in the welfare of the domesticated horse.

The aim of this workshop is to conduct a series of assessments of the negative (adverse) welfare impacts of common interventions on horses (horses and ponies) across a broad range of different contexts of equine care, activity and training.

Our plan is to spend four days as an expert panel:

- presenting some core information on common interventions (and constraints) that are imposed on the domestic horse in various contexts
- evaluating the impact of each intervention, as a function of its duration
- anticipating the duration of the impact for the animal's life, using scenarios
- recording any gaps in the scientific literature
- and potentially, developing a scoring system so that horse carers can map-out the welfare impacts of their activities.

These assessments will primarily focus on interventions for which there is some peer-reviewed literature; but it will also provide best-guess assessments where such literature is absent.

We aim to include each panelist as a co-author of an anticipated peer-reviewed article to emerge from the workshop. To do this, we need to ensure that every panelist engages in the process and provides sign-off at the end of the workshop. We will then seek volunteers to help with the drafting of the eventual manuscript.

The activities to be undertaken during the project overall, several of which have already been completed, include:

1. Identification and coordination of an expert panel to perform the welfare assessments (workshop delegates)
2. Development of a list of priority domestic equid interventions to be assessed, in consultation with the panel. This list will include existing routine training and husbandry methods (pre-workshop surveys 1 and 2)
3. Performing an extensive literature search to gather relevant information to assist assessments (topic summaries and presentations by context leaders)
4. Adaptation of the domain-based humaneness model for equine welfare assessment (welfare assessment summary and templates)
5. Preparation and organisation of a four-day meeting of panel members to conduct assessments using the welfare impact model
6. Preparation of assessment worksheets and scoring matrices to assist with interpretation of results.
Contexts and interventions

For the purpose of the workshop, we have grouped the things we do to horses into a series of contexts. Each context has been assigned to a workshop delegate (and buddy) who will lead the discussion on this topic (Table 1). A condition of funding from The Dorothy Russell Havemeyer Foundation is that each delegate attending a workshop provides a presentation to the workshop - the first day of the workshop allows delegates to briefly introduce each context through a 15-minute presentation.

For each context, we have assembled a list of common interventions that affect horses. An example of an intervention in the context of, say, care procedures is mane pulling. An example of an intervention in the context of restraint for management procedures is using a nose twitch.

Table 1 Assignment of leaders and buddies to the 14 different contexts for assessment

<table>
<thead>
<tr>
<th>Context</th>
<th>Leader</th>
<th>Buddy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet</td>
<td>Paul McGreevy</td>
<td>Claudia Jones</td>
</tr>
<tr>
<td>Housing</td>
<td>Christine Nicol</td>
<td>Liane Crowther</td>
</tr>
<tr>
<td>Weaning</td>
<td>Liane Crowther</td>
<td>Christine Nicol</td>
</tr>
<tr>
<td>Foundation training</td>
<td>Andrew McLean</td>
<td>Orla Doherty</td>
</tr>
<tr>
<td>Medical interventions (ill-health and veterinary)</td>
<td>Anna Harrison</td>
<td>Nic de Brauwere</td>
</tr>
<tr>
<td>Surgical interventions (ill-health and veterinary)</td>
<td>Nic de Brauwere</td>
<td>Anna Harrison</td>
</tr>
<tr>
<td>Elective procedures</td>
<td>John Webster</td>
<td>Sarah Wolfensohn</td>
</tr>
<tr>
<td>Care procedures</td>
<td>Julie Fiedler</td>
<td>Paul McGreevy</td>
</tr>
<tr>
<td>Restraint for management</td>
<td>Sarah Wolfensohn</td>
<td>John Webster</td>
</tr>
<tr>
<td>Road transport</td>
<td>Claudia Jones</td>
<td>Paul McGreevy</td>
</tr>
<tr>
<td>Activity: Competition</td>
<td>Orla Doherty</td>
<td>Andrew McLean</td>
</tr>
<tr>
<td>Activity: Work</td>
<td>Jeannine Berger</td>
<td>James Yeates</td>
</tr>
<tr>
<td>Activity: Breeding mares</td>
<td>James Yeates</td>
<td>Jeannine Berger</td>
</tr>
<tr>
<td>Activity: Breeding stallions</td>
<td>Sue McDonnell</td>
<td>James Yeates</td>
</tr>
</tbody>
</table>
Workshop program

<table>
<thead>
<tr>
<th>DAY ONE</th>
<th>Monday 10 August</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00 am</td>
<td>Meet &amp; greet/laptop setup</td>
</tr>
<tr>
<td>10.30</td>
<td>Welcome and introduction</td>
</tr>
<tr>
<td>10.45</td>
<td>The Dorothy Russell Havemeyer Foundation</td>
</tr>
<tr>
<td>11.00</td>
<td>Delegate introductions</td>
</tr>
<tr>
<td></td>
<td>Approaches to welfare assessment</td>
</tr>
<tr>
<td>11.30</td>
<td>Welfare matrices</td>
</tr>
<tr>
<td>11.45</td>
<td>Five Domains model</td>
</tr>
<tr>
<td></td>
<td>Introduction to contexts</td>
</tr>
<tr>
<td>12.00</td>
<td>Diet</td>
</tr>
<tr>
<td>12.15</td>
<td>Housing</td>
</tr>
<tr>
<td>12.30</td>
<td>Weaning</td>
</tr>
<tr>
<td>12.45</td>
<td>Foundation training</td>
</tr>
<tr>
<td>1.00-1.30</td>
<td>Lunch</td>
</tr>
<tr>
<td>1.30</td>
<td>Medical interventions</td>
</tr>
<tr>
<td>1.45</td>
<td>Surgical interventions</td>
</tr>
<tr>
<td>2.00</td>
<td>Elective procedures</td>
</tr>
<tr>
<td>2.15</td>
<td>Care procedures</td>
</tr>
<tr>
<td>2.30</td>
<td>Restraint for management</td>
</tr>
<tr>
<td>2.45</td>
<td>Road transport</td>
</tr>
<tr>
<td>3.00</td>
<td>Activity: Competition</td>
</tr>
<tr>
<td>3.15</td>
<td>Activity: Work</td>
</tr>
<tr>
<td>3.30</td>
<td>Activity: Breeding mares</td>
</tr>
<tr>
<td>3.30-3.45</td>
<td>Refreshment break</td>
</tr>
<tr>
<td>3.45</td>
<td>Activity: Breeding stallions</td>
</tr>
<tr>
<td>4.00</td>
<td>Donkey differences</td>
</tr>
<tr>
<td>4.15-5.00</td>
<td>Mock assessment</td>
</tr>
</tbody>
</table>
### DAY TWO  Tuesday 11 August

<table>
<thead>
<tr>
<th>Time</th>
<th>Assessments</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30-10.30</td>
<td>Joint session</td>
<td>1  Housing</td>
</tr>
<tr>
<td>10.30-10.45</td>
<td><strong>Refreshment break</strong></td>
<td></td>
</tr>
<tr>
<td>10.45-12.00</td>
<td>Split group session</td>
<td>2A Road transport</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2B Foundation training</td>
</tr>
<tr>
<td>12.00-12.45</td>
<td><strong>Lunch</strong></td>
<td></td>
</tr>
<tr>
<td>12.45-2.00</td>
<td>Split group session</td>
<td>3A Medical interventions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3B Activity: Work</td>
</tr>
<tr>
<td>2.00-2.15</td>
<td><strong>Refreshment break</strong></td>
<td></td>
</tr>
<tr>
<td>2.15-4.00</td>
<td>Joint session</td>
<td>4  Restraint for management</td>
</tr>
<tr>
<td>4.00-4.30</td>
<td>Debrief</td>
<td></td>
</tr>
</tbody>
</table>

### DAY THREE  Wednesday 12 August

<table>
<thead>
<tr>
<th>Time</th>
<th>Assessments</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30-9.00</td>
<td>Recount of previous day</td>
<td></td>
</tr>
<tr>
<td>9.00-11.00</td>
<td>Joint session</td>
<td>5  Diet</td>
</tr>
<tr>
<td>11.00-11.15</td>
<td><strong>Refreshment break</strong></td>
<td></td>
</tr>
<tr>
<td>11.15-12.30</td>
<td>Split group session</td>
<td>6A Activity: Competition - part 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6B Surgical interventions</td>
</tr>
<tr>
<td>12.30-1.15</td>
<td><strong>Lunch</strong></td>
<td></td>
</tr>
<tr>
<td>1.15-2.30</td>
<td>Split group session</td>
<td>7A Weaning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7A Activity: Breeding stallions</td>
</tr>
<tr>
<td>2.30-2.45</td>
<td><strong>Refreshment break</strong></td>
<td></td>
</tr>
<tr>
<td>2.45-4.30</td>
<td>Joint session</td>
<td>8  Care procedures – part 1</td>
</tr>
</tbody>
</table>
### DAY FOUR  Thursday 13 August

<table>
<thead>
<tr>
<th>Time</th>
<th>Assessments</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30-9.00</td>
<td>Recount of previous day</td>
<td>Session 9: Elective procedures</td>
</tr>
<tr>
<td>9.00-11.00</td>
<td>Joint session</td>
<td></td>
</tr>
<tr>
<td>11.00-11.15</td>
<td>Refreshment break</td>
<td></td>
</tr>
<tr>
<td>11.15-12.30</td>
<td>Split group session</td>
<td>10A Activity: Breeding mares</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10B Activity: Competition – part 2</td>
</tr>
<tr>
<td>12.30-1.15</td>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>1.15-3.15</td>
<td>Joint session</td>
<td>11 Care procedures – part 2</td>
</tr>
<tr>
<td>3.15-3.45</td>
<td>Debrief</td>
<td></td>
</tr>
<tr>
<td>3.45-4.00</td>
<td>Closing comments</td>
<td></td>
</tr>
</tbody>
</table>
Delegate biographies

**Jeannine Berger**

Jeannine Berger obtained her veterinary degree in 1991 in Zurich, Switzerland. After graduation, she worked at the University of Zurich and in private practice before moving to Davis, California in 1998. She completed her residency in veterinary behavior and attained board certification with the American College for Veterinary Behaviorists from UC Davis in 2007. Jeannine is the only US veterinarian to have completed a veterinary specialty training program in animal behavior with an emphasis on equine and companion animal behavior. Most recently she fulfilled all credentials and passed the exam for the American College of Animal Welfare in 2014. She is also certified with the Society of Animal Welfare Administrator (SAWA). She is an internationally renowned speaker, a well-published writer, and a seasoned educator on behavior sciences. Currently she is the Director for Behavior Resources at the San Francisco SPCA where she oversees all aspects of behavior and welfare for the Society.

**Nic de Brauwere**

Nic de Brauwere graduated from the Onderstepoort veterinary school, South Africa, in 1991 and has worked at Redwings Horse Sanctuary as a veterinary surgeon and welfare professional since then. Nic is Chair of the UK’s National Equine Welfare Council and is actively engaged on various panels and groups tackling equine welfare issues across the UK. A need to provide assistance to suffering feral ponies opened a whole new world for Nic and Redwings, from learning to round them up to developing handling facilities to facilitate emergency treatment. A desire to do more than just cope led a number of the staff at Redwings to pursue information about equine behaviour, from which the permanent equine behaviour team and training facility grew. Having vets in the team ensured that an evidence based approach became the underpinning principle in the charity’s behaviour work which has led to Redwings specialising in helping and managing feral equines and those with serious behavioural problems.

**Liane Crowther**

Liane Crowther graduated from Hartpury College in 2003 with a BSc (Hons) in Equine Science. Upon completion of her degree, she entered the field of equine insurance working for PetPlan and later Amlin Plus, a specialist bloodstock insurance company. In 2007, Liane began working for welfare charity The Horse Trust as their Welfare and Education Officer. During this time, she also completed a part-time MSc in Equine Science at Writtle College. The title of her MSc thesis was The Use of Animal-Based Welfare Indicators for the Assessment of Equine Welfare. Liane began a part-time PhD at the Royal Veterinary College in October 2009 under the supervision of Dr Charlotte Burn, Dr Siobhan Abeyesinghe and Professor Christopher Wathes. The project is co-funded by The Horse Trust and the Royal Veterinary College.

**Orla Doherty**

Orla Doherty qualified as a veterinary surgeon from University College Dublin (UCD) in 1992 before completing a Masters Degree in Applied Animal Behaviour and Animal Welfare at Edinburgh University (1994). Since 1994 Orla has been running the Animal Behaviour Clinic, a veterinary referral behaviour clinic treating problem behaviours in horses, dogs and cats. Orla gives lectures, workshops and clinics to
veterinary surgeons, horse owners, riders and trainers on ethology, welfare and the application of an understanding of learning theory to the treatment of behaviour problems.

Orla is currently Associate Lecturer at University College Dublin and the University of Limerick, lecturing on animal behaviour, behaviour problems and welfare. Orla is currently carrying out a PhD at the University of Limerick investigating the pressures exerted by bits and nosebands in the ridden horse. Orla has competed in affiliated dressage and eventing in Ireland.

**Julie Fiedler**

Julie Fiedler has been in the horse industry her entire working life. Starting out as a jillaroo before coaching at a riding centre, then Riding for the Disabled and a TAFE horse program lecturer before taking up her current role Executive Officer for Horse SA a not for profit community organisation, a position held for the last 13 years. Horse SA has provided opportunity to work with and for horse owners on a wide range of issues & topics, including development of a long distance multi-use trail and a horse keeping education program with a focus on environmental sustainability.

Working as part of a passionate team, Julie has been responsible for the National Equine Welfare Protocol, the National Equine Welfare Survey, the Welfare Officers Toolkit (horse events & activities) and Large Animal Rescue all of which have been progressed with a series of recent workshops around South Australia. Julie is currently also undertaking external studies to complete a Bachelor of Creative Arts and Industries (Communication) with Charles Darwin University.

**Anna Harrison**

Anna Harrison graduated from Bristol last millennium and spent time in mixed practice before specialising in farm animal welfare as a DEFRA vet in the UK West Country. Animal Welfare Science, Ethics and Law Certificate holder (1998). Finally saw the light in 2010 and took up the newly created role of Welfare Vet at The Donkey Sanctuary. (No books, learned titles or honours to my name but a passion for animals - their company and their welfare).

**Bidda Jones**

Bidda Jones joined RSPCA Australia as its first national scientist in 1996 after moving to Australia from the UK. She now heads the organisation’s science and policy team and is also responsible for oversight of its animal welfare campaign development and strategy. She has an honours degree in Zoology and a PhD in animal behaviour. Bidda coined the term *ethical equitation* in 2009 and has been developing the concept ever since. She was recently awarded the Eureka Prize, Australia’s most prestigious award, for her work in this domain. Bidda is an Honorary Associate of the Faculty of Veterinary Science at the University of Sydney.

**Claudia Jones**

After working as a zookeeper at Taronga Zoo looking after large and small carnivores, as well as the farm animals, Claudia decided that she wanted to be more actively involved in improving the welfare of animals in the community. She commenced working at RSPCA NSW in 2006 and has been an RSPCA Inspector for the last six years working in the Metropolitan Sydney region. Her area includes one of the largest Equestrian Centres in Sydney, which accommodate a number of riding schools. Although an inspector’s main role is to
educate, Claudia has successfully completed a number of prosecutions relating to horses with offences including lack of nutrition, confinement and various veterinary treatment issues from excessive worm burdens, through to fractures.

Sue McDonnell

Sue McDonnell is a native Pennsylvanian, raised in a dairy farming family in the anthracite coal regions north of Scranton. She holds a 1982 master’s degree in Psychology from West Chester University and a 1985 PhD in Reproductive Physiology and Behavior from the University of Delaware. She completed post-doctoral study in clinical veterinary reproduction at the University of Pennsylvania’s New Bolton Center in 1987 and became board certified in Applied Animal Behavior in 1991. She is the founding head of the Equine Behavior Program at the University of Pennsylvania School of Veterinary Medicine, where her work includes clinical, research, and teaching activities focused on horse behavior. She includes all types of behavior in her clinical case load, with stallion behavior as an area of particular interest and expertise.

Sue’s research interests include several areas within equine physiology, behavior and welfare. She has also traveled to study equids throughout the world. In addition to laboratory and field studies, she maintains a semi-feral herd of ponies specifically for the study of their physiology and behavior under semi-natural conditions. This affords veterinary and animal behavior students the opportunity for long-term observation of equine social and developmental behavior and for first-hand comparison of horse behavior under free-running and traditional domestic conditions.

Sue is the author of two introductory level books on horse behavior entitled Understanding Horse Behavior, and Understanding Your Horse’s Behavior, published by The Blood Horse in their Horse Health Care Library Series, and the recently released catalog of horse behavior, The Equid Ethogram, A Practical Field Guide to Horse Behavior, published by Eclipse Press. Along with Dr. Danny Mills, she co-edited The Domestic Horse: Evolution, Development and Management. Among Sue’s honors are The George Stubbs Award given by the American Association of Equine Practitioners for contributions to equine veterinary medicine by a non-veterinarian and a Gold Medal from the Agricultural University of Krakow, Poland, their highest honor for distinguished scientific collaboration.

Paul McGreevy

Paul McGreevy is Professor of Animal Behaviour and Welfare Science at the University of Sydney’s Faculty of Veterinary Science. A co-founder and former Honorary President of the International Society for Equitation Science (ISES), he is the author of over 170 peer-reviewed articles and six books including "Equitation Science" and "Equine behavior - a guide for veterinarians and equine scientists".

Andrew McLean

Andrew McLean is Senior Vice President of ISES and brings together a rare combination of academic and equestrian achievement. In the early 1990’s Andrew determined to explore the science of horse training. He found the very little was identified or described, leading to his PhD on the topic. A prolific author of books and journal papers on the science and ethics of horse training, Andrew has won Australia’s most prestigious science award, the Eureka Prize for Science along with Professor Paul McGreevy and Dr Bidda Jones. In Equestrian Sport, he has represented Australia in eventing, was shortlisted for the Australian team for the WEG in Stockholm in 1990, has ridden to Grand Prix in show-jumping and trained to Grand Prix in dressage.
Andrew is also well known for his acclaimed systematic approach to elephant training in Nepal and India where his work is endorsed, continued and supported at government level.

**Lindsay Nakonechny**

Lindsay Nakonechny is a BSc Animal Health graduate from the University of Alberta with an avid interest in animal welfare, behavior, and humane education. Lindsay served as a humane education intern at the Alberta SPCA in 2013, and an education outreach intern at Alberta Farm Animal Care in 2014. Since then, she has collaborated with an Alberta-based high school to develop an animal behaviour and ethics course for the Alberta Education Curriculum. In 2014, Lindsay also served as a student fellow on the Classy Animal and Wildlife Welfare Leadership Council. Currently, Lindsay is investigating an industry view of the prevalence and perception of horse welfare issues in Canada for completion of her MSc in Animal Welfare and Behaviour at the University of Guelph.

**Christine Nicol**

Christine Nicol obtained a degree in Zoology from Oxford University in 1981, worked with horses for a year, then returned to Oxford to do a DPhil on the welfare of caged hens with Professor Marian Dawkins. She joined Bristol University in 1986 as a Lecturer in Farm Animal Welfare, where she worked hard to promote and develop animal welfare as an inter-disciplinary theme. Until 2006 Christine acted as Head of the Animal Welfare and Behaviour group, and until 2008 as initiator and program director of the BSc in Animal Behaviour and Welfare. She has held short-term research fellowships in Canada, Australia and New Zealand and as a section editor for the journal *Animal Welfare*. Christine has published 120 peer-reviewed publications, 15 book chapters and co-edited the recent CABI, Encyclopedia of Applied Animal Behaviour Science.

**John Webster**

John (AJF) Webster, MA, Vet MB, PhD, MRCVS is Professor Emeritus at the University of Bristol and Former Head of the Bristol Vet School. On arrival at Bristol in 1977, he established a unit for the study of animal behaviour and welfare, which now is over 50 strong. He was a founder member of the Farm Animal Welfare Council and first propounded the ‘Five Freedoms’ that have gained international recognition as standards for defining the elements of good welfare in domestic animals. He is a former President of both the Nutrition Society and the British Society for Animal Science. His books include “Animal Welfare: A Cool Eye towards Eden” and “Limping towards Eden”. His latest book “Animal Husbandry Regained: the place of farm animals in sustainable agriculture” examines the practicalities of sustainability and animal welfare within the single principle of reverence for life.

**Sarah Wolfensohn**

Sarah Wolfensohn graduated from Cambridge in 1981 and is a partner in general practice where she worked for several years, also taking on the role of named veterinary surgeon for various small pharmaceutical and biotech companies. She was head of the Veterinary Services Department at the University of Oxford from 1991 until 2010 and then set up a consultancy providing advice on animal health and welfare to clients from the pharmaceutical industry, academia, animal welfare organisations, funding agencies and governments; both in the UK and overseas. She is involved in the ethical review of projects relating to animal use, and is a Veterinary Non-Executive Director of the Veterinary Defence Society. She is an RCVS Recognised Specialist
in Laboratory Animal Science, holds the Diploma from the European College of Laboratory Animal Medicine, the Diploma from the European College of Animal Welfare and Behaviour Medicine (Welfare Science, Ethics and Law) and is a Fellow of the Society of Biology. She was awarded an OBE for services to animal welfare in 2012.

James Yeates

James Yeates is Head of the Companion Animals Department at the RSPCA, having joined in May 2011. His interests include dog, cat, rabbit and horse welfare, veterinary ethics and the engagement of companion animal guardians in animal welfare issues. James qualified with a Bachelors of Veterinary Science in 2004, and has a Bachelors in bioethics, a certificate and diploma in animal welfare science, ethics and law and a PhD in veterinary ethics. He has worked as a vet in a RSPCA branch and two private practices.

James is currently Honorary Lecturer at the University of Bristol, Chair of the BVA Ethics and Welfare Group and Honorary Secretary for the Society of Practising Veterinary Surgeons. He is also on the Animal Welfare Science, Ethics and Law Veterinary Association Committee, the BSAVA Scientific Committee and is a Fellow of Centre for Animal Ethics. James edits the AWSELVA Journal of Animal Welfare Science, Ethics and Law and is writing a book for the UFAW animal welfare series on Achieving Animal Welfare in Veterinary Practice.
Assessment approach

The Five Domains Model — Bidda Jones

A key issue in the assessment of welfare is that it should consider what matters to animals from their point of view (Bracke et al. 2002). Animal welfare science has identified a large number of objective measures that can be used to determine the welfare state of an animal – there is no one single measure or standard that can be used by itself to tell us the state of an animal (Mason and Mendl 1993; Bracke et al. 1999a; Dawkins 2004). Instead, we need an approach that considers all available measures to develop a picture of the overall welfare impact of a given procedure or intervention in an animal’s life.

One strategy for assessing welfare involves constructing lists of the most important welfare indicators as determined by consensus of expert opinion (e.g. Whay et al. 2003; Rousing et al. 2007). Another is to use a biological functioning framework that assesses how an animal is coping with the challenges it faces as reflected in the normality of its biological functioning and fitness (Hemsworth and Coleman 2011). Other approaches rely on behavioural observations and specific questions (see Dawkins 2004) to capture both the physical and mental aspects of an animal’s welfare state. A more subjective approach to assessing welfare is to evaluate an animal’s ‘quality of life’ (see Scott et al. 2003; Broom 2007; Kirkwood 2007; Scott et al. 2007).

The assessment approach planned for this workshop is based on the Five Domains model developed by Mellor and Reid (1994) and updated over time, based on emerging behavioural, physiological and neuroscience evidence (Mellor & Beausoleil 2015). This model has been adapted to provide a practical means of assessing negative or adverse welfare impact on animals in several different areas. It has been used as a regulatory tool to systematically assess the welfare impacts of all research, teaching and testing procedures conducted on vertebrates in New Zealand since 1997 (Williams et al. 2006; Mellor et al. 2009). It has also been used widely to assess the impact of vertebrate pest control methods (Sharp and Saunders 2008; 2011). It was first proposed as a means of evaluating the welfare impact of interventions on horses by Jones and McGreevy (2010).

The approach taken by Sharp and Saunders involves the use of an expert panel to reach consensus on the welfare compromise (humaneness) of different methods of vertebrate pest control. The panel approach provides a way for individuals with different experiences of the intervention (animal welfare scientists, practitioners, veterinarians, etc.) to define the intervention and discuss each domain before reaching consensus on the overall welfare impact. We intend to use this process at the workshop to assess a multiple interventions to horses across 14 different contexts.

Under the Five Domains model, potential or actual welfare compromise is identified in four physical or functional domains and one mental domain, numbered 1 to 5 (Figure 1). When considering a procedure or intervention, panelists use their knowledge and relevant literature to describe the potential compromise relating to each domain.

In the context of welfare compromise, the first four domains focus on internal physiological and pathophysiological disturbances due to nutritional, environmental and health-related problems (Domains 1–3), and on external physical, biotic and social conditions in the animal’s environment that may limit its capacity to express various behaviours or may otherwise pose significant challenges (Domain 4) (Mellor et al 2009).
Once such internal and external factors are assessed, their anticipated affective consequences are assigned to the fifth ‘mental’ domain; it is these experiences that determine the animal’s welfare state (Mellor et al 2009). The current list of affective states includes breathlessness, thirst, pain, hunger, nausea, dizziness, debility, weakness and sickness, which are mainly associated with sensory inputs generated internally, and anxiety, fear, frustration, anger, helplessness, loneliness and boredom, which are associated mainly with the animal’s cognitive assessment of its external circumstances (Beausoleil & Mellor 2015).

The Five Domains Model has recently been extended to facilitate consideration of positive experiences that may enhance welfare (Mellor & Beausoleil 2015). Applying the model to assessing welfare compromise focuses on mitigating suffering, while applying it to welfare enhancement requires a focus on the capacity of animals to experience rewarding behaviours. For this workshop the aim remains to assess welfare compromise, however during the discussion process we can also note the potential for an intervention to provide positive experiences.

Figure 1. Domains of potential welfare compromise divided broadly into physical or functional and mental components. Modified from Mellor et al. 2009.
References


Introduction to each context

Diet — Paul McGreevy

Free-ranging horses are able to move about, selecting habitat that allows them to maximise their intake of high-quality food (Duncan, 1983; Crane et al., 1997). Similarly, in domestic contexts they enjoy tremendous variability in the shape and quality of pastures they are offered, which influences the amount of movement required during grazing – it has been estimated that horses take some 10,000 steps per day (Katherine Houpt, personal communication, 2002). Pastures more square in shape are often more evenly grazed than rectangular paddocks (Kusunose et al., 1987). When exposed to a new pasture, horses concentrate their foraging on patches of their preferred grasses (Okuda et al., 1980), and intake per bite increases when fertilizers that encourage leaf rather than stem growth are used (Stobbs, 1973).

Free-ranging horses regularly consume soil along with their forage (Salter and Hudson, 1979), but although it is not clear what elements they are seeking, it has been suggested that sodium, iron and copper traces are probably among them (Salter and Pluth, 1980; McGreevy et al., 2001). When stabled horses are not exercised, they do more salt-licking (Krzak et al., 1991). This is surprising because, in general, exercise increases the food intake of horses fed ad libitum (Sasimowski et al., 1979) and salt consumption could be expected to rise to reflect salt loss through sweating. However, stabled horses may have oral needs that salt-licking fills. Ponies fed an all-concentrate diet spend more time licking salt than those on a hay diet (Willard et al., 1973). Occasionally, salt-licking may become excessive and result in polydipsia (Buntain and Coffmann, 1981).

In the domestic situation, performance horses are fed readily digested concentrated food that can be consumed more rapidly than less energy-dense (i.e., more natural) forages. In a bid to reduce the chances of colic, access to concentrated food is usually restricted immediately before and after strenuous exercise, though it is not clear whether this practice is effective. The effect of exercise itself is interesting because exercised horses modify their grazing behaviour by taking fewer, but larger, bites (Duren et al., 1989) compared with non-exercised animals.

Providing long fibre (e.g., hay in nets and raised feeders to prevent wastage and soiled bedding) means that the horse is not in its natural grazing stance. Some horses show their frustration at this by pulling the forage out onto the stable floor to eat (Heleski et al., 2002). But perhaps more significant is the reduction in fibrous components and the increase of concentrate in the diet.

Horses have evolved to be trickle feeders. The stomach of an adult horse is relatively small (9-15 litres) and inelastic (Harris, 1999), so it empties within about 20 minutes, depending on the physical qualities of the current meal. Restrictions on feeding behaviour, and especially limiting a horse to discrete meals, can lead to digestive anomalies and behavioural frustration. Because bulky foods make a considerable contribution to gut-fill and thermal load and are thought to compromise lung volume and racing performance, they are avoided for racehorses. Furthermore, fibre and the saliva that must be swallowed with it add to the non-functional weight the horse must carry. Hay has fallen from favour with some horse-keepers because of its role in the etiology of chronic obstructive pulmonary disease (Cuddeford, 1999) and suggestions that attempts to reduce its allergen content by soaking may decrease its nutritive value (Warr and Petch, 1992; Blackman and Moore-Colyer, 1998). This means that although their nutritional needs are being met, such horses often cannot fulfil their behavioural need to forage and maintain their gut-fill.

The type of food influences the rate of chewing (Bergero and Nardi, 1996) and the energy required for
ingestion (Vernet et al., 1995). The addition of chaff, traditionally used with concentrates to slow consumption time, works simply by increasing the total forage content of the rations. High-energy hay replacers, such as haylage, have been associated with initiating wood-chewing behaviours in foals (Waters et al., 2002). Haylage is often fed in restricted quantities, which may result in decreased gut-fill (Nicol, 1999) and thus to the redirection of oral behaviours due to increased motivation to forage or other feedback mechanisms (Johnson et al., 1998).

Food presented as highly compounded pellets may be less attractive to horses than softer substrates (Hintz and Loy, 1966). Palatability can increase motivation to defend food and can be a significant factor in some cases of food-related aggression. Foodstuffs are dried to make them easier to store and handle, but this may reduce their palatability and make their flavours less accessible. Some horses learn to remedy the dryness of hay by dunking mouthfuls in water, either because moisture makes it more pleasing to the palate, or makes it easier to swallow (Waring, 1983; McGreevy, 1996), or less painful to swallow if there is any dental pain.

**Variety**

Despite strong seasonal variation, the grass content of diets rarely falls below 80% in open-range situations (Salter and Hudson 1979). When they have a choice of edible plants, horses tend to select grasses to meet their immediate energy needs and then forbs (non-grass plants) as a means of supplementation (Olson-Rutz et al., 1996). Icelandic ponies have been observed selecting medicinal plants with the surrounding grasses (Schafer, 1975). Schafer suggests that this may help them to ‘avoid worm infections’ and offers the consumption of chestnut leaves as another example of pharmacognosy, resulting in a demonstrable improvement in vigour (Schafer, 1975).

Most stabled horses are provided with a single forage (McGreevy et al., 1995), so they have no opportunity to blend substrates to suit their individual needs. The effects of such monotony are not clear, but providing multiple forages may improve the welfare of stabled horses by enriching their environments and allowing them to perform highly motivated foraging behaviours (Goodwin et al., 2002). It is further proposed that this might reduce the chances of intestinal obstruction by decreasing the amount of straw stabled horses consume (Goodwin et al., 2002). That said, horses in developing countries are commonly fed large quantities of straw, in the absence of any better cheap forage source, with no apparent ill-effects on gut motility (Caroline Hahn, personal communication, 2002) – possibly the gut flora of such horses are well-adapted to the robust nature of straw.

**Gastric health**

The significance of gastric ulceration in intensively managed (food-restricted) horses is now widely recognised, with 82% of racehorses (Vatistas et al., 1999) and 51% of Thoroughbred foals under the age of 3 months (Murray et al., 1998) showing lesions. Epidemiological risk factors for oral stereotypies that relate to diet (such as small amounts of daily forage) could have the effect of increasing gastric acidity (Willard et al., 1977; Schafer, 1975). Saliva is a natural buffer to excess gastric acidity, but in horses, its production depends on pressure on the parotid salivary gland during chewing. If too little time is spent grazing or chewing forage, not enough saliva may be produced to buffer the stomach contents.

**Take-home points**

- Concentrated feeds are associated with reduced saliva production and increased gastric acidity.
- Periods without food are associated with increased gastric acidity and risk of gastric ulceration.
• Lack of forage is the most important management factor linked with the development of stereotypic behaviours in cross-sectional epidemiological studies.

• Lack of forage and provision of concentrate feed are important causal factors that precede the development of oral stereotypies in young horses in prospective epidemiological studies.

References


**Housing** — Christine Nicol

Quantitative information is emerging on how horses are kept and managed, primarily from the UK, Switzerland and Germany (Table 1). Longitudinal information from Switzerland suggests a move towards more group-housing between 1999 and 2004.

<table>
<thead>
<tr>
<th></th>
<th>Tethered or stalls</th>
<th>Individual Box inside building</th>
<th>Individual box</th>
<th>Group/not stabled</th>
<th>Turn out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachmann et al. 2002 (CH)</td>
<td>18.3</td>
<td>32.3</td>
<td>32.9</td>
<td>16.5</td>
<td>36% of horses daily; weather dependent 1.2% never</td>
</tr>
<tr>
<td>Hotchkiss et al. 2007 (UK)</td>
<td>21.2</td>
<td>64.1</td>
<td>10.8</td>
<td></td>
<td>Median 23h/summer day; Median 8h/winter day</td>
</tr>
<tr>
<td>Hockenhull and Creighton 2015 (UK)</td>
<td>1</td>
<td>32</td>
<td>66</td>
<td>2</td>
<td>Median 13-16h/day summer; Median 9-12h/day winter</td>
</tr>
<tr>
<td>Ionita et al. 2006 (CH)</td>
<td>17</td>
<td>57</td>
<td>25</td>
<td></td>
<td>13.7h/day summer; 3.9h/day winter</td>
</tr>
<tr>
<td>Knubben et al. 2008 (CH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petersen et al. 2006 (DE)</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Surveys show that social isolation is associated with a higher prevalence of stereotypic behaviour (Albright et al., 2009; Bachmann et al., 2003; Heleski et al., 2002; Hockenhull and Creighton, 2014; Mills and Davenport, 2002; Visser et al., 2008). When examined experimentally, increased social contact has produced beneficial changes in responsiveness (Baragli et al. 2009; LeSimple et al., 2011) and horses that are easier to handle (Yarnell et al., 2015). At the point of social isolation, increased stress (Jezierski & Gorecka, 2000; Erber et al.,
and agitation (Harewood & McGowan 2005) generally occur, particularly in young horses, when the experience of isolation is novel, or the environment is unfamiliar. In certain circumstances, the response to moving to a novel pasture differs little between horses moved individually or in pairs (Strand et al., 2002). Even if horses cannot fully interact, benefits are apparent. The provision of opportunities for partial social contact, for example head-to-head contact, is highly preferred. Horses will work equally for such partial social contact as for full contact in demand experiments (Sondergaard et al., 2011). Partial social contact additionally reduces stress (Yarnell et al., 2015) in comparison with no social contact.

In many studies, the effect of social isolation is confounded with a greater degree of physical confinement. For example, outdoor tethered horses are prevented both from full social interaction and from free movement. Either or both of these conditions could be responsible for the greater vocalisation seen in the tethered horses (Mullan et al., 2014). An experimental example is the study of Visser et al. (2008) which compared individual horses in small boxes with paired horses kept in boxes of 4 times the size. The treatment effects: more eating and less pawing, neighing and other stress-related behaviours (Visssser et al., 2008) could be due to either variable. Studies of confinement that are not confounded with social variables show that a small box size is associated with reduce sternal lying (Raabymangle & Ladewig, 2006). In addition, horses kept tied in stalls have greater stress responses than horses kept in individual boxes (Hoffmann et al., 2012), a reduced behavioural repertoire and an increased prevalence of stereotypic behaviour (Zeitlerfeicht and Buschman, 2002; 2004).

Increased time spent at pasture is associated with a reduced prevalence or incidence of stereotypic behaviour (Christie et al., 2006; Parker et al., 2008; Waters et al., 2002), lower stress levels (cortisol, Erber et al., 2013; HRV, Werhahn et al., 2012a), easier initial and ongoing training (Rivera et al., 2002; Werhahn et al., 2012b), fewer handling problems (Hockenhull and Creighton, 2014) and high overall welfare scores produced using the Welfare Quality audit framework (Topczewska, 2014).

Experiments that require horses to perform operant responses to gain a reward reveal that horses respond at the greatest rate to obtain food. They also perform at a relatively high rate to gain access to a small enclosure with a social companion, with relatively few responses for access to a large empty enclosure (Lee et al., 2011).

Indoor housing environments can be dangerous for physical and respiratory health (Appel et al., 1995; Broeckx et al., 2011). Specifications for building design and interior environment (lighting, dust, air speed etc.) have been proposed (Zeitlerfeicht, 1993) but the evidence base for these proposals is not clear. Outdoor environments can result in harassment from insects (Gorecka and Jezierski, 2007) and horses seek shelter from combinations of wet, windy and cold weather (Heleski and Murtazashvilli, 2010; Mejdell and Boe, 2005). Horses also seek shade during peak solar radiation (Holcombe et al., 2013) with demonstrable benefits (Holcombe et al., 2014). Tethered horses are more vulnerable to extremes of weather (Mullan et al., 2014). Responses to weather will depend on horse condition, breed, food availability, acclimatisation and use of rugs. Permanent outdoor housing must be managed carefully (Zeeb, 1994; Zeitlerfeicht, 2004).

Group-housing can have contradictory effects on lying time. Horses have been found to show more lying in larger groups (Rose-Meierhofer et al., 2010), but laying time can decrease for certain less-assertive individuals (Fader and Sambraus, 2004). Aggression can also be a concern if insufficient space is available (Flauger et al., 2013; Fureix et al., 2012). Repeated re-grouping and resultant instability in social groupings is associated with more agonistic behaviour (Christensen et al., 2011). It should be possible to design management strategies that minimise agonistic encounters (Hartmann et al., 2009; 2011; 2012; Zeitlerfeicht, 1996). The use of automated or novel feeding systems for group-housed animals is beginning to be explored (Zeitlerfeicht et al., 2010, 2011; Hampson et al., 2013).
Environmental enrichment (this term covers a broad range of items) variously increases foraging and affiliative behaviour, reduces passive behaviour, particularly in individuals (Hampson et al., 2013; Hoffmann et al., 2012; Jorgensen et al., 2011; Winskill et al., 1996) reduces fearfulness (Lansade et al., 2014) produces apparently favourable changes in gene expression (Lansade et al., 2014) and reduces weaving and indicators of frustration (Mills and Davenport, 2002; Nonomiya et al 2008a). Environmental enrichment results in variable effects on aggression (Benhajali et al., 2009; Hampson et al., 2013; Jorgensen et al., 2011). Enhancing foraging opportunities is a particularly beneficial strategy for enrichment (Thorne et al., 2005), whilst the provision of non-edible items is not very effective (Bulens et al., 2013).

The evidence available to evaluate horse housing is patchy and its quality is variable (often behavioural or physiological data are interpreted to suit pre-conceptions, inconvenient results are explained away e.g. lower cortisol levels are taken to be an indicator of depression rather than an indicator of low stress; over-reliance on time budget data which is difficult to interpret) but the situation is improving with some high quality recent papers. Evidence of rebound behaviour is useful in evaluating the importance of specific behaviours. A rebound in locomotor behaviour after confinement is now well documented (Chaplin and Gretgrix, 2010; Chaya et al., 2006; Houpt et al., 2001) and suggests that provision should be made for a degree of turn-out or other exercise.

References


Weaning — Liane Crowther

Weaning is a process that results in the foal becoming socially and nutritionally independent. Natural weaning involves a gradual reduction in milk intake, an increase in social independence from the dam and an increase in solid food intake, which starts to occur from 2-3 months of age. After weaning the mare and foal retain a social bond and the foal usually remains with the natal group until sexual maturity. Under domestic conditions weaning normally occurs at 4-6 months of age, and has been associated with additional psychological, physical and nutritional stressors that can accentuate the distress experienced by mare and/or foal (for review see Waran et al., 2008; Weary et al., 2008; Newberry and Swanson, 2008). A number of domestic weaning methods have been investigated. Abrupt separation is common and involves suddenly and completely separating the mare and foal by enough distance to prevent them from seeing, hearing and smelling each other (for review see Waran et al., 2008); it may occur individually or in groups and be accompanied by prompt or delayed removal to a new environment (Dubcová et al., 2015). Other methods investigated include gradual weaning, partial separation that permits fence-line contact between mares and foals, weaning in pairs or groups, interval weaning where one mare is removed at a time, weaning in
paddocks that permit grazing, and weaning in the presence of an unrelated adult. The effect of feeding different diets prior to and during weaning has also been investigated (for review see Waran et al., 2008).

References

Foundation training — Andrew McLean

Welfare issues relating to foundation training practices are profound and largely arise owing to a benevolent, willing-to-please mindset and anthropomorphism that do not account for the roles of ethology and learning theory in training (McGreevy and McLean, 2007). Few equitation texts describe the correct use of negative reinforcement or any other relevant associative or non-associative learning modality in the foundation training process.

As a result, excellence in horse training is more matter of luck than education arising from learning principles, and so we see that abusive and coercive practices abound. In the last few decades, horse whispering has emerged which was misinformed by a misinterpretation of ethology and so belief systems centred on dominance, submission and respect have emerged (Goodwin et al., 2009).

As a result of this ill-informed background horses are sometimes (McLean and McGreevy, 2010a):

- trussed with ropes and thrown to the ground
- hobbled
- chased excessively in round pens
- have unnecessarily harsh bits placed in their mouths to ‘mouth’ them
- have their heads tied down forcing them to arch and shorten their necks to ‘give’ to the bit
- simply ridden until they stop bucking.

If trainers of young horses chance upon the effective use of negative reinforcement (the application and reduction of rein and legs pressures) then it is largely perceived subjectively as good ‘horse sense’, horsemanship or horse whispering rather than a result of the understanding of the ubiquitous role of negative reinforcement in developing and achieving control of the ridden and led horse (McGreevy and McLean, 2010b).

References
Medical interventions — Anna Harrison

There is nothing good about being ill! A sick person may be reassured by the presence of doctors, nurses, diagnostic equipment and a hospital environment, safe in the knowledge that help is at hand, but this is not the case for equids! Handling by an unfamiliar person and potentially painful interventions can be rendered much more acceptable to a horse by a combination of negative and positive reinforcement (McGreevy and McLean, 2010, Pearson, 2015a, 2015b)) but such behavioural training is rarely done before it is needed! A home visit by a veterinarian could induce stress and the owner/handler may already be tense because of the sick equid and this can be transmitted to the animal. In the case of donkeys an equine vet may not be familiar with some of the anatomical differences, such as narrow nasal meati, dorsally situated naso lacrimal duct ostia, and the relative thickness of the cutaneous colli musculature, making jugular venepuncture somewhat challenging. Transportation proves stressful for many equines (Fazio et al, 2008, Kay and Hall, 2009) and, certainly in the case of donkeys, it is essential that they are accompanied by their companion to minimize the risk of separation induced hyperlipaemia (Grove, 2008).

Once hospitalised the equine is in unfamiliar territory (particularly stressful if an equid is usually maintained outside and is suddenly confined to a stable) and surrounded by strangers and, frequently, a different diet. The animal is facing potentially painful interventions and may be reassured by the presence of a familiar handler but this is often discouraged by hospital staff. Interventions may include injections by various routes, catheter placement, naso gastric intubation, bladder catheterisation, abdominal paracentesis, biopsy, broncho alveolar lavage, endoscopy, standing or GA surgery and dental procedures (Taylor et al, 2010). Various forms of restraint are inevitable such as stocks and the use of a twitch.

References


Pearson, G, 2015a. Practical application of equine learning theory, part 1. In Practice 37(5), 251-254


Surgical interventions — Nic de Brauwere

Surgery performed on horses can be broadly grouped into those that save lives / restore health; affect performance (return to function or improve function); and aid management. The benefit to the horse is therefore not necessarily for its own welfare though its welfare may be positively impacted because of the (perceived?) improvement the surgery confers on the horse (e.g. the horse might remain alive because it
continues to perform, or could enjoy better husbandry as a gelding in a herd than as a stallion in isolation). Welfare may also be negatively impacted with no perceived advantage to the horse.

Advancement in veterinary surgical capability has not only meant that more horses with a broader range and severity of conditions can be returned to full athletic ability or kept functioning at some level; but also give owners more choices and decisions to make. Cost has always been a factor in veterinary provision. Even with insurance for vets fees, owners' costs have increased to keep pace with the true cost of delivering the higher capability of veterinary care; either through more sophisticated equipment/drugs or greater levels of attention to care throughout an intervention (e.g. pre-anaesthetic blood tests, not reusing disposable equipment).

Cost of treatments may pressurise vets and owners to find ways to make interventions affordable, including reducing costs by using less costly techniques (open standing versus closed castration under GA) or giving less analgesia, perhaps justified by beliefs about the importance of pain in horse health (Pice et al. 2002).

This all happens against a backdrop of increased expectation and also a higher awareness in some quarters of the welfare needs of the horse, for example practices that were in the past done without anaesthesia are now considered unethical without local or general anaesthesia (Animal Welfare Act 2006 and The Mutilations (Permitted Procedures) (England) Regulations 2007 which consider castrations and vasectomies in equines as mutilations, but ones that are permitted if the stipulations are observed) (UK legislation). In contrast, procedures like firing of tendons remain legal. A debate at BEVA Congress in 2012 highlighted that despite evidence questioning the value of the technique, it has not been made illegal (BEVA 2012). Evidence based veterinary medicine is now widely embraced as a vital component of the continuing professional development of qualified practitioners ensuring their treatment choices are responsive to evidence based changes in knowledge (e.g. Theme of BEVA Congress 2014).

However, emphasis of measuring outcomes is largely on return to function, whether for full performance or at a reduced capacity but still useful as e.g. a hack. Quality of life measurements involving the horse's perceptions of the value of the intervention are arguably based on the presumption that being returned to function and being free from pain are adequate markers of quality of life. While this is another area to explore, assessment of pain has long been a major component of veterinary responsibility. Recent work to assess behavioural indicators of pain offer opportunities to broaden veterinary and owner understanding of the welfare impact surgical interventions can have on horses (Dalla Costa et al. 2014).

Common procedures like castration are seen as almost essential in many countries, e.g. the UK, unless the horse has clear breeding potential or there is a cultural bias against castration within specific owner communities. Modifying anticipated unwanted behaviours is a strong driver for why owners want horses to be castrated, perhaps highlighting failings in how stallions are managed. On the other hand, castration is seen as a critical tool in controlling unwanted breeding, in particular the over production of indiscriminately bred offspring that pose all manner of challenges especially in times of economic downturn (“Left on the Verge. The approaching Equine Crisis in England and Wales” (2012) and “Left on the verge: In the grip of a horse crisis in England and Wales”(2013) ) especially when disposal via slaughter has become more problematic in Europe (Commission Regulation (EC) No 504/2008 "Horse Passports" and the EU response following a meat fraud scandal in Europe with new EU regulations tightening up on traceability to reduce fraud). Research into the effectiveness of castration as a form of equine population control, in the context of situations like the “horse crisis” is limited to welfare organisations collating their activity data. Fertility control in feral herds appears to be more likely to be effective when medical interventions applied to mares and stallions are deployed but even here research is limited (e.g. Killian et al. 2006). In the UK, decisions to
castrate an individual horse are based on the owner’s needs rather than a contribution towards overall population control.

Arguably the perceived need to castrate male horses is almost universal in the UK, making it one of the most common equine surgical interventions. In addition to breeding control, the challenge of finding rented accommodation for uncastrated horses is a factor alongside the perceived behavioural challenges; as to why so many horses are gelded in the UK. Because it is seen as a necessity, the costs associated with it are a classic issue of horse ownership, arguably putting downward pressure on prices leading to pressure to reduce costs. Often this is analgesia, though vets also withhold analgesia for other reasons such as believing the inflammation is helpful to promote healing. Cost, along with the perception of relatively few complications of what is often regarded as a simple minor procedure is also potentially a reason for open standing or recumbent castrations still being the norm. Complication rates in castrations are in fact quite high. In my personal experience closed castrations under general anaesthesia (with local anaesthesia) have fewer significant complications and post operatively patients appear in less discomfort and behaviourally return to normal quicker (personal observation and Portier et al. 2009)

Other surgical interventions are major procedures, such as colic surgery to remove extensive necrotic bowel. Post-operative care is intensive and complications in cases where the procedure was challenging or the patient was in severely compromised condition prior to surgery, are high. Reflux, ileus, septicaemia and laminitis are all potential complications that cause the animal to suffer, despite provision of analgesia. This kind of suffering is understood as necessary, and in common with other surgical interventions, appears to be a feature of the post-operative life of the horse for periods of minutes to days or even longer. Deciding whether major surgery is appropriate or in the best interests of the horse needs to recognise the impact such operations have on the horse. In a study to evaluate short term colic survival rates the authors question whether survival to discharge was good enough as a prognostic measure to help decide whether to proceed with surgery. Owner attitudes to suffering and euthanasia were among factors identified as relevant to making a decision but in need of further study. However, the value to the animal of proceeding with treatment wasn’t explored directly (Christophersen et al. 2014).

References

Elective procedures — John Webster

Elective procedures should be subjected to benefit: harm analysis: benefits may be for horse or owner, harm may be physical or psychological, short or long-term.

**Caslick’s procedure** involves partial suturing of the vulva in mares where there is a perceived risk of infection. The technique is reversible (stitches are removed before parturition). Performed with appropriate anaesthesia, it should not cause short or long-term discomfort. There is evidence to indicate that it reduces the risk of infection and infertility in mares whose vulval conformation puts them at risk.

**Forsell’s procedure** is designed to prevent the actions of crib-biting and wind-sucking by surgical neurectomy. It probably does not involve long-term fear or discomfort, so is considered by some as preferable to other interventions, e.g. cribbing straps and electric shock aversion. However it frustrates a strong behavioural need that may be stereotypic or physiological. The problem is better dealt with at source.

**Hobdays** and similar procedures to correct laryngeal hemiplegia are designed to prevent “roaring” and restore maximal respiratory capacity during exercise. The latter objective can bring benefit, especially to the owner. Roaring, which is especially prevalent in draught horses, may not compromise their function but is seen as an unsoundness at time of sale.

**Wolf teeth** seldom create a problem but may cause discomfort and distress when horses are ridden on a bit: to be removed only when absolutely necessary.

**Clitorectomy** has been claimed to reduce the risk of transmission of contagious endometritis from symptomless mares. Better techniques for diagnosis and cure should have made this practice unnecessary.

**Docking** carries no benefit to horses, impairs fly control and may contribute to psychological distress.

**Castration**: most people consider it necessary to castrate most male horses. Questions arise as to how well different approaches address pain, fear and the risk of post-operative complications. Best veterinary practice involves preoperative sedation and analgesia, operation under local or general anaesthesia and post-operative analgesia. The list of publications list dealing with which drugs to administer and when is extensive. Provided that sedation is adequate, I can find no evidence to suggest that standing castration causes more distress than general anaesthesia. Evidence as to the incidence of post-operative complications following standing-unsutured and recumbent-sutured castration is equivocal. Most uncertainty relates to the severity and duration of post-operative pain. More research is needed into the pharmacodynamics of analgesics and behavioural indices of pain in the horse. Castration at any age without full, competent administration of veterinary anaesthesia and analgesia should be unacceptable in any society.

**Identification and marking**: identification methods include those to identify horses when restrained and observed close up (micro-chipping and tattooing) and those that can identify individuals without the need for restraint (hot iron and freeze branding). Hot-iron and freeze branding both cause immediate pain. Studies with cattle indicate that the duration of significant inflammation following freeze- and hot iron branding is about 24 h and 7 days respectively. There is little evidence to suggest that micro-chipping or lip tattooing cause significant chronic discomfort in horses. Human reports of immediate and long-term pain following tattooing and body piercing, together with some scientific evidence suggest that the lip appears to be a relatively low sensitivity area.
References

2. TR Greet 1982 Equine Vet J 14, 299-301
4. JW Williams et al. 2008 Vet. Surgery 19, 142-147
5. PM Dixon et al 2001 Equine Vet J 33, 452-458
6. O Liyou 2005 Australian Stock Horse Journal July 2005
7. SW Ricketts 1996 Equine Vet Education 8, 166-170
8. JL Wood et al. 2005 Vet Record 157, 41-46
10. Murrel JC et al. 2003 Vet Anaesthesia and Analgesia 30 138-146

Care procedures — Julie Fiedler

How we care for horses has always been a conversation point, a sign of our social status, a vocation or even a personal choice in today’s busy lifestyle to ‘get away from it all’. So steeped in tradition are many horse care practices, it is often difficult to identify their purpose or origins.

Today practices are quickly shared and adopted, enabled by the Internet. Through watching a ‘how to’ YouTube video or witnessed in a ‘behind the scenes’ eventing blog, horse care practices continue to provide a topical conversation point. A ‘new’ practice can be adopted across the world almost overnight.

"In the past, experienced horsemen would say -Do this, it works--these days, we have so much more knowledge gained from research, that we are able to say: Do this, it works because..." (Dr. Robyn Stokes, Australian Horse Welfare Protocol)

Horse care practice relies on the best known information of the time, available resources and individual skills. In many situations the horse care practices that kept both the horse and human alive. As society entered the modern era, the role of science, as it relates to improving our ‘best knowledge of the day’, starts to gain recognition.

Horse care conversations today are more likely to be carried out between participants in ‘imagined communities’, where people get to know each other intimately online but may never meet face to face. Gathering, collating, and dissemination of horse care information can be carried out by individuals throughout the day on multiple screens.

Communication about science and horse care is taking place more today than any other time in history. Science influences sub-cultures of cohorts interested in horse care to the point where it becomes ‘owned’ (Interpellation)
A long list of horse care practices has been provided for this workshop. Particular points to consider are:

1. Which are practiced more often, across more countries, breeds or events?
2. Where are rule books not keeping up with practices?
3. Where new practices are likely to be adopted quickly e.g. emerging economies and sport with new sources of prize money?
4. Role of online shopping and marketing influence

The sample selection of papers provides an overview of three approaches to measuring horse care interventions. The first is directly measure responses to an intervention, for example clipping a horse. Yarnell et al. (2013) discuss how differences in behaviour do not always correlate with physiological measures of stress when clipping, while Gough (1999) argues that stress during clipping can be reduced by playing taped recordings of clippers running while ponies are eating in the time leading up to a clip, which may eliminate the need for restraint. Further, grooming at the preferred sites reduces stress (Feh & De Mazieres, 1993).

A second approach is to design methodologies for testing commercially available products, especially in categories often recommended by veterinarians, for example ear plugs and leg boots. MacFarlane et al. (2010) tests the ability of commercial earplugs to muffle sound in the equine ear, comparing with the traditional wad of cotton wool. Similarly, Kicker et al. (2004) tests the effectiveness of four brands of support boots on fetlock joint function.

The third approach investigates the development and use of scientifically tested tools for horse carers to assess the risk of interventions. Young et al (2012) designed and tested an instrument to measure welfare associated with horse husbandry procedures, while McGreevy et al. (2009) investigate if horse training and handling activities can align with the equid social ethogram.

References


Restraint for management — Sarah Wolfensohn

Horses have evolved for life on the open-plain\(^1\) so restraint by confinement limits the behavioural opportunities available, and isolation and confinement are both stressful for horses\(^2\). In restricted space horses will frequently be further restrained using head ties even though they are less stressed if the head is not tied during transport\(^3\). If tied tightly, restricting head movement, this can lead to health problems by affecting drainage of the upper respiratory tract\(^4\), and affecting guttural pouch environment\(^5\). Immobilisation of the horse is often prescribed to assist healing times for equine lameness which may involve box rest, cross tying, slinging or use of equine flotation tanks, all of which involve restraint and can have adverse side effects\(^6\). Although not often considered as restraint, the fencing around an enclosure restrains the horse from free roaming and is frequently the source of injury and adverse welfare. A common misunderstanding that perpetuates in the horse industry involves use of the twitch for restraint and many horses have an aversion to the twitch due to improper technique\(^7\). Various methods of restraint have been used on horses since they were first domesticated, many of which have negative effects on welfare. Lungeing was developed from the historical use of small, circular arenas with high, solid sides. One method of training was to tie the horse to a post in the middle of the school and, with a whip, encourage the horse to move in a circle around the central pole. Sometimes one leg would be tied up to tire it more rapidly leading to the horse reaching a state of learned helplessness. Wild horses were caught by lassoing them\(^8\), then hobbled, restrained by neck ropes, saddled, bridled, mounted and ridden until it stopped all attempts to escape, also relying on learned helplessness\(^9\).

References


Road transport — Claudia Jones

Loading

The first difficulty horses face is being loaded and, occasionally, later during unloading. Both these events should be seen as problems with being led and can be dealt with by behaviour-modification techniques (McGreevy and McLean 2010). It is well worth spending time getting horses used to the vehicle intended to transport them. The calmer horses are during loading and transport, the less likely are injuries.
Vehicle attributes and driver skills

The first priority for transporting horses is a vehicle or container strong enough to weather any fearful behaviour horses may engage in. A struggling horse can do a lot of damage. Like people travelling in buses, horses adopt different body postures (such as widening their stance) to brace themselves against changes in speed and direction during the journey. They panic if there is insufficient space to do this, so sometimes using a wider float is enough to reassure nervous travellers. The amount of muscular and emotional stress horses undergo as they continually adjust their posture depends on road conditions and the driver’s skill (Giovagnoli et al., 2002). It can be easily evaluated by monitoring heart rates during transport (Giovagnoli et al., 2002).

Journey length

The longer the journey, the more likely it is that there will be increases in horses’ white blood cell count (Yamauchi et al., 1993) and body temperature (Friend et al., 1998). The level of dehydration may rise (Van den Berg et al., 1998) and some weight loss is also likely (Foss and Lindner, 1996; Mars et al., 1992). Air temperature and humidity tend to peak when vehicles are stationary (e.g., during loading, unloading, refuelling and other delays, especially with air transport). It is important to keep such delays to a minimum (Stewart et al., 2003).

Orientation

There is evidence to show that horses facing backwards during road transport are less likely to suffer side and total impacts and losses of balance than those facing forwards (Clark et al., 1993). They seem able to absorb deceleration with their haunches and so are better able to maintain stability (Cregier, 1982). Forward-facing horses most commonly suffer head, throat and neck injuries when propelled forward by braking. They also tend to move and vocalise more frequently and have elevated heart rates (Waran et al., 1996). While Gibbs and Friend (1999) found no significant benefit for facing forwards or backwards, they did note a slight preference for travelling at about 45° to the direction of travel. While this suggests that forward-facing travel is not distressing, it does not rule out the possibility that it is tiring and increases the likelihood of injury (Cregier, 1994).

Protection

Leg wounds can occur through loss of balance when speed and/or direction alters and on uneven surfaces. Protection such as a padded headstall or poll guard (head bumper in the USA), protective leg bandages and generous tie ropes (Mansmann and Woodie, 1995) will help. Bandaging the tail will reduce damage from contact with tailgate or wall. A horse with an orthopaedic injury should travel with the injured leg to the rear of the vehicle to protect it from the effects of deceleration.

Head height

Restricted head movement can compromise a horse’s ability to balance and avoid respiratory disease (Stull and Rodiek, 2000). In enclosed containers the respiratory system can be challenged by increased humidity, ammonia concentrations (Katayama et al., 1995) and airborne microorganisms (Leadon, 1995). Breaks in journeys, recommended every 4–6 hours, help prevent fatigue and dehydration, but to prevent the accumulation of bacteria and mucus in the respiratory tract breaks are not enough (Raidal et al., 1995). A head position that allows the cranial trachea to be below the caudal trachea is more effective (Racklyeft and Love, 1990). If the horse must be tethered, use a ‘log and rope tie’ to allow enough head movement.
Dehydration

Preventing dehydration is a priority during hot-weather transportation and providing water has favourable effects on physiological parameters of hydration and distress (Friend, 2000).

Individual

Transporting horses individually may be associated with some stress responses. For example, any horses that is unaccustomed to transport will find being on a moving platform challenging or are leaving their stud of origin for the first time.

Group – familiar versus unfamiliar

When unfamiliar horses are mixed in a confined space, fighting is a major cause of injury, especially during transportation (Reece et al., 2000). For this reason, the condition of established bands of feral horses after transport is often better than that of domestic horses from various origins, eg groups of horses traveling from saleyards to slaughterhouses. As such, the best way of preventing the risk of injuries may be to avoid mixing unfamiliar horses. At the very least, it would be best to transport stallions and particularly aggressive animals separated by partitions.

Summary of key points

• Numerous factors associated with transport can compromise health and welfare.
• Preventing dehydration is a priority in transported horses.

References

Activity: Competition — Orla Doherty

Use of the horse in equestrian competition involves changes in routine and management that affect all participating horses. These include transport, separation from co-specifics and familiar environment, changes in feeding and hydration regime and also exposure to training techniques and equipment specific to the discipline within which that horse competes. Techniques which inflict pain or fear, or do not align with the learning ability of the horse may reduce welfare (McLean and McGreevy, 2010). This is also true of the use of equipment which restricts natural movements or elicits or restricts specific behaviours through the application of high levels of pressure (McGreevy et al., 2012). The challenge inherent in identifying pain in the horse enables the use of pain-inducing equipment or techniques without detection or awareness by authorities or trainers and riders. Where competition is located at a distance from the home base, overnight stabling, stabling in proximity to unfamiliar co-specifics and changes in stabling and feeding regimes may also impact negatively on welfare.

In addition, different disciplines expose horses to risk of possible welfare reducing components, depending on the discipline. Risks associated with specific disciplines include injury in eventing, (Ekberg et al., 2011), dehydration in endurance (Carlson, 1994, Marlin, 2009), use of medications to mask clinical symptoms of injury or reduce challenging behaviours in various disciplines (Wend, 2011, Higgins, 2006), and the use of inflammatory agents to elicit exaggerated movements (trotting, show jumping) (Sneed, 2013), High levels of gastric ulceration in equine athletes (Vatistas et al., 1999), high recorded wastage levels within some equestrian disciplines (Olivier et al., 1997, Thomson et al., 2014) and approval of the use of certain training methods and equipment by regulatory authorities are areas of concern with regard to the welfare of the equine athlete.

References


**Activity: Work — Jeannine Berger**

For the purpose of this workshop we considered the following categories under the term *work horses*:

1. Rodeo horses
2. PMU ranching
3. Equine in agriculture
4. Carriage horses
5. Police work
6. Therapeutic Riding horse
7. Riding school horses
8. Horses in research (covered under the *Animal Welfare Act* in US)

**Rodeo horses**

In the USA rodeo horses have a long history and are famous since the 1800’s for the “wild west shows”. What initially started as daily ranch horse (and people) work, evolved into a competition. There are approximately 10,000 rodeos held per year in US, of which only 650 are PRCA sanctioned. The first Rodeo Association was organized in 1947 and the PRCA has 60 welfare related rules. Activities include events such as saddle bronc riding, bare back riding, steer wrestling, steer roping, tie-down roping, barrel racing and team roping. The major welfare topics discussed with such events include:

- ‘spurring’
- flank strap
- transport
- handling
- use of livestock prod
- injuries and injury/veterinary care.

**PMU ranching**

In the 1930s it was discovered that pregnant mare urine contains estrogens which led to the beginning of an “Agricultural enterprise” (from breeder to urine collector) especially in the midwestern provinces of Canada and North Dakota in the US. The product later known as “Premarin” (1942) was in 2003 still used by approximately nine million American women. Whereas in the years 1960-90 500 ranches with 60-70,000 mares existed, the 2002 WHI landmark study led to significant down-size to 80 ranches in 2003. Historically the major welfare topics discussed with such events include (however now they are self-regulated [http://www.naeric.org/about.asp?strNav=5&strBtn=5]).
• harness apparatus – "on-line" October till March
• housing and lack/limited of pasture access
• health, continued breeding
• nutrition/water restriction
• byproduct: excess foals
• foal and mare handling.

Equine in agriculture

The probably most pure and romantic purpose of the horse, at least in my opinion, are the equids in agriculture. The industrial revolution brought mechanization of transportation and farming leading to a 35% reduction in the value of the horse from 1918 to 1924, which led to 45% reduction in animals born by 1925. In 1925 there were 5.3 million farms with horses in the US and in 2002 it was estimated to have dropped to 500,000. Initial purpose included draft, working cattle and transportation. Pleasure was followed by farm and ranch use (NAHMS 2007). Encyclopedia of agriculture (Loundon, 1825). In 1964 Ruth Harrison’s book “Animal machines” led to the efforts of the Bramble report (1965) known as the “Five freedoms”. The animal welfare movement with organizations like PETA (1980) and RHAA (1998) suggested the awareness of animal welfare and promote humane principles. The major welfare topics discussed with such events include:

• training methods
• workload
• proper tack
• injuries and Illness
• veterinary and hoof care
• hydration and nutrition
• transportation.

Carriage horses

Horse-drawn carriages operate in many cities, 17 of the 25 largest US cities plus many historical districts have a year round or at least seasonal carriage trade for tourism. Other draft or carriage horses fall under agriculture purpose. Therefore it needs to be discussed if it is ethical to employ horses for profit business despite a strong public demand (Utilitarian view). Urban carriage horses are highly visible, hence some organizations call for elimination of urban carriage horse (PETA, HSUS, ASPCA). Welfare experts need to provide education of the public and objective guidance to continue to improve animal welfare. The major welfare topics for work horses discussed include:

• injuries/lameness (fewer than race and event horses) often times retired from other careers due to lameness, colic, dw,
• nutrition and hydration
• housing in cities
• weather condition
• fitting tack
• shoeing
• work load
• retirement
• accidents
• lack of exercise during off-season
Police horse

Welfare issues are very similar to urban carriage horse or event horse and include additional topics such as training methods and handling and crowd control.

Therapeutic riding horse

Horses can have a very positive cognitive, physical, emotional impact on humans and therefore have been utilized to help improve the well-being of people. Therapeutic riding programs have gained popularity and with it the interest in the welfare of the horses used in such programs. There some scientific information on the effects of therapeutic riding programs on the behavior, stress level, and welfare of horses in such programs. However there are associations for such programs each program is slightly different. It is knowns that the horse’s welfare can be impaired during handling with high special needs patients as seen with coping behaviors (Kaiser et al. 2006).

School horse (riding school)

Welfare issues similar to therapeutic riding horse.

Horses in research

Their oversight is covered by the animal welfare act in the US, The welfare issues are depending on project and the approval of an animal use protocol. The 3R’s must always be considered!

- level 1: highly qualified randomized blinded studies
- level 2: cohort and observational studies
- level 3: case controlled studies
- level 4: case series
- level 5: expert opinion.

References

APHIS The Horse Protection Act (2004)
Balding and Kurtz 1992 – 18month of 4314 unannounced street inspections NY fewer than 20 lameness or illness found in working horses (less problems than in race horses or event horses )
Cornell post mortem study: no significant chronic lung lesions in 6 NY carriage horses
Flannigan and Stookey (2002) day time budgets of pregnant mares housed in tie stalls: a comparison of draft versus light mares AABS 78, 125-143
Houpt, Eggleston, Knuckle and Houpt (200) effect of water restriction on equine behavior and physiology. Eq Vet J 32, 341-244
Kaiser, Lana, MD, DVM; Camie R. Heleski, PhD; Janice Siegford, PhD; Katharine Ann Smith (2006) Stress-related behaviors among horses used in a therapeutic riding program. Journal of the American Veterinary Medical Association.
Manitoba Department of Agriculture (1990) recommended code of practice for the care and handling of horse in PMU operations, Canadian Agri food research council Ottawa.

Mazan et al 2001 – urban horse has less airway reactivity than rural horse


McDonnell, Freeman, Cymbaluk, Schott, Hinchcliff, Kyle (1990) Behavior of stabled horse provide continous or intermittent access to drinking after AJ vet research 60, 1451-1456.

NAERIC 1997 equine vet consensus report on the care of horse on PMU ranches

NAERIC 2007 recommended code of practice of the care and handling of horses in PMU operations


Sparks, Topcliff, Collie, Freeman Breazile (1999) the influence of restricted movement on the physical fitness and wellbeing of pregnant mares. In Proceeding of the 16th equine nutrition and physiology society symposium Raleigh, NC, 251-252.


**Activity: Breeding** — James Yeates

**Management**

The management of breeding stallions and mares may involve harms of isolation, housing and poor handling, leading to issues such as self-directed aggression or stereotypes. Stallions may, at times, experience frustration from an unfulfilled motivation to breed; mares may undergo altered lighting schedules (necessitating indoor housing) or hormonal manipulation, and examination including restraint for rectal examinations. Both may also undergo various handling methods.

**Mate selection**

Inappropriate mate selection may lead to increased interventions (e.g. additional restraint) or perpetuate breed/individual inheritable disorders (Bettley et al. 2012), although mate selection might also include some health screens (Brosnahan et al. 2010) or selection for temperament. Animals kept for breeding may thereby avoid euthanasia or slaughter. Breeding excessive numbers of horses may lead to their being neglected or slaughtered.

**Mating methods**

Mating “at pasture allows pre-courtship bonding; pre-copulatory behaviour or repulsion; sex; parturition (with its oxytocin-release and risks) and post-birth interactions. It also carries some risk of injuries and venereal disease, and may necessitate transportation.

Cover “in hand” prevents most pre-copulatory behaviour, and some, overused stallions may show reduced libido, while reducing some injury risks. AI additionally prevents sex; the insemination procedure may be unpleasant; and reduces the some risks of injury, venereal disease and transportation, and stallions can be used less or be castrated. Teasers used for cover in hand or AI may experience frustration.

Embryo transfer and oocyte transfer involve multiple mares. They may additionally involve closer hormonal control and monitoring. In addition to cover (of donor or recipient), the donor mare undergoes the procedure of either flushing (risking discomfort from the uterus being fluid with fluid and agitated) or
oocyte retrieval, either percutaneous (risking pain from the needle insertion and introducing pathogens) or transvaginal (risking discomfort and injury). The recipient mare may undergo surgery or transcervical transfer, with the potential for pain, discomfort and uterine infection. ET also means the animal who is mated is not the one who carries the pregnancy or interacts with the foal.

Each option therefore has risks and benefits. Increased “intervention” decreases natural risks, but introduces new ones. By moving from behavioural detection by stallions, or then by ourselves, we effectively are moving further from mares’ choice in the sense of behavioural receptivity – and basing it entirely on physiology.

References

Campbell M, Sandoe P 2014 Welfare in horse breeding. Veterinary Record 176:436-440