

*AWIN
welfare
assessment
protocol for*

Horses



Acknowledgement

The research leading to these results has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n° 266213.

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- The photos and drawings included are examples to illustrate a specific condition; these must not be considered as the only representation of animal or farm conditions.

Safety and welfare are the first priorities. The assessor, the handler, the stable manager and the animals should never be put in danger. The animals should be handled gently and with consideration at all times. If it is not possible to complete all or part of the assessment without compromising the animal welfare through fear, discomfort, pain, or excessive restraint, the assessment should be stopped.

This document forms an integral part of the protocol.

No parts of the protocol may be copied without the permission of the authors.

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This document presents version 1.1 of the assessment protocol for horses.

Please use the following citation when referring to this document:

AWIN, 2015. AWIN welfare assessment protocol for horses.

DOI: [10.13130/AWIN_HORSES_2015](https://doi.org/10.13130/AWIN_HORSES_2015)

March 2015

FOREWORD

The European Animal Welfare Indicators Project (AWIN) addressed the development, integration and dissemination of animal-based welfare indicators, with an emphasis on pain assessment and pain recognition.

AWIN research objectives were carried out in four complementary workpackages and focused on sheep, goats, horses, donkeys and turkeys, species that, although commercially relevant world-wide, have so far been overlooked in previous science-based animal welfare assessments.

Workpackage 1 developed practical, science-based, welfare assessment protocols, including pain indicators. AWIN also translated the welfare assessment protocols into interactive apps to facilitate data collection, data storage and data analysis.

Workpackage 2 studied the impact of diseases and pain on animal welfare and developed interactive apps to facilitate data collection, data storage and data analysis.

Workpackage 3 examined the effects of different prenatal social environments, social dynamics and prenatal handling methods on developmental and welfare outcomes of the offspring of sheep, goats and horses.

Workpackage 4 developed interactive learning objects to disseminate the scientific work developed in the AWIN project, and created the Animal Welfare Science Hub to promote transparency, establishing a global research and education repository in animal welfare science.

The AWIN project remains committed to promote solid science, which could be used in practical settings.

A list of partners of the AWIN project is reported at the end of the document.

Draft protocols were subjected to an extensive consultation process with interested parties, across many European countries, and the wider world. Stakeholders actively contributed to testing the draft protocols and offered useful feedback. In order to increase the feasibility of protocols, AWIN proposes a stepwise strategy of assessment, with a more detailed assessment dependent on the outcome of a smaller number of important first measures.

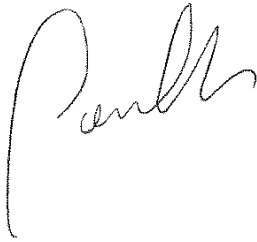
This document includes the AWIN welfare assessment protocol for horses, developed by:

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Special thanks are due to Stefano Guazzetti for developing sampling strategy and calculation system, Kirk Ford for English revision and Marco Colombo for graphic support. The authors also gratefully acknowledge the Service Centre for Technologies and Multimedia and Distance Learning (CTU) of the Università degli Studi di Milano for valuable technical assistance, the generosity and help of the farmers that allowed the protocol to be tested in their farms, and the stakeholders for their important contribution to the development of the protocol.



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HOW TO USE THIS DOCUMENT

This document presents the on-farm protocol to assess the welfare of horses developed by AWIN and it is divided into three parts:

- **Chapters 1, 2, 3** – preliminary information relevant for applying the protocol.
- **Chapters 4, 5** – description, assessment and scoring of the welfare indicators (presented according to the four principles and twelve criteria of Welfare Quality®); flow of first and second level welfare assessment; description of the outcome of the assessment.
- **Appendix A, B, C** – recording sheets to collect data, adaptation of welfare assessment protocol for group housed horses.

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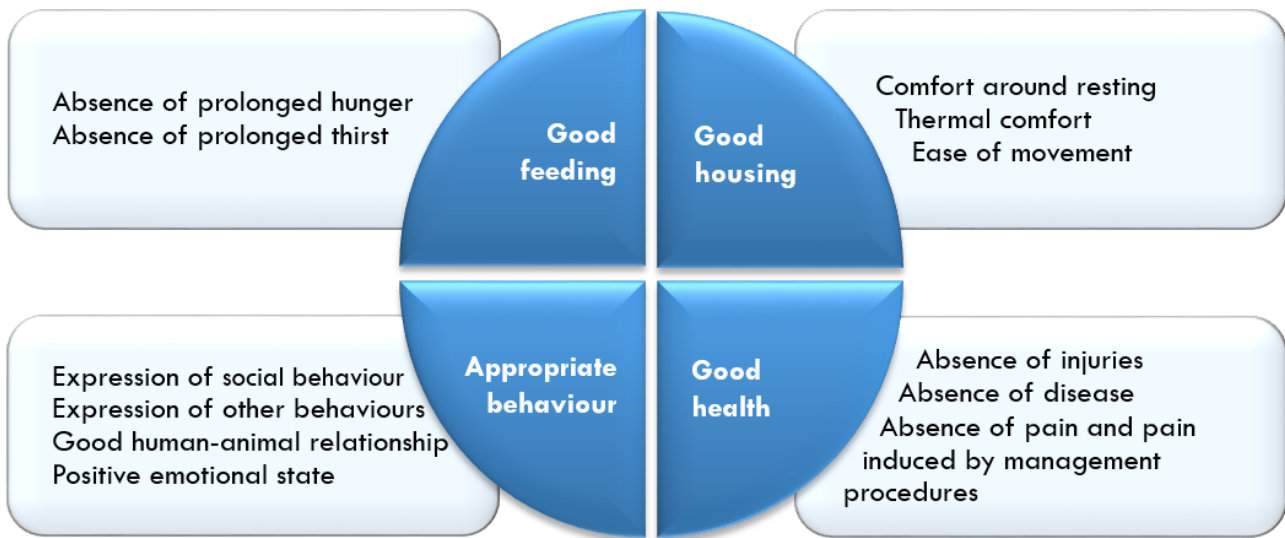
1. INTRODUCTION

Good animal welfare is a prerequisite for high-quality and sound farm animal production. Providing environmental and management conditions that favour animal welfare is not only expected by consumers and the general public, but is also related to achieving system-appropriate levels of performance and profitability. Animal welfare assessment is thus one of the pillars of productive, efficient and sustainable production systems.

In order to develop valid welfare assessment protocols it is important to remember that current, accepted definitions of animal welfare are based on a multidimensional concept, defined as a state of complete mental and physical health where the animal is in harmony with its environment (Hughes, 1976), and as its state as regards its attempts to cope with its environment (Broom, 1986). The physical environment, resources available to the animals and management practices of the farm can affect the welfare of animals, which adjust to these inputs with behavioural, and physiological responses. Since the beginning of the 21st century, on-farm welfare monitoring systems have been developed. Initially monitoring schemes were largely based on environmental assessments, such as design or resource indicators, which assess inputs that could affect animal welfare. These resource-based and management-based measures should be considered as risk factors that might affect welfare; however in order to assess animal welfare at farm level, it is crucial to develop and use animal-based measures. These indicators provide a more accurate welfare assessment as they give direct information about the response of, and the effects on, the animal. Animal-based measures are considered by EFSA to be “the most appropriate indicators of animal welfare and a carefully selected combination of animal-based measures can be used to assess the welfare of a target population in a valid and robust way” (EFSA, 2012). The European Commission emphasizes the use of science-based animal welfare indicators as a possible means to simplify the legal framework and allow flexibility to improve competitiveness of livestock producers (EC, 2012).

The first welfare assessment protocols built on animal-based measures were developed by the Welfare Quality[®] project for pigs, poultry, dairy and beef cattle (Welfare Quality[®] Protocol, 2009a, Welfare Quality[®] Protocol, 2009b, Welfare Quality[®] Protocol, 2009c). This project, funded within the 6th EU Framework Programme, developed a scheme where the needs of animals are related to four principles and twelve criteria, considered necessary to cover all aspects of animal welfare (Fig. 1). This approach was the basis for future research on welfare assessment at farm level.

Figure 1. Welfare principles and criteria according to Welfare Quality®



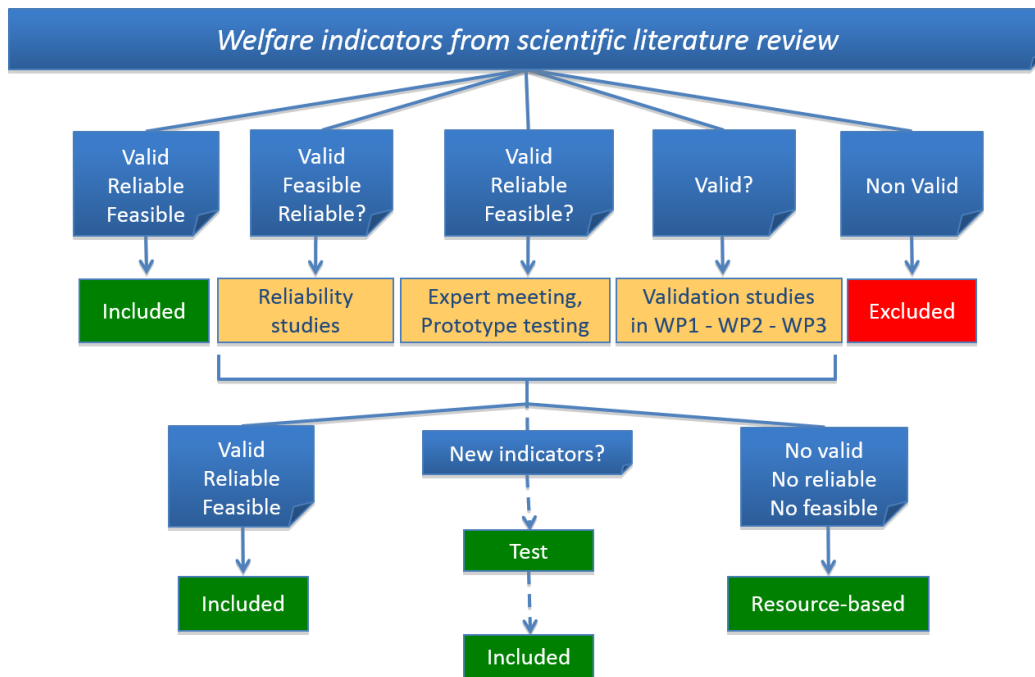
After dealing with welfare assessment of some of the most common farmed species, in the 7th Framework Programme, the European Commission required the development, integration and dissemination of animal-based indicators, including pain, in commercially important husbandry species not yet covered in previous projects. In 2011 the AWIN (Animal Welfare Indicators) project was funded with the overall goal of improving animal welfare of sheep, goats, horses, donkeys and turkeys by developing, integrating and disseminating information about animal welfare indicators. These animal species offer challenges since they have been less studied and thus there is generally less information available on well-validated welfare indicators. In addition, the heterogeneity of the farming systems and environments in which these animals live may make the assessment more difficult. AWIN also puts special emphasis on the recognition and assessment of pain, as pain is an area that is frequently lacking from many animal welfare assessments and yet is often key when animal welfare problems arise.

AWIN workpackage 1 (WP1) aimed to develop and refine welfare assessment protocols using animal-based indicators, including pain, in the above mentioned species. The welfare assessment protocols developed by AWIN are grounded on the four welfare principles and twelve criteria developed by Welfare Quality® and are complete but not complex, so that their application can meet current needs.

This Section briefly summarizes the principles and the rationale of the AWIN welfare assessment protocols for sheep, goats, horse, donkeys and turkeys, to be applied for on-farm welfare assessment; information about the animal based indicators, data processing and outcome will be presented later in the document.

As a starting point WP1 reviewed background scientific information to select promising animal-based indicators to be included in the protocols. Indicators were classified according to the four principles and the twelve criteria developed by Welfare Quality® (Fig. 1), and assessed for their validity, reliability and feasibility, identifying gaps in current knowledge (Fig. 2).

Figure 2. Characteristics and process to identify promising animal-based indicators



From this process, at least one indicator for each welfare criterion was selected to be included in the protocols. AWIN scientists developed a research action plan to address the lack of knowledge regarding the validity, repeatability and feasibility of single promising indicators where this was not present in the literature.

The work involved collaboration with workpackage 2 of the AWIN project, which addressed the relationship between disease, pain and animal welfare and with workpackage 3, which examined the effects of prenatal social environments, social dynamics and prenatal handling methods on the development and welfare of the considered species. Workpackage 4 maximised the effective translation of WP1 scientific results into learning objects. New indicators were developed and results were published in peer reviewed journals. Welfare assessment protocols were developed using animal-based indicators, although some resource-based indicators were included when no animal-based indicator were available to assess specific aspects. To develop the welfare assessment protocols, stakeholders’ perception of the selected indicators was taken into consideration. The purpose of involving the stakeholders was to increase the acceptability of the project outcomes through stimulation of a multidisciplinary dialogue, and identify solutions to potential barriers to the application of the protocols in practice. Stakeholders’ opinion and farmers’ experience were crucial for the successful implementation of the protocols. An on-line questionnaire in five languages was developed with the aim of understanding the current opinion of various stakeholders (farmers, veterinarians, owners) on welfare evaluation of the different species. In addition, the welfare assessment protocols for horses, donkeys, sheep, goats and turkeys were discussed with a network of stakeholders in

several meetings, gaining feedback on their acceptability and feasibility, and facilitating the experimental phases of the project through practical support for the on-farm testing of the protocols.

The protocols were refined according to the results of WP1 studies and the feedback from the stakeholders favouring the use of indicators with the highest acceptability.

A two level approach is adopted for animal welfare assessment at farm level to increase feasibility and acceptability without losing scientific validity. The protocols offer, as a first level, a quick screening, consisting of a selection of robust and feasible animal-based indicators, which can be readily applied and require no or minimal handling of animals. Depending on the outcome of the first level assessment, a second level, consisting of more comprehensive and in depth assessment, may be recommended. In the second level protocols, animals are often handled, but the welfare assessment is still feasible and can be conducted in a reasonable amount of time.

The outcome of the protocols aims to give a clear and immediate visual feedback to the farmers about the welfare of the animals on the farm, highlighting positive conditions and enabling comparison with a reference population.

AWIN protocols are designed to enable comparisons among similar production and management systems and are intended to assess animal welfare in order to guide its improvement throughout Europe and elsewhere in the world.

It should be underlined that this document presents the first version of the assessment protocol for donkeys on March 2015 and that scientific research will progress, refining indicators so that AWIN protocols could be updated according to new scientific knowledge. It should also be highlighted that proper training and adequate knowledge are essential to apply the protocols.

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2. AIMS

AWIN aimed to develop welfare assessment protocols that provide a toolbox of sound, feasible and practical animal-based indicators to assess animal welfare in order to promote improvements in animal production systems throughout Europe. The protocols were developed for species with broadly different rearing systems, ranging from very intensive to pasture based systems, and different production settings, ranging from intensive milk production to extensive meat production or working animals.

The AWIN welfare assessment protocol for horses is intended to function as a highly accepted and applicable welfare assessment tool for single stabled horses over than 5 year old.

Some suggestion for the adaptation of the protocol to horses housed in groups are presented in the [Appendix C](#).

3. PRELIMINARY INFORMATION

The objective of this section is to ensure that assessors know how to organise a visit, how to behave on a horse farm, how to approach the stable manager and how to present the protocol so that results are reliable and useful to all.

Before contacting the stable manager, assessors should be sure that they have a good knowledge of:

- o how the protocol works;
- o possible constraints in the protocol application;
- o farm practices and husbandry features for horses;
- o horse behaviour;
- o sanitary rules and common diseases.

3.1 Contact the stable manager

It is essential to contact the stable manager and plan an appointment to visit the farm taking into account the timing of the farm routine.

When talking to the stable manager, assessors should discuss and agree the objectives of the visit, timetable and methods. It should be made clear that special arrangements and changes in routine will be kept to a minimum.

It is important to underline that the welfare assessment is neither dangerous for the horses nor for the people involved. All procedures conducted as part of the welfare assessment are non-invasive and routine operations that any good handler would conduct as part of daily checks.

Assessors should ask at what time the horses receive their meal and explain:

- o how and for how long the stable manager and/or the handlers will be involved;
- o that they will need to enter the horse boxes;
- o that horses should not wear rugs.

For the second level welfare assessment, assessors should require the collaboration of a handler to handle the horses with a head-collar.

3.2 Equipment required

Useful materials for the welfare assessment are: recording sheets, paper, pens/pencils, tablet or smartphone, camera, measuring tape or laser distancemeter, stopwatch, safety shoes/boots, disposable shoe covers and disinfectants.

3.3 Biosecurity

Biosecurity is a crucial issue. Welfare assessors should never be a potential disease-spreading source, or be seen as such. In the case of a horse showing signs of infectious disease (e.g. discharge, diarrhoea), the animal must not be touched.

Clean clothes and shoes/boots are essential even if additional disinfection will be performed on the farm premises.

3.4 Arriving and working

On arrival, assessors should look for the stable manager and/or handlers in charge of the animals and ask them to briefly present the farm safety rules and if there are any horses that, in their opinion, are aggressive or dangerous.

During this conversation, the welfare protocol should be presented, including the objectives, the approximate assessment duration, the assessor schedules and activities and the indicator collection order. This will provide the stable manager with precious information on where the assessors will be at any time. Although the flow of the welfare assessment protocol cannot be changed, the plan should be discussed so that the assessment is conducted without interfering with routine work. AWIN welfare assessment protocol for horses should be performed at least 30 min after the feed distribution.

When walking around the farm, assessors should be discreet. Any disturbance to people working on the farm or to the animals must be kept to the minimum possible.

Knowing how horses behave is crucial when entering the box. This will not only ensure adequate assessment but will also allow the identification of aggressive, threatening or fear signs.

Other advices on how to move around and behave on the farm is:

- do not leave the gates and doors open after going through;
- avoid talking too loudly and making sudden movements;
- do not leave any object within reach of the animals;
- avoid being licked on the hands;
- avoid touching the horses if it is not necessary;
- keep focused on the work at all times.

If records are to be checked, assessors should always ask for permission and, if possible, consult them with the stable manager or whoever is in charge.

3.5 Safety handling

The present welfare assessment protocol is designed for use by trained assessors. Safety and welfare are of prime importance. The assessors, the handlers or the animals should never be put in danger. The assessment must be terminated if the horse shows any behaviour that can be dangerous for people involved.

3.6 Sampling

This welfare assessment protocol is intended for horses over than 5 year old and already used for different activities.

3.6.1 Selecting horses for first level welfare assessment

In the first level welfare assessment, sampling of horses is needed.

The sampling should be randomized as much as possible. Random selection of horses from microchip numbers is suggested.

It is important to be aware that there are many possible sources of bias that could affect animal sampling on-farm. For instance, testing horses in adjacent boxes can affect their response to some indicators (e.g. avoidance distance or fear tests).

The effect of familiarization can be minimized through careful design of the order in which the horses are assessed.

The assessors should not evaluate horses in adjoining boxes, but follow assessments in distant parts of the farm, so that it can be reasonably assumed that the horses do not see or hear the assessors before being evaluated.

3.6.1.1 Number of horses to be assessed for the first level welfare assessment

In order to select the number of animals to be assessed, it is important to know the current number of horses over than 5 year old.

The number of horses to be sampled should be determined according to the following table:

Farm size – number of horses over than 5 year old	Suggested sample*
1-14	All animals
15-19	13
20-24	16
25-29	19
30-34	21
35-39	24
40-44	26
45-49	28
50-59	29
60-69	32
70-79	35
80-89	37
90-99	39
100-124	41
125-149	44
150-174	47
175-199	49
>200	51

**The sample size is calculated for an expected variation in data of 0.5, at the level of confidence of 0.9 and a precision of the estimate (δ) of 0.1*

3.6.2 Selecting horses for second level welfare assessment

In the second level welfare assessment it is recommended to assess all the horses over than 5 year old.

4. AWIN WELFARE ASSESSMENT PROTOCOL FOR HORSES

4.1 Welfare indicators divided by principles and criteria

This Section reports description, assessment and method of scoring of each AWIN welfare indicator for horses, listed according to WQ® principles and criteria. It is always specified if the indicator should be assessed at individual or group level, or if it is resource or management-based. In order to highlight the association between welfare indicators and principles throughout the document, different colours are used to identify each principle. Even though some indicators can be informative of more than one issue, positive assessment of each indicator communicates that a specific criterion has been fulfilled. For example, poor Body Condition Score can be related to a variety of factors such as food availability, disease and feeding practices, however, optimal Body Condition Score reflects prolonged appropriate nutrition. As there is a logic order in which the different indicators should be collected, Sections [4.2](#) and [4.3](#) report the flow of the first and second level welfare assessment.

Welfare principles	Welfare criteria	Welfare indicators
Good Feeding	Appropriate nutrition	Body Condition Score
	Absence of prolonged thirst	Water availability Bucket test
Good Housing	Comfort around resting	Bedding Box dimensions
	Thermal comfort	Not considered for single stabled horses
	Ease of movement	Exercise
Good Health	Absence of injuries	Integument alterations Swollen joints Lameness Prolapse
		Absence of disease
	Absence of pain and pain induced by management procedures	
		Appropriate Behaviour
Expression of other behaviours	Stereotypies Fear test	
Good human-animal relationship	Human-animal relationship tests	
Positive emotional state	Qualitative Behaviour Assessment	

BODY CONDITION SCORE

GOOD FEEDING

APPROPRIATE NUTRITION

Description

Body condition scoring is a standardized method to evaluate the amount of fat on a horse's body. Body condition can be affected by a variety of factors such as food availability, reproductive activities, weather, performance or work activities, parasites, dental problems, diseases and feeding practices.

How to assess [Individual]

Start with a general visual inspection from the side of the horse and assess the fat/muscle covering the neck, ribs, shoulder, back, abdomen and pelvis. Stand at a safe distance behind the horse and assess the fat reservoirs/deposits around the tail bone/caudal vertebra of the horse, assess the shape of the croup, the visibility of the spine and hip bone.



How to score

Use the Body Condition Score system of Carrol and Huntington (1988 Equine vet j, 20(1) 41-45) with a scale from 1 to 5. This system is used for all breeds and all purposes of use.

Score 1



Neck: ewe neck, narrow and slack at base
Back and ribs: ribs easily visible, prominent backbone with skin sunken on either side
Pelvis: prominent pelvis and croup, sunken rump but skin supple, deep cavity under tail

Score 2



Neck: narrow but firm
Back and ribs: ribs just visible, backbone covered but spine can be felt
Pelvis: rump flat either side of backbone, croup well-defined, some fat, slight cavity under tail

Score 3



Neck: no crest (except for stallions), firm neck
Back and ribs: ribs just covered and easily felt, no gutter along back, backbone well covered but spine can be felt
Pelvis: covered by fat and rounded, no gutter, pelvis easily felt

Score 4



Neck: slight crest, wide and firm
Back and ribs: ribs well covered
Pelvis: gutter to root of tail, pelvis covered by soft fat, needs firm pressure to feel

Score 5



Neck: marked crest, very wide and firm, folds of fat
Back and ribs: ribs buried, cannot be felt, deep gutter along back, back broad and flat
Pelvis: deep gutter to root of tail, skin dispended, pelvis buried, cannot be felt

WATER AVAILABILITY

GOOD FEEDING

ABSENCE OF PROLONGED THIRST

Description

Assessing the water availability means not only checking the presence of water points but also evaluating their functioning and cleanliness. Water is essential for life; every animal should have access to a water point. Equines must be fully hydrated to help preventing the development of health and welfare problems.

How to assess [Resource-based]

Enter the box and check:

- the presence and type of the water point;
- the functioning;
- the cleanliness.

Record all these parameters separately.

How to score

Evaluate the presence and type of the water point

No water point

Trough

Any water container which is manually filled and contains some water

Automatic drinker

A water container connected to a water network which is automatically filled after every use



Evaluate if the automatic drinker is functioning

Not functioning



Functioning



Evaluate the water point cleanliness

Dirty

Water point and water dirty at the moment of inspection



Partly dirty

Water point dirty but water clean at the moment of inspection



Clean

Water point and water clean at the moment of inspection



BUCKET TEST

GOOD FEEDING

ABSENCE OF PROLONGED THIRST

ONLY SECOND LEVEL

Description

The bucket test is a practical and easily performed test designed to evaluate thirst in horses. *It is important to be aware that under particular conditions (e.g. if the horse has had little to eat) an apparent lack of thirst does not necessarily indicate that a horse does not need to drink.*

How to assess [Individual]

Performance of this test is recommended when the water point is not present or not functioning at the moment of inspection.

Use a 5 l graduated plastic container. Fill it with fresh clean water.

Enter the box and put the bucket in the corner in front of the door.

After 10 min, remove the bucket and check the remaining level.

Clean the bucket and completely replace the water each time (in order to minimize health risks and water temperature changes).



How to score

Measure the volume of water drunk (to the nearest 0.5 l)



BEDDING

GOOD ENVIRONMENT

COMFORT AROUND RESTING

Description

Comfort around resting relies on suitable bedding. Bedding material should be nontoxic, free of mould and excessive dust, and allow effective drainage, or be absorbent enough to maintain a dry bed and assist in keeping the air fresh. Whatever bedding is used (e.g. straw, shavings, rubber mats etc.) it should be well managed and changed or cleaned regularly.

How to assess [Resource-based]

Enter the box and determine if:

- there is bedding and the quantity of the bedding material is sufficient;
- the bedding material is clean.

Record all these parameters separately.

How to score

Evaluate the quantity of the bedding material

No bedding



Insufficient

(floor areas not covered by bedding are clearly visible)



Sufficient / rubber mat



Evaluate the cleanliness of the bedding material

Dirty

(presence of faeces more than a day old, obviously wet)



Clean



BOX DIMENSIONS

GOOD ENVIRONMENT

COMFORT AROUND RESTING

Description

It is important that the dimensions of the box allow the horse to turn around and lie down easily.

How to assess [Resource-based]

Enter the box and, using a measuring tape, record the height at the withers of the horse. Measure the length of the 2 sides of the box and calculate the area of the box (length of the first side x length of the second side). Compare the area of the box with the satisfactory dimensions reported in the table* below:



Height at the withers	<120 cm	120-134 cm	134-148 cm	148-162 cm	162-175 cm	> 175 cm
Single box	5.5 m ²	7 m ²	8 m ²	9 m ²	10.5 m ²	12 m ²

*Swiss Animal Welfare Ordinance (TSchV) of 23 April 2008 (position as at 1 April 2011)

How to score

Evaluate whether the box dimensions are satisfactory

Not satisfactory



Satisfactory



EXERCISE

GOOD ENVIRONMENT

EASE OF MOVEMENT

Description

Exercise refers to the possibility the horse has to spend time outside the box on a daily basis (e.g. walking in hand, riding, lunging, hand grazing, not under controlled movement in a dry lot, arena, pen or pasture).

How to assess/score [Management-based]

Ask the stable manager the following questions

Frequency of exercise

Daily

Weekly (1-4 times/wk)

Sometimes (less than 1/wk)

Exercise per day in h

INTEGUMENT ALTERATIONS

GOOD HEALTH

ABSENCE OF INJURIES

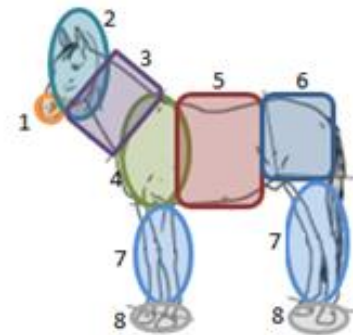
Description

Hairless patches, scabs, skin lesions, wounds and swellings are considered integument alterations. They may be present due to a variety of reasons such as traumas, type and quality of the equipment used, type, quantity and intensity of work, fights with other horses as well as disease.

How to assess [Individual]

Start with a general visual inspection from the side and assess every area looking for integument alterations (on both sides of the body). Ideally divide the horse into 8 areas:

1. Muzzle;
2. Head (including ears);
3. Neck (excluding withers);
4. Shoulder (including withers; excluding elbow);
5. Midsection (back, loin, flank, barrel);
6. Hindquarters (including croup, dock, excluding stifle);
7. Legs (including elbow, stifle, pastern, excluding coronet);
8. Hooves (including coronet).



Take into consideration only lesions larger than a 1x2 cm² area or more than 4 cm length (for linear lesions).





No alteration

No evidence of integument alterations that are worth mentioning



Alopecia

Loss of hair: hairless spot or scar



Skin lesion

Superficial wound with a minor cut through the skin. Superficial underlying tissue is visible



Deep wound

Wound through the skin involving damage to deeper tissue



Swelling

An increase in the size or a change in the shape of an area of the body
It includes hernias, but no swollen joints

How to score

First level welfare assessment

For each area, evaluate the presence of integument alterations. If there are small, multiple and grouped alterations (distinguishable or not distinguishable) that cover an area bigger than a 1x2 cm² or more than 4 cm length (for linear lesions), score presence of integument alterations.

Midsection: **presence of skin lesion**



Midsection: **absence of integument alterations**



Second level welfare assessment

For each area, count the number of integument alterations.

If more than 20 alterations per area are present, or one alteration is bigger than the palm of a hand, score >20.

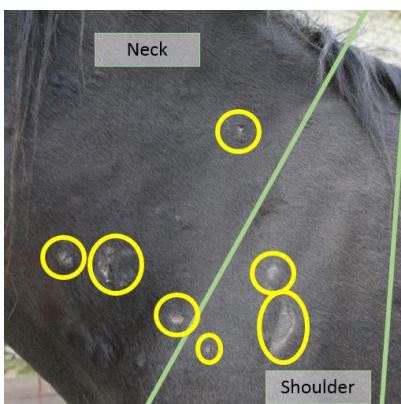
If there are small, multiple and grouped alterations (distinguishable or not distinguishable) that cover an area bigger than a 1x2 cm² or more than 4 cm length (for linear lesions), score 1 integument alteration.

If single alterations are not distinguishable and the area covered is bigger than the palm of a hand, score >20.

If there are different categories of alterations at the same location (e.g. swelling and lesion at one leg) or adjacent to each other (e.g. a round hairless patch with a lesion in its centre) all these alterations are counted.



Midsection: alopecia bigger than a 1x2 cm (yellow circle)
Score: Midsection – Alopecia 1



Neck: 4 alopecia bigger than a 1x2 cm² (yellow circle)
Shoulder: 3 alopecia bigger than a 1x2 cm² (yellow circle)
Score: Neck – Alopecia 4 + Shoulder – Alopecia 3

© IASP

SWOLLEN JOINTS

GOOD HEALTH

ABSENCE OF INJURIES

Description

Swollen joints happen when there is an increase of fluid in the tissues that surround the joints. Swollen joints can be painful and indicative of several conditions such as arthritis, injuries, infection or broken bones.

How to assess [Individual]

Start with a general visual inspection of the horse body (both sides). Determine if swellings around the elbow, knee, fetlock, stifle, hock are present.

How to score

Assess the presence of swellings

Present**Absent**

LAMENESS

GOOD HEALTH
ABSENCE OF INJURIES

ONLY SECOND LEVEL

Description

Lameness describes an abnormality of movement and is most evident whilst the animal is in motion. Lameness reduces a horse's ability to use one or more limbs in a normal manner, with severe cases reducing mobility or resulting in an inability to bear weight on the limb(s). Lameness indicates that the horse is experiencing pain and discomfort and may be the result of several clinical conditions.

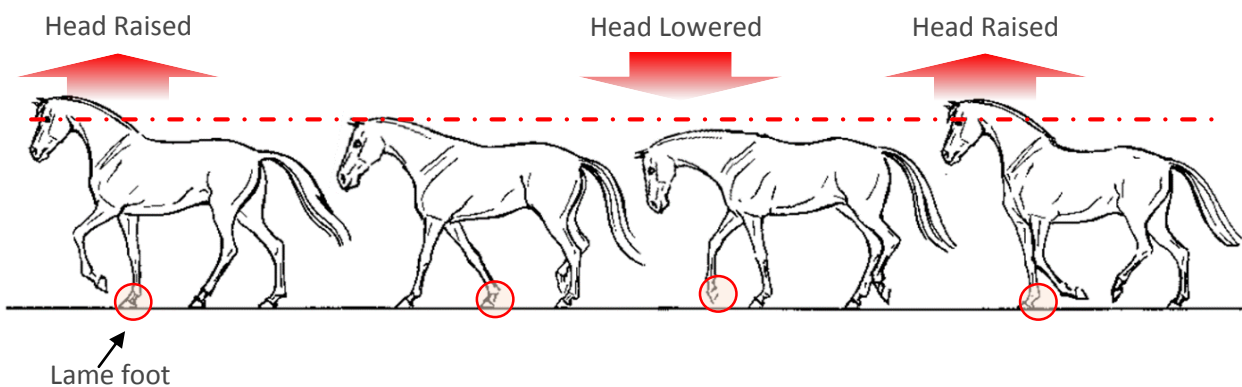
How to assess [Individual]

Observe the horse's posture at rest to see if it can stand and bear weight equally and fully on all limbs. If it requires assistance to rise, is unable to bear any weight on one leg or shows halted movement, the assessment of the horse's gait is not required.

Then, ask the handler to handle the horse and assess its gait. Observe the horse from the front, side and rear during a 10 m walk in a straight line*. The rope between the handler and the animal's halter/head collar should be slack to allow the animal's head to move freely.

For lameness on forelegs, observe whether the horse:

- changes head position during movement: when pressure is placed on the lame foot, the head rises, when pressure is removed from the lame foot, the head lowers (see diagram below).



Assessment of hind limb lameness might be more difficult to perform, observe whether the horse:

- Takes a shorter stride with one hind foot in comparison to the other;
- Raises pelvis as one hind leg hits the floor; this is the lame hind leg.

**Always assess a horse for potential lameness in a quiet and safe place, on a hard, even surface!*

How to score

Evaluate the horse gait

Non-ambulatory

The horse is unable to stand without assistance or is unable to bear any weight on one leg or shows halted movement. The assessment of the horse's gait is not required.



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Lame

The horse has imperfect locomotion, but can walk. When walking the head rises when the pressure is placed on the lame foot. Raises pelvis raises as the lame hind leg hits the floor.



©HAV

Not lame

Can bear weight equally and fully on all limbs at rest and when walking.



PROLAPSE

GOOD HEALTH

ABSENCE OF INJURIES

Description

A condition in which an internal organ protrudes through a natural opening. Prolapses of the uterus, vagina or rectum may be found in horses.

How to assess [Individual]

Ask the handler to handle the horse and make a visual assessment of the anus and vulva.

How to score

Assess the presence of prolapse

Present

Presence of prolapse



Absent

No prolapse



HAIR COAT CONDITION

GOOD HEALTH

ABSENCE OF DISEASE

Description

Good hair coat condition is an indicator of both good coat health and also good general health. Vice versa, bad hair coat condition could indicate a number of clinical conditions or poor nutrition.

How to assess [Individual]

Base the assessment on a picture of the whole horse. Do not take into consideration:

- local alterations in coat condition;
- changing coat (please note that some breeds change coats later in the season or have an irregular change pattern);
- alterations to the coat caused by harnessing.

How to score

According to the Welfare Monitoring System Assessment protocol for horses*, evaluate the coat condition:

Unhealthy

Dull, dry coat with or without rough coat



Healthy

Sleek, glossy, nicely sited coat



*available at <http://edepot.wur.nl/238619>

DISCHARGES

GOOD HEALTH

ABSENCE OF DISEASE

Description

Discharges from natural orifices (nose, eyes, vulva or penis) can be a symptom of the presence of a localized or generalized disease.

How to assess [Individual]

Make a visual assessment of the nose, the eyes, the vulva or penis.
Evaluate both sides of the head. The horse is observed, but must not be touched.

How to score

Evaluate the presence of nasal discharge

Present

Clearly visible flow/discharge from one or two nostrils (may be watery or thick, transparent, yellow/green or hematic)



Absent

No nasal discharge



Evaluate the presence of ocular discharge

Present

Clearly visible flow/discharge from one or two eyes (may be watery or thick, transparent, yellow/green or hematic)



Absent

No ocular discharge



Evaluate the presence of discharge from vulva or penis

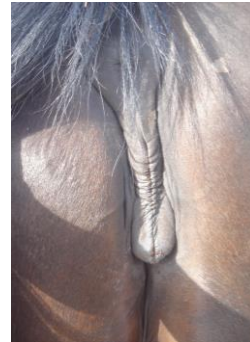
Present

Clearly visible flow/discharge from the vulva or penis
(may be watery or thick, transparent, yellow/green
or hematic)



Absent

No discharge



CONSISTENCY OF MANURE

GOOD HEALTH

ABSENCE OF DISEASE

Description

The consistency of manure depends on water content. A bad manure consistency could indicate a gastrointestinal problem, but also a poor value of food.

How to assess [Individual]

Check for fresh (not more than a day old) manure.

How to score

Assess the consistency of the manure

Abnormal

(e.g. water-like, cow dung, loose structure, too dry)



Normal



ABNORMAL BREATHING

GOOD HEALTH

ABSENCE OF DISEASE

Description

Abnormal breathing is characterized by an exaggerated effort to breathe. Under standard climate conditions and at rest, abnormal breathing can be the consequence of different types of health problems.

How to assess [Individual]

Assess the horse for 1 min under standard climate conditions and at rest. It is important to be familiar with the horse normal respiratory rate. Measured as breaths per min; it should be around 10-24.

Make a visual assessment of the horse breathing, paying particular attention to the sides, checking the focal areas: nostrils, chest and abdomen.

Abnormal breathing is present when one or more of the following signs are observed: flaring of the nostrils, increased or decreased breathing rate, heaving abdomen, asynchrony between movements of the chest and abdomen and noisy breathing.



How to score

Score if the breathing is normal or abnormal

Present

Presence of abnormal breathing



Absent

Breathing is normal



COUGHING

GOOD HEALTH
ABSENCE OF DISEASE

ONLY SECOND LEVEL

Description

Coughing is a vigorous inspiratory contraction, followed by a rapid exhalation, with the genesis of a sound vibration.

How to assess [Individual]

Assess the horse at rest for 5 min and pay attention carefully to any coughing.

How to score

Coughing

The horse coughs at least once

Not coughing

The horse does not cough

HORSE GRIMACE SCALE

GOOD HEALTH

ABSENCE OF PAIN AND PAIN INDUCED BY MANAGEMENT PROCEDURES

Description

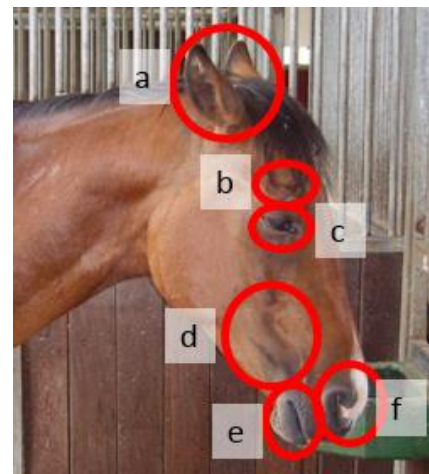
The Horse Grimace Scale (HGS) is a standardized method to evaluate changes in a horse facial expression due to pain. An Android app, the HGS App has been developed in order to facilitate assessment and evaluation of the Horse Grimace Scale.

The HGS App is available on Google Play Store 

How to assess [Individual]

Observe the horse face for 1 min and assess the presence of:

- a. stiff, backward-turned ears
- b. tension above the eye area
- c. orbital tightening
- d. prominent strained chewing muscles
- e. mouth strained and chin pronounced
- f. strained nostrils and flattening of the profile



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How to score

Score each area as described below

a.



Not present



Moderately present



Obviously present

The ears are held stiffly and turned backwards. As a result, the space between the ears may appear wider relative to baseline

b.



Not present



Moderately present



Obviously present

The contraction of the muscles in the area above the eye causes the increased visibility of the underlying bone surfaces. Clearly visible temporal crest bone should be coded as “obviously present”

c.



Not present



Moderately present



Obviously present

The eyelid is partially or completely closed. Any eyelid closure that reduces the eye size by more than half should be coded as “obviously present”

d.



Not present



Moderately present



Obviously present

Straining chewing muscles are clearly visible as an increase in tension above the mouth. If chewing muscles are clearly prominent and recognizable the score should be coded as “obviously present”

e.



Not present



Moderately present



Obviously present

Strained mouth is clearly visible when upper lip is drawn back and lower lip causes a pronounced “chin”

f.



Not present



Moderately present



Obviously present

Nostrils look strained and slightly dilated, the profile of the nose flattens and lips elongate

©HAV

SIGNS OF HOOF NEGLECT

GOOD HEALTH

ABSENCE OF PAIN AND PAIN INDUCED BY
MANAGEMENT PROCEDURES

Description

Neglected hooves are overgrown, rarely trimmed or trimmed incorrectly and can be painful for horses.

How to assess [Individual]

Walk around the horse and examine each hoof.

Check for signs of neglect: severely overgrown hooves, toes backed up, severe hoof cracks.

How to score

Present

One or more hooves show one or more signs of neglect



Absent

None of the hooves shows any sign of neglect



LESIONS AT MOUTH CORNERS

GOOD HEALTH

ABSENCE OF PAIN AND PAIN INDUCED BY MANAGEMENT PROCEDURES

ONLY SECOND LEVEL

Description

Lesions at the corners of the mouth are usually due to improper use of reins or use of an inappropriate mouthpiece.

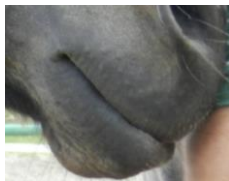
How to assess [Individual]

Make a visual and tactile assessment of the corners of the mouth and determine the presence of hardened spots, redness or open wounds.

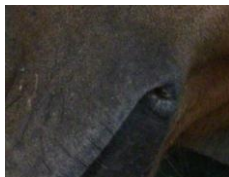


How to score

Register the presence of any lesions at mouth corners



No lesion



Hardened spots



Redness



Open wounds

SOCIAL INTERACTION

APPROPRIATE BEHAVIOUR

EXPRESSION OF SOCIAL BEHAVIOUR

Description

Social interaction is any contact between two or more animals. Horses are social animals, therefore, social behaviour is important to guarantee good welfare. The type of housing system can limit the possibility horses have to freely express normal social behaviour.

How to assess [Resource-based]

Observe the horse in its own box and assess the possibility for social contact (interaction) between horses.

How to score



Possibility to nibble and partly groom (not whole body)



Possibility to sniff other horses (for example through grid)

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Possibility to have visual contact (with horse in opposite box)



No possibility for visual or physical contact

STEREOTYPIES

APPROPRIATE BEHAVIOUR

EXPRESSION OF OTHER BEHAVIOURS

Description

Stereotypies are repetitive, relatively invariant behaviours with no obvious function, which are generally believed to be indicative of an ongoing or previous welfare problem.

How to assess [Individual]

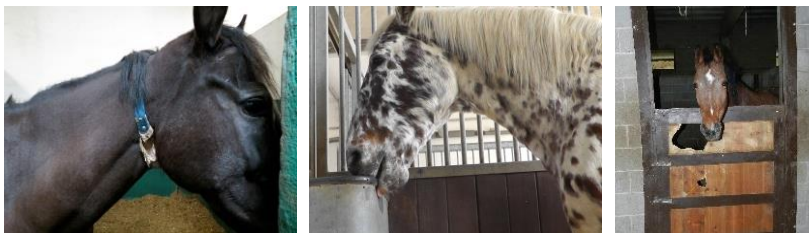
Observe the horse for 1 min without disturbing it. Evaluate if the horse is prevented to perform stereotypies or if the box shows one or more recent sign of undesired behaviour. Evaluate if the horse is performing one or more of the following stereotypic behaviours:

- crib-biting: the horse leans his teeth on a fixed structure (manger, box door, fence, etc), arching the neck by tightening the muscles and making repetitive and noisy swallowing motions to bring air into the cranial oesophagus;
- weaving: the horse repeatedly shifts body weight from side to side. The head and neck generally fluctuate in the same direction and the feet are lifted off the floor as if the horse was walking;
- head nodding: the horse performs oscillating movements of his head, from the top down, generally while looking over the door of the box or another barrier;
- wood chewing: the horse bites and apparently ingests portions of woody material from boxes, fences.

How to score

Evidence of stereotypies

Indirect signs of stereotypies and/or observation of stereotypic behaviour



No evidence of stereotypies

No evidence of indirect signs of stereotypies and/or observation of stereotypic behaviour

FEAR TEST

APPROPRIATE BEHAVIOUR

EXPRESSION OF OTHER BEHAVIOURS

ONLY SECOND LEVEL

Description

Fear tests are experimental situations that have been designed to determine fearfulness in animals.

How to assess [Individual]

Use a green 1.5 l plastic bottle filled up with little stones with a 4 m string attached to it.

- Place the bottle at the box entrance, hang the string over the box door so that the bottle is kept at a height of about 1.5 m.
- When the horse approaches the bottle let go of the string so that the bottle drops emitting a muffled noise.
- If the horse does not approach the bottle in 5 min, then let go of the string.
- Wait until the horse re-approach the bottle. If the horse does not re-approach the bottle, the test is capped at 5 min.



The assessment must be terminated if the horse shows any behaviour that can be dangerous for itself or the people involved.

How to score

Record (in s):

- First latency time: the time the horse takes to approach the bottle after it is placed; If the horse does not approach the bottle in 5 min, the bottle is dropped and >300 is scored for first latency time.
- Second latency time: the time the horse takes to re-approach the bottle after it has dropped; If the horse does not re-approach the bottle in 5 min, the test is capped and >300 is scored for second latency time.

HUMAN-ANIMAL RELATIONSHIP

APPROPRIATE BEHAVIOUR

GOOD HUMAN-ANIMAL RELATIONSHIP

TESTS

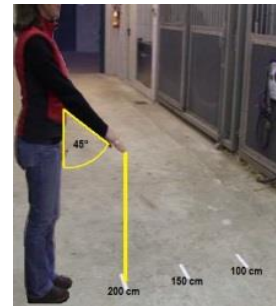
Description

Human-animal relationship tests are behaviour tests aimed to assess the quality of the relationship between horses and humans. A horse perception of humans and the interaction with them has a major impact on horse welfare and human safety.

How to assess - Avoidance Distance (AD) [Individual]

- Starting position

Stand in front of the box door of the horse that is to be assessed. The distance between you and door should be approximately 250 cm. Raise the right arm at 45° from the chest, the back of the hand facing upwards. The tip of the fingers should be at a distance of 200 cm from the door of the horse box.



- Testing phase

The test should start when the horse is attentive (paying attention). If the horse is taking no notice of the presence of the assessor, call it (clicking with the tongue three times). As soon as the horse is looking, start walking calmly and slowly (1 step per s), with the arm in the same position as it was in the starting position.



How to score – Avoidance Distance (AD)

If any avoidance behaviour (e.g. moving away from you, turning the head) is displayed, stop and score the presence of avoidance

Avoidance behaviour



No avoidance



How to assess – Voluntary Animal Approach Test (VAA) [Individual]

Outside the box, turn the body at an angle of 45° from the door in the direction in which it opens. Lean the hand on the door latch in the same way that you would to open it. Wait for the horse to approach and observe its behaviour for 20 s



How to score - Voluntary Animal Approach Test (VAA)

Record any sign of the animal being alert to your presence at any point

Negative signs

Moving away, turning the head, ears flat back, trying to bite



No interest

The horse does not approach



Positive signs

The horse moves towards you and sniffs your hand



How to assess - Forced Human Approach Test (FHA) [Individual]

Open the door and wait 5 s before entering, observing the behaviour of the horse. If the horse is not aggressive (trying to bite or kick, turning back), approach the horse slowly and calmly. Raise your arm and move to the left side of the horse, touching the neck and the back, walk down the side of the animal keeping at a distance of approximately 30 cm, towards its tail.



How to score - Forced Human Approach Test (FHA)

Record any sign of the horse being alert to your presence at any point

Negative signs
The horse shows an aggressive behaviour (e.g. try to bite or kick)



Avoidance
The horse moves away from the assessor as soon as they touches the withers



Positive signs
The horse stays still calmly for the entire duration of the test or shows positive signs of interest (i.e. sniffing or staying in contact with the assessor)



QUALITATIVE BEHAVIOUR ASSESSMENT

APPROPRIATE BEHAVIOUR POSITIVE EMOTIONAL STATE

Description

The Qualitative Behaviour Assessment (QBA) relies on the ability of humans to integrate perceived details of behaviour, posture, and context into descriptions of an animal's style of behaving, or "body language", using descriptors such as "relaxed", "tense", "frustrated" or "content". Such terms have an expressive, emotional connotation, and provide information that is directly relevant to animal welfare and may be a useful addition to information obtained from quantitative indicators (Wemelsfelder 2007 Anim. Welfare, 16, 25-31).

How to assess [Individual]

Initially observe the horse from outside the box, without disturbing it, for 30 s. Then enter the box, approach the horse slowly and perform the manual imitation of the allo-grooming at the withers for 30 s.



How to score

At the end of the whole observation period, find a quiet spot and score the list of descriptors (see below) using the visual analogue scales (VAS). The horse will not be scored during the observation, and only one integrative assessment of the whole observation period will be made.

Each VAS is defined by its left "minimum" and right "maximum" point. "Minimum" means that, at this point, the expressive quality indicated by the term is entirely absent in the whole period of observation. "Maximum" means that, at this point, this expressive quality is dominant during all the observation period. Intermediate scores depend on:

- intensity of a behaviour;
- duration of a behaviour.

The measure for that term is the distance in mm from the minimum point to the point where the VAS is ticked. It is important not to skip any term and to follow the predefined order.

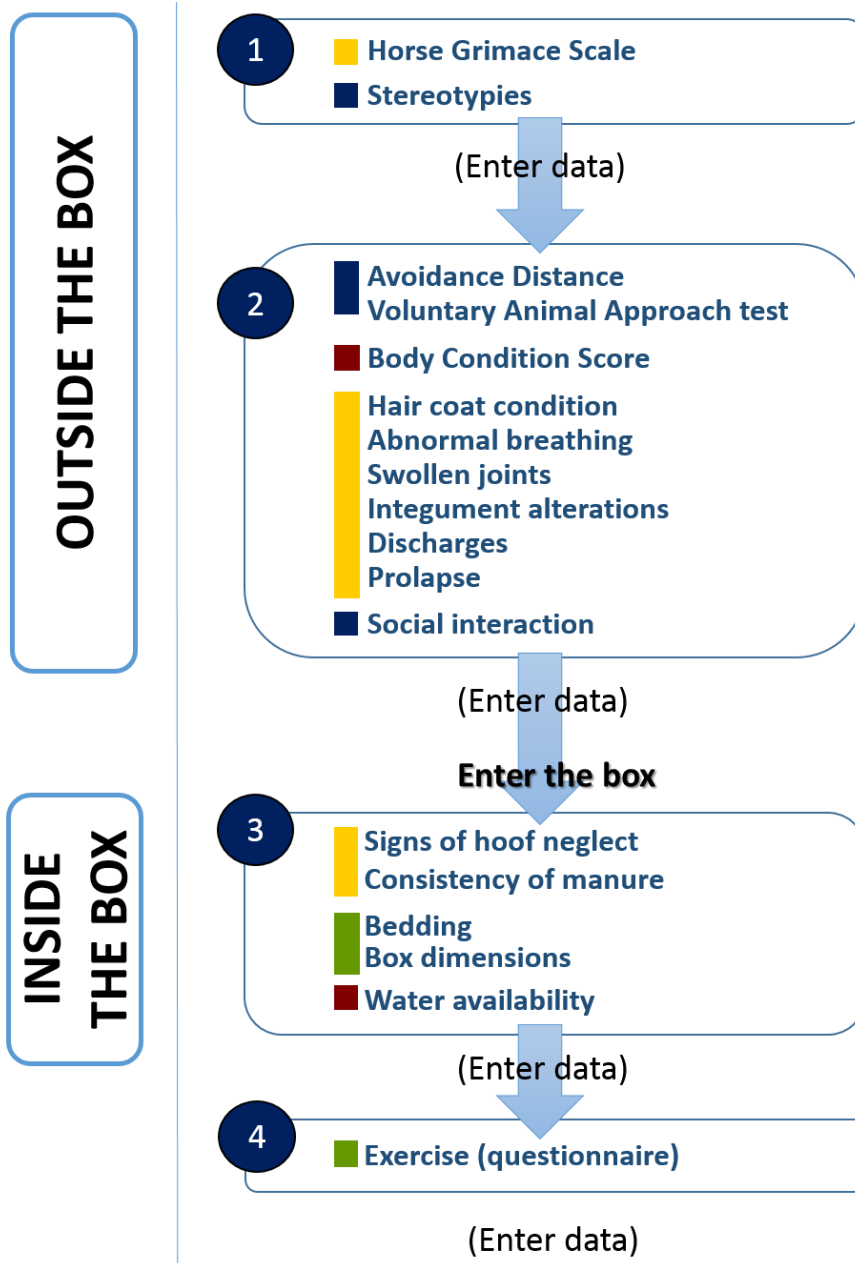
Descriptors

Aggressive	Hostile, attacking, wants to fight/attack, dominance, defensive aggression, (i.e. may display the following: bite/kick, position of ears flat-back against head, dilated nostrils, turns the hindquarters towards object of aggression, intention to harm, tail-swishing)
Alarmed	Worried/tense, apprehensive, jumpy, nervous, watchful, on guard against a possible threat/danger (i.e. rigid stance, startled reaction to loud noise, looking around/vigilant, moving ears)
Annoyed	Irritated, displeased, bothered by something, disturbed, upset, troubled, exasperated (i.e. may display rapid tail-swishing, stomping)
Apathetic	Having or showing little or no emotion; disinterested, indifferent, isolated, depressed, unresponsive, motionless
At ease	Calm, carefree, peaceful
Curious	Inquisitive, desire to investigate (i.e. approach person/object of curiosity, engaged in exploratory behaviour; possibly displaying head and neck extended toward object of curiosity, with ears pricked forward)
Friendly	Affectionate, kind, not hostile, receptive, positive feelings toward people, confident (i.e. the horse approaches the person, may sniff or interact in some way)
Fearful	Afraid, hesitant, timid, not confident, not necessarily linked with something going on in the environment (i.e. you may see the body tremble, flared nostrils, tail clamped)
Happy	Feeling, showing or expressing joy, pleased, lively, playful, satisfied
Look for contact	Actively looking for interaction, interested, close proximity, eager to approach
Relaxed	Not tense or rigid, easy-going, tranquil
Pushy	Assertive or forceful (i.e. not leaving space, head butting out of the way, exhibits dominant behaviour, may be mouthy or nippy)
Uneasy	Afflicted, uncomfortable, unsettled, restless

4.2 Flow of first level welfare assessment

The assessors should first become familiar with the farm where horses are kept. There is a specific order in which the different welfare indicators should be collected and data entered, represented in the graph below.

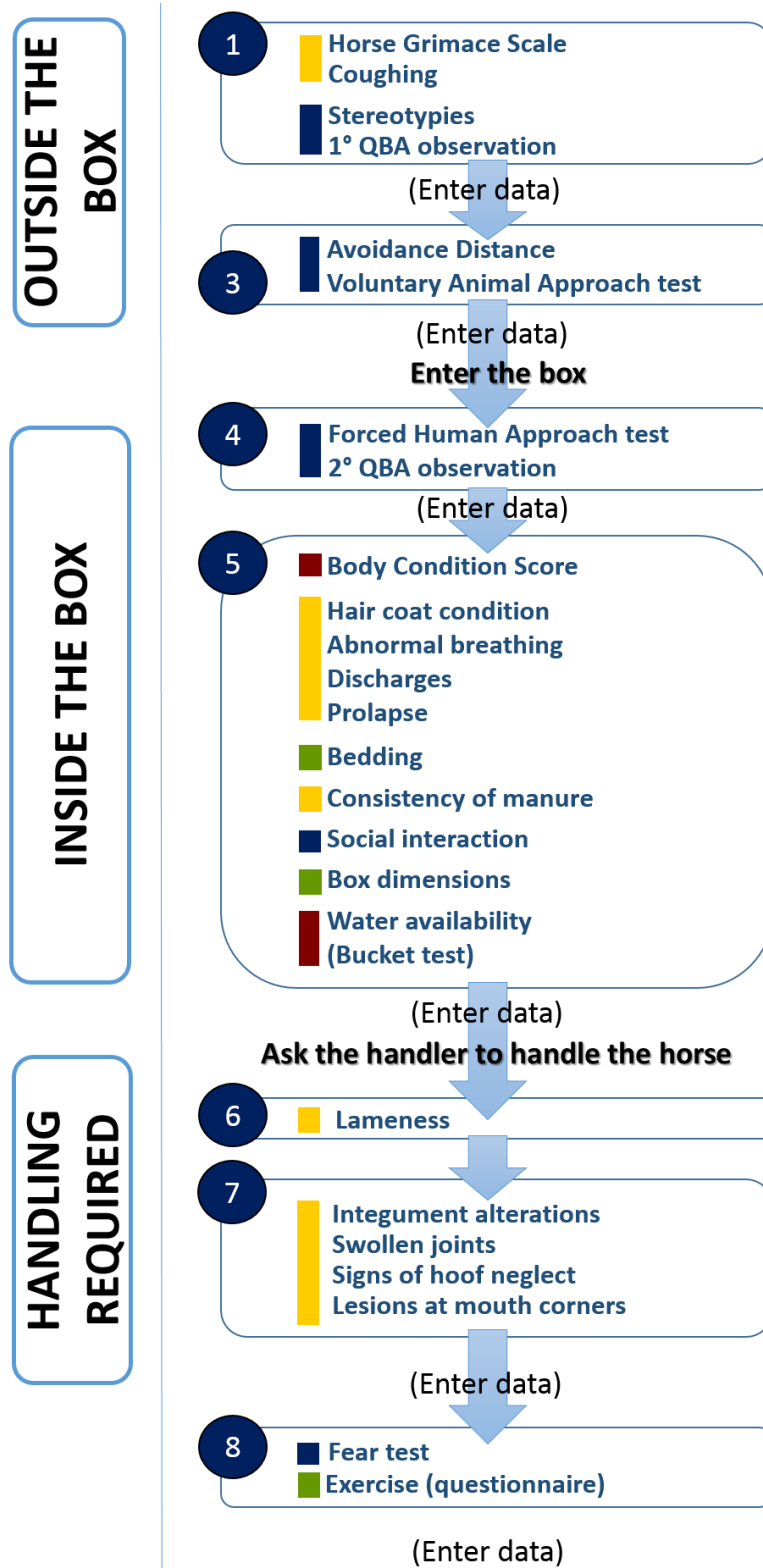
Time needed approximately for assessing a horse is 5 min.



4.3 Flow of second level welfare assessment

Performance of second level welfare assessment is recommended in conditions listed in [Section 5.2](#).

Approximate time needed for assessing a horse varies between 11 to 25 min.



5. OUTCOME OF WELFARE ASSESSMENT

After the assessment, welfare data should be entered into a data set and an objective descriptive output should be generated. The aim of the output is to give a visual feedback about welfare of the animals on the farm, to highlight positive conditions and enable comparison with a reference population. Currently, the reference population displayed in the output refers to data collected during the AWIN project on 50 farms in Germany and Italy.

5.1 Data entry, data aggregation and output of first level welfare assessment

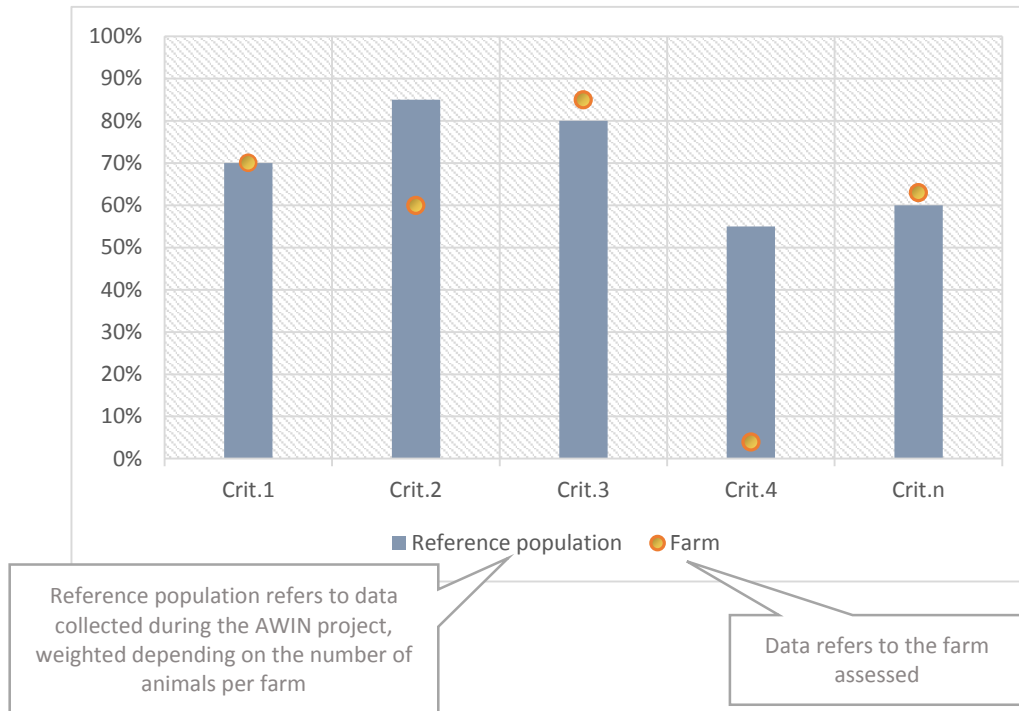
The app for data entry and data aggregation of first level welfare assessment is available on Google Play Store and App Store.



Specifically, welfare indicators of the first level welfare assessment can be aggregated at criterion level reporting the proportions of horses for which the criterion is satisfied, e.g. proportion of animals enjoying appropriate nutrition, good human-animal relationship, etc.

Welfare criteria	How to report data in the output
Appropriate nutrition	Proportion of horses with “BCS = 3”
Absence of prolonged thirst	Proportion of horses with “presence of automatic drinker + functioning + clean” OR “presence of trough + clean”
Comfort around resting	Proportion of horses with “sufficient bedding + clean + satisfactory box dimensions”
Ease of movement	Proportion of horses with “daily exercise > 2”
Absence of physical injuries	Proportion of horses with “no integument alterations + no swollen joints + no prolapse”
Absence of disease	Proportion of horses with “healthy hair coat condition + normal consistency of manure + no discharges (ocular, nasal, vulva/penis) + no abnormal breathing”
Absence of pain and pain induced by management procedures	Proportion of horses with “HGS = all action units scored not present + no signs of hoof neglect + no lesions at mouth corners”
Expression of social behaviour	Proportion of horses with “possibility to see, sniff or nibble other horses”
Expression of other behaviours	Proportion of horses with “no stereotypies”
Good human-animal relationship	Proportion of horses with “AD = no avoidance + VAA = neutral/positive”

In the example reported below, information is aggregated at criterion level, resulting in an assessment of how an individual farm complies with each criterion. The criteria are displayed in the output and the position of the assessed farm is highlighted in comparison with the median value of the reference population. All data used to calculate the proportions are weighted according to the number of horses on the farm.



If there are less than 10 horses on the farm, calculating the proportions of animals is unsuitable, it is preferable to consider how individual animals comply with each criterion.

As horses have a long life expectancy, focus on individuals, besides farms, may be relevant. In this case data could be also considered for each horse, thus enabling to appreciate how much each individual is affected by various welfare problems.

5.2 From first to second level welfare assessment

The second level welfare assessment is recommended:

- o when there is noncompliance with the current legislation;
- o if there is only one horse;
- o when at least one of the following conditions is present:

Welfare criteria	Conditions
Appropriate nutrition	The within-farm proportion of animals meeting the criterion is lower than the proportion of animals observed in the worst 5% of the farms of the reference population
Absence of prolonged thirst	The within-farm proportion of animals meeting the criterion is lower than the proportion of animals observed in the worst 5% of the farms of the reference population
Absence of disease	The within-farm proportion of animals meeting the criterion is lower than the proportion of animals observed in the worst 5% of the farms of the reference population
Absence of pain and pain induced by management procedures	The within-farm proportion of animals meeting the criterion is lower than the proportion of animals observed in the worst 5% of the farms of the reference population

The second level welfare assessment can be run independently any time the assessor deems it appropriate.

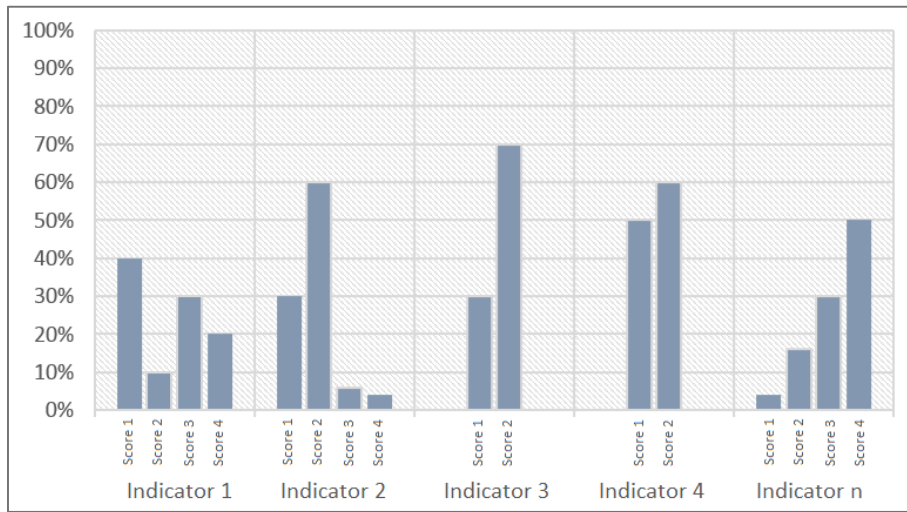
5.3 Output of second level welfare assessment

In the output of second level welfare assessment, the proportion of animals with different scores for each welfare indicator is reported. Second level indicators are expressed as follows:

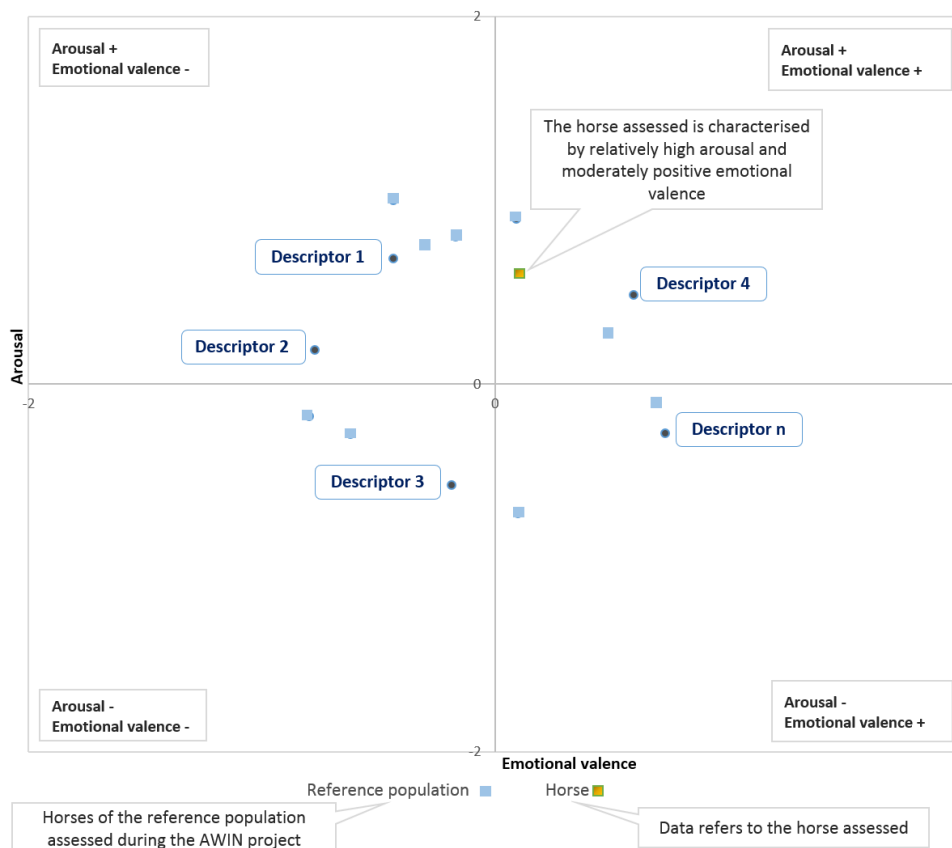
Welfare criteria	How to report data in the output
Appropriate nutrition	Proportion of horses of each score of BCS
Absence of prolonged thirst	Proportion of horses of each score of water availability and bucket test
Comfort around resting	Proportion of horses of each score of bedding and box dimensions
Absence of injuries	Proportion of horses of each score of integument alterations; swollen joints; lameness and prolapse
Absence of disease	Proportion of horses of each score of hair coat condition; consistency of manure; discharges (ocular, nasal, vulva/penis); abnormal breathing and coughing
Absence of pain and pain induced by management procedures	Proportion of horses with each score of HGS, signs of hoof neglect and lesions at mouth corners
Expression of social behaviour	Proportion of horses with each score of social interaction
Expression of other behaviour	Proportion of horses with each score of stereotypies elapsed time in s for the first and second latency of fear test*
Positive emotional state	PCA plot
Good human animal relationship	Proportion of horses with each score of AD, VAA and FHA

**This variable can be treated as time in survival analysis and thus the Kaplan-Meier estimator is used to represent its distribution on each farm.*

In the example reported below, the proportion of animals with different scores for each welfare indicator is displayed.



QBA could be considered as an additional indicator that is a valuable tool when discussing the general demeanour of the horse with the stable manager. In the QBA output, a Principal Component Analysis (PCA) plot is generated. Horse values will be included with those of the reference population and shown in a different colour. An example is given below:



TERMS AND DEFINITIONS

Animal-based indicator

Indicator that is taken directly from the animal

Assessor

Person in charge of collecting data using the welfare assessment protocol developed by AWIN on an individual animal or on a group of animals

Farm

Farm refers to any type of facility housing equines where the assessment may take place

Handler

Person in charge of restraining the donkeys during the individual welfare assessment

Management-based measure

Measure which refers to what the stable manager does on the animal group and what management processes are used

Reference population

The reference population is defined by a geographic area where the assessment occurred and/or a time period when the assessment occurred and/or the type of animals covered by the assessment. Throughout this document, the term “reference population” refers to data collected during the AWIN project on 20 farms in Italy and UK

Resource-based measure

Measure that is taken regarding the environment in which the animals are kept

Stable manager

Person responsible for the planning and daily management of the farm. It should be clarified that stable manager refers also to the owner or the primary carer of the animals

Welfare assessment protocol

A welfare assessment protocol is a description of the procedures and requirements for the overall assessment of welfare

Welfare criterion

A welfare criterion represents a specific area of welfare, which indicates an area of welfare concern (WQ®)

Welfare indicator

An observation, a record or a measurement used to obtain information on animal welfare

Welfare principle

A welfare principle is a collection of criteria associated with one of the following areas: feeding, housing, health and behaviour (WQ®)

Units of measure are abbreviated according to standard International System of Units usage.

APPENDIX A – FIRST LEVEL WELFARE ASSESSMENT RECORDING SHEET

Date: _____ Assessor: _____ Farm: _____ Horse ID: _____

Single horse recording sheet

Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Gelding <input type="checkbox"/> Pregnant female								
Age	_____								
Attitude	<input type="checkbox"/> Gallop <input type="checkbox"/> Trot <input type="checkbox"/> Jump <input type="checkbox"/> Eventing <input type="checkbox"/> Dressage <input type="checkbox"/> Western <input type="checkbox"/> Endurance <input type="checkbox"/> Leisure <input type="checkbox"/> Therapy <input type="checkbox"/> Other								
Horse Grimace Scale	<table border="1"> <thead> <tr> <th>Not present</th> <th>Moderately present</th> <th>Obviously present</th> <th>NA</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	Not present	Moderately present	Obviously present	NA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not present	Moderately present	Obviously present	NA						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
Ears stiffly backwards	<input type="checkbox"/>								
Orbital tightening	<input type="checkbox"/>								
Tension above eye area	<input type="checkbox"/>								
Prominent strained chewing muscles	<input type="checkbox"/>								
Mouth strained and pronounced chin	<input type="checkbox"/>								
Strained nostrils and flattening of the profile	<input type="checkbox"/>								
Stereotypies	<input type="checkbox"/> Evidence of stereotypies <input type="checkbox"/> No evidence of stereotypies <input type="checkbox"/> NA								
Avoidance Distance	<input type="checkbox"/> Avoidance behaviour <input type="checkbox"/> No avoidance <input type="checkbox"/> NA								
Voluntary Animal Approach test	<input type="checkbox"/> Negative signs <input type="checkbox"/> No interest <input type="checkbox"/> Positive signs <input type="checkbox"/> NA								
Body Condition Score	<input type="checkbox"/> Score 1 <input type="checkbox"/> Score 2 <input type="checkbox"/> Score 3 <input type="checkbox"/> Score 4 <input type="checkbox"/> Score 5 <input type="checkbox"/> NA								

Hair coat condition	<input type="checkbox"/> Healthy <input type="checkbox"/> Unhealthy <input type="checkbox"/> NA							
Abnormal breathing	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Swollen joints	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Integument alterations: if you see any alteration tick the correspondent cell								
	Muzzle	Head	Neck	Shoulder	Midsection	Hindquarters	Legs	Hooves
Alopecia								
Skin lesion								
Deep wound								
Swelling								
Nasal discharge	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Ocular discharge	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Discharge from vulva and penis	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Prolapse	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Signs of hoof neglect	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Consistency of manure	<input type="checkbox"/> Normal <input type="checkbox"/> Abnormal <input type="checkbox"/> NA							
Resource-based indicators								
Social interaction	<input type="checkbox"/> Possibility to nibble and partly groom <input type="checkbox"/> Possibility to sniff other horses) <input type="checkbox"/> Possibility to have visual contact <input type="checkbox"/> No possibilities for visual or physical contact							
Box dimensions	<input type="checkbox"/> Not satisfactory <input type="checkbox"/> Satisfactory <input type="checkbox"/> NA							
Bedding - Quantity	<input type="checkbox"/> No bedding <input type="checkbox"/> Insufficient <input type="checkbox"/> Sufficient/rubber mat <input type="checkbox"/> NA							

Bedding - Cleanliness	<input type="checkbox"/> Dirty <input type="checkbox"/> Clean <input type="checkbox"/> NA
Water availability - Type of water point	<input type="checkbox"/> No water point <input type="checkbox"/> Trough <input type="checkbox"/> Automatic drinker <input type="checkbox"/> NA
Water availability - Functioning of automatic drinkers	<input type="checkbox"/> Not functioning <input type="checkbox"/> Functioning <input type="checkbox"/> NA
Water availability - Cleanliness of water points	<input type="checkbox"/> Dirty <input type="checkbox"/> Partially dirty <input type="checkbox"/> Clean <input type="checkbox"/> NA
Management-based indicators	
Exercise	
Frequency of exercise (walking in hand, riding, lunging and hand grazing, not under controlled exercise in a dry lot, arena, pen or pasture)	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly (1-4 times/wk) <input type="checkbox"/> Sometimes (less than 1/wk)
Exercise per day in h	_____

APPENDIX B – SECOND LEVEL WELFARE ASSESSMENT RECORDING SHEET

Date: _____ Assessor: _____ Farm: _____ Horse ID: _____

Single horse recording sheet

Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Gelding <input type="checkbox"/> Pregnant female			
Age	_____			
Attitude	<input type="checkbox"/> Gallop <input type="checkbox"/> Trot <input type="checkbox"/> Jump <input type="checkbox"/> Eventing <input type="checkbox"/> Dressage <input type="checkbox"/> Western <input type="checkbox"/> Endurance <input type="checkbox"/> Leisure <input type="checkbox"/> Therapy <input type="checkbox"/> Other			
Horse Grimace Scale	Not present	Moderately present	Obviously present	NA
Ears stiffly backwards	_____			
Orbital tightening	_____			
Tension above eye area	_____			
Prominent strained chewing muscles	_____			
Mouth strained and pronounced chin	_____			
Strained nostrils and flattening of the profile	_____			
Coughing	<input type="checkbox"/> Coughing <input type="checkbox"/> No Coughing <input type="checkbox"/> NA			
Streotypies	<input type="checkbox"/> Evidence of stereotypies <input type="checkbox"/> No evidence of stereotypies <input type="checkbox"/> NA			
Avoidance Distance:	<input type="checkbox"/> Avoidance behaviour <input type="checkbox"/> No avoidance <input type="checkbox"/> NA			
Voluntary Animal Approach test	<input type="checkbox"/> Negative signs <input type="checkbox"/> No interest <input type="checkbox"/> Positive signs <input type="checkbox"/> NA			
Forced Human Approach test	<input type="checkbox"/> Negative signs <input type="checkbox"/> Avoidance <input type="checkbox"/> Positive signs <input type="checkbox"/> NA			

Qualitative Behaviour Assessment

Aggressive	_____
Alarmed	_____
Annoyed	_____
Apathetic	_____
At ease	_____
Curious	_____
Friendly	_____
Fearful	_____
Happy	_____
Look for contact	_____
Relaxed	_____
Pushy	_____
Uneasy	_____

Body Condition Score	<input type="checkbox"/> Score 1
	<input type="checkbox"/> Score 2
	<input type="checkbox"/> Score 3
	<input type="checkbox"/> Score 4
	<input type="checkbox"/> Score 5
	<input type="checkbox"/> NA

Hair coat condition	<input type="checkbox"/> Healthy
	<input type="checkbox"/> Unhealthy
	<input type="checkbox"/> NA

Abnormal breathing	<input type="checkbox"/> Present
	<input type="checkbox"/> Absent
	<input type="checkbox"/> NA

Nasal discharge	<input type="checkbox"/> Present
	<input type="checkbox"/> Absent
	<input type="checkbox"/> NA

Ocular discharge	<input type="checkbox"/> Present
	<input type="checkbox"/> Absent
	<input type="checkbox"/> NA

Discharge from vulva and penis	<input type="checkbox"/> Present
	<input type="checkbox"/> Absent
	<input type="checkbox"/> NA

Prolapse	<input type="checkbox"/> Present
	<input type="checkbox"/> Absent
	<input type="checkbox"/> NA

Consistency of manure	<input type="checkbox"/> Normal
	<input type="checkbox"/> Abnormal
	<input type="checkbox"/> NA

Lameness	<input type="checkbox"/> Non ambulatory
	<input type="checkbox"/> Lamé
	<input type="checkbox"/> Not lame
	<input type="checkbox"/> NA

Signs of hoof neglect	<input type="checkbox"/> Present
	<input type="checkbox"/> Absent
	<input type="checkbox"/> NA

Swollen joints	<input type="checkbox"/> Present <input type="checkbox"/> Absent <input type="checkbox"/> NA							
Lesion at mouth corners	<input type="checkbox"/> No lesions <input type="checkbox"/> Hardened spots <input type="checkbox"/> Redness <input type="checkbox"/> Open wounds <input type="checkbox"/> NA							
Integument alterations - record the number of alterations in the corresponding cell								
	Muzzle	Head	Neck	Shoulder	Midsection	Hindquarters	Legs	Hooves
Alopecia								
Skin lesion								
Deep wound								
Swelling								
Fear test - First latency	_____ ^s <input type="checkbox"/> NA							
Fear test - Second latency	_____ ^s <input type="checkbox"/> NA							
(Bucket test)	_____ ^l <input type="checkbox"/> NA							
Resource-based indicators								
Social interaction	<input type="checkbox"/> Possibility to nibble and partly groom <input type="checkbox"/> Possibility to sniff other horses <input type="checkbox"/> Possibility to have visual contact <input type="checkbox"/> No possibilities for visual or physical contact							
Box dimensions	<input type="checkbox"/> Not satisfactory <input type="checkbox"/> Satisfactory <input type="checkbox"/> NA							
Bedding - Quantity	<input type="checkbox"/> No bedding <input type="checkbox"/> Insufficient <input type="checkbox"/> Sufficient/rubber mat <input type="checkbox"/> NA							
Bedding - Cleanliness	<input type="checkbox"/> Dirty <input type="checkbox"/> Clean <input type="checkbox"/> NA							
Water availability - Type of water point	<input type="checkbox"/> No water point <input type="checkbox"/> Trough <input type="checkbox"/> Automatic drinker <input type="checkbox"/> NA							
Water availability – Functioning of automatic drinkers	<input type="checkbox"/> Not functioning <input type="checkbox"/> Functioning <input type="checkbox"/> NA							
Water availability - Cleanliness of water points	<input type="checkbox"/> Dirty <input type="checkbox"/> Partially dirty <input type="checkbox"/> Clean <input type="checkbox"/> NA							

Management-based indicators

Exercise

Frequency of exercise (walking in hand, riding, lunging and hand grazing, not under controlled exercise in a dry lot, arena, pen or pasture)

Daily

Weekly (1-4 times/wk)

Sometimes (less than 1/wk)

Exercise per day in h

APPENDIX C – ADAPTATION FOR GROUP HOUSED HORSES

This protocol was developed for singly housed horses that are already used for different activities. When applying the protocol to group housed horses, specific approaches should be adopted for the selection of horses to be assessed and for the assessment flow.

Selecting horses for assessment

In first level welfare assessment, sampling of horses is needed (see Subsection 3.6.1.1).

It is important to be aware that, when horses are kept in groups, there are many possible sources of bias that could affect their sampling on-farm. For instance, the first horses in a group that allow themselves to be approached and assessed are usually the ones that have a better relationship with man or that are more dominant. The likelihood of sampling bias may be affected by specific conditions, e.g. lame animals cannot flee as much as others and aggressive animals tend not to be assessed. In order to avoid sampling bias, the sampling should be randomized as much as possible.

Welfare indicators adapted for group housed horses

Welfare indicators reported in the protocol are considered valid for all horses regardless of their attitude or use. However, when applied to horses kept in groups, few indicators might show limitations in their reliability. Some suggestions for their adaptation to group housed horses are reported hereafter. These suggestions have been accepted in anticipation of further improvements and refinements. Scientific research is needed to refine the protocol for group housed horses. For example, indicators of Expression of social behaviour should be refined and specific indicators of adequate rest and sleep should be developed and validated. The AWIN welfare assessment protocol for group housed horses should be updated in the light of new knowledge.

Welfare principles	Welfare criteria	Welfare indicators	Adaptation to group horses
Good Feeding	Appropriate nutrition	Body Condition Score	Adaptation not needed
	Absence of prolonged thirst	Water availability Bucket test	Adaptation not needed Adaptation not needed
Good Housing	Comfort around resting	Bedding Box dimensions	Adaptation not needed Use <i>Shelter dimensions adapted</i>
	Thermal comfort	-	Use <i>Signs of thermal stress</i>
	Ease of movement	Exercise	Adaptation not needed
Good Health	Absence of injuries	Integument alterations	Adaptation not needed
		Swollen joints	Adaptation not needed
		Lameness	Adaptation not needed
		Prolapse	Adaptation not needed
	Absence of disease	Hair coat condition	Adaptation not needed
		Discharges	Adaptation not needed
		Consistency of manure	<i>Not performed in group horses</i>
Absence of pain and pain induced by management procedures	Abnormal breathing	Adaptation not needed	
	Coughing	Adaptation not needed	
	Horse Grimace Scale	Adaptation not needed	
Appropriate Behaviour	Signs of hoof neglect	Adaptation not needed	
	Lesions at mouth corners	Adaptation not needed	
	Expression of social behaviour	Social interaction	Use <i>Agonistic behaviour</i>
	Expression of other behaviours	Stereotypies Fear test	Adaptation not needed <i>Not performed in group horses</i>
Good human-animal relationship	Human-animal relationship tests	Use <i>Human-animal relationship tests adapted</i>	
Positive emotional state	Qualitative Behaviour Assessment	Use <i>Qualitative Behaviour Assessment adapted</i>	

SIGNS OF THERMAL STRESS

GOOD ENVIRONMENT

THERMAL COMFORT

Description

Both extremes of thermal stress must be considered. Horses should not be exposed to heavy rain, snow, hail or to strong winds other than for very short periods.

How to assess [Individual]

Outside the paddock: observe the horse for 1 min and determine if:

- Heat Stress

The animal displays most (more than three) or all of the following signs: flared nostrils, increased respiratory rate (>24 breaths per min), increased respiratory depth with head movement, apathy, profuse sweating, sunburn (particularly in pale/white animals, on nose or exposed skin)

- Cold Stress

The animal displays most (more than three) or all of the following signs: shallow breathing, decreased respiratory rate (<10 breaths per min), shivering, huddling together, apathy.

How to score

Evaluate the presence of signs of thermal stress

SHELTER DIMENSIONS *adapted*

GOOD ENVIRONMENT

COMFORT AROUND RESTING

Description

Sufficient space should be provided, and to allow all the horses to lie down at the same time should they wish to. Insufficient space increases the competition for personal space with herd mates, which in turn increases stress which can affect the temperament of the horse.

How to assess [Resource-based]

Enter the stabling area and, using a measuring tape, record the height at the withers of the horses. Measure the length of the 2 shelter sides and calculate the area of the shelter (length of the first side x length of the second side).

Compare the area of the shelter with the satisfactory dimensions reported in the table* below:

Height at the withers	<120 cm	120-148 cm	148-162 cm	162-175 cm
Shelter area per horse	5.5 m ²	7 m ²	8 m ²	9 m ²

*Swiss Animal Welfare Ordinance (TSchV) of 23 April 2008 (position as at 1 April 2011)

How to score

Evaluate whether the shelter dimensions are satisfactory.

AGONISTIC BEHAVIOUR

APPROPRIATE BEHAVIOUR

EXPRESSION OF SOCIAL BEHAVIOUR

ONLY SECOND LEVEL

Description

Agonistic behaviour is defined as social behaviour related to fighting and includes aggressive as well as submissive behaviours. Here only aggressive interactions are taken into account (Zeitler-Feicht et al., 2006 Aktuelle Arbeiten zur artgemäßen Tierhaltung, 147-156).

How to assess [Group]

Assess the horses from outside the paddock without disturbing them. Observe the group for 20 min, agonistic behaviours are recorded using continuous behaviour sampling. Binoculars can be used to facilitate observations.

How to score

Count the number of horses present in the paddock. Count the number of each of the following agonistic behaviours* and divide it for the number of horses present in the paddock.

Agonistic approach	Forward movement toward another horse in a straight or curving path. The approach can be at any gait or speed. The head may be elevated and ears forward or the head may be lowered and ears pinned back.
Arched neck threat	Neck tightly flexed with the muzzle drawn toward the chest.
Bite threat	Similar to a bite except that no contact is made. The neck is stretched and ears pinned back as the head swings toward the target horse.
Kick threat	Similar to a kick, but without sufficient extension or force to make contact with the target horse.
Biting	Opening and rapid closing of the jaws with the teeth grasping the flesh of another horse. The head is turned towards the other horse. Ears are pinned back and lips retracted.
Hindquarter kick	One or both hind legs lift off the ground and rapidly extend backwards toward another horse, with apparent intent to make contact. The forelegs support the weight of the body and the neck is often lowered.

*McDonnell 2003 *A practical field guide to horse behavior – The Equid Ethogram*. Eclipse Press, Boston

HUMAN- ANIMAL RELATIONSHIP TESTS adapted

APPROPRIATE BEHAVIOUR

GOOD HUMAN-ANIMAL RELATIONSHIP

How to assess - Avoidance Distance (AD) [Individual]

- Starting Position

Place in front of the horse that should be to assess. The distance between the assessor and the horse should be approximately 3.5 m.

Raise the right arm to 45° from the chest, the back of the hand should be facing up. The tip of the fingers of the hand should be at a distance of 3 m from the horse.

- Testing Phase

Test should start when the horse is attentive (paying attention). If the horse is not taking any notice, call it (clicking with the tongue three times). As soon as the horse is looking at you, start walking calmly and slowly (1 step per s); the arm should be in the starting position (45°). The test ends as soon as the horse shows any avoidance behaviour (e.g. moving away, turning its head away).

How to score – Avoidance Distance (AD)

Follow the same procedure adopted for horses in single boxes

How to assess - Forced Human Approach (FHA) [Individual]

Approach the horse slowly and calmly. Raise your arm and move to the left side of the horse, touching the neck and the back.

How to score - Forced Human Approach (FHA)

Follow the same procedure adopted for horses in single boxes

QUALITATIVE BEHAVIOUR ASSESSMENT *adapted*

APPROPRIATE BEHAVIOUR POSITIVE EMOTIONAL STATE

How to assess [Group]

Perform the assessment at least 30 min after feed distribution. Assess the horses from outside the paddock without disturbing them. Perform the assessment on the whole group and not on individual animals.

Select observation points that enable the observation of the different areas of the farm. The number of observation points depends on the complexity of the housing environment and the group size. Consequently, select the timing of the observations.

The observation session may last from 10 to 20 min, depending on the complexity of the housing environment and the group size, with the time spent at each observation point ranging from 2,5 (8 points) to 10 min (1 or 2 points) according to the following table.

Number of observation points	Duration of observation from each point (min)	Total observation time (min)
1	10	10
2	10	20
3	6.5	19.5
4	5	20
5	4	20
6	3	18
7	2.5	17.5
8	2.5	20

The assessment takes place during activity periods of horses, where different behavioural expression may be exhibited.

How to score

At the end of the observation period, find a quiet spot and score the list of descriptors (see below) using the visual analogue scale (VAS). The group will not be scored during the observation, and only one integrative assessment will be made per farm (integrate the information from each observation point).

Each VAS is defined by its left “minimum” and right “maximum” point. “Minimum” means that, at this point, the expressive quality indicated by the term is entirely absent in the whole group under observation. “Maximum” means that, at this point, this expressive quality is dominant across all observed horses. Intermediate scores depend on:

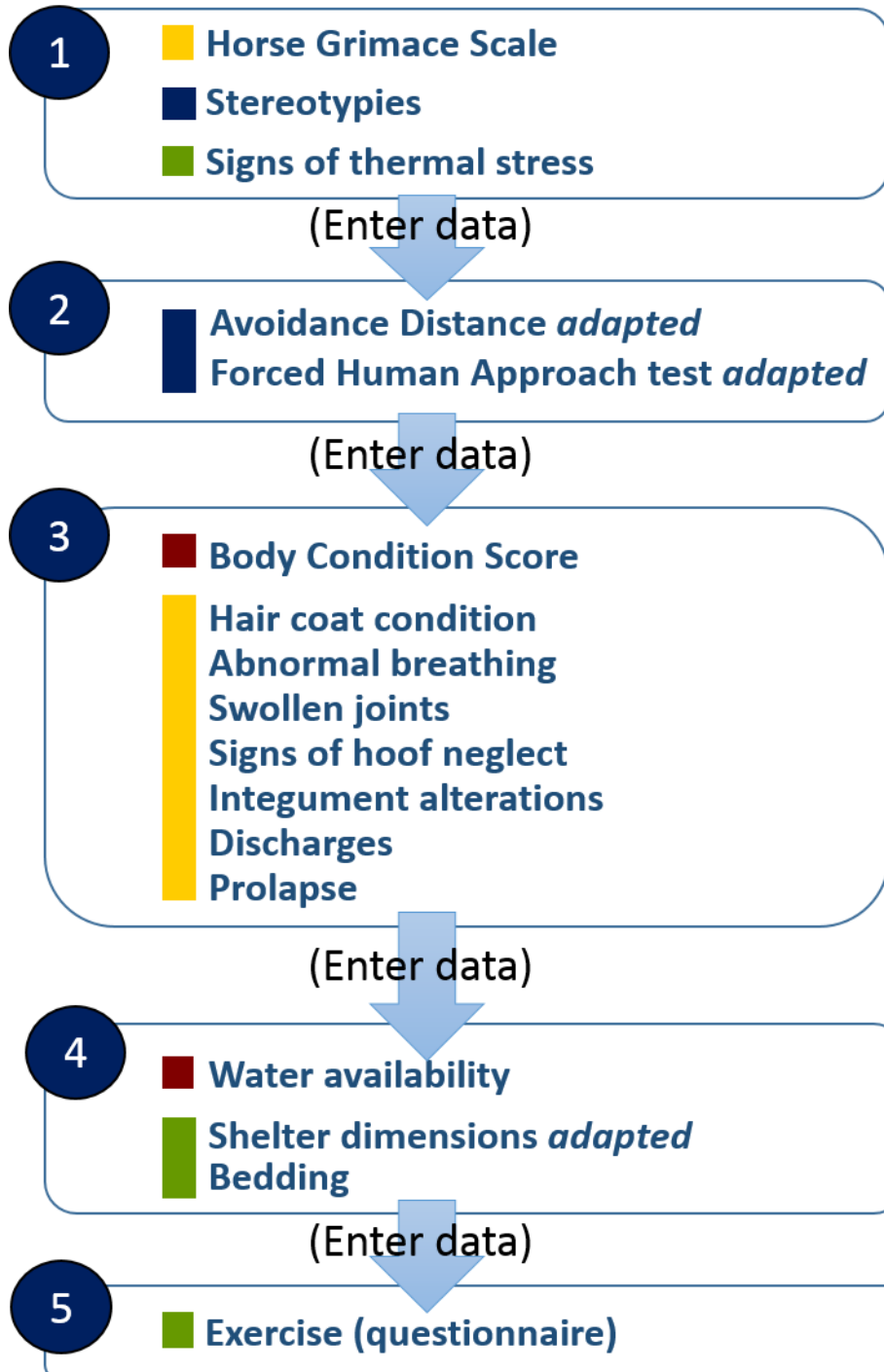
- number of animals involved in an activity
- intensity of a behaviour
- interactions with the rest of the herd

The measure for that term is the distance in mm from the minimum point to the point where the VAS is ticked. It is important not to skip any term and to follow the predefined order.

Descriptors	
At ease	Relaxed, calm with other animals, not anxious, carefree
Aggressive	Hostile, attacking, disruptive, angry, wants to fight/attack another horse, dominance/defensive aggression (e.g. provocation during play or safeguarding) (i.e. Bite/kick/vocalise/chase, position of ears flat-back against head, intention to harm)
Agitated	Highly active, restless, fidgety, excited, worried/upset, disturbed, in a bad mood, annoyed (i.e. Separation from friend; lots of flies; stereotypy; – weaving, fence pacing, head shaking, muscle twitch, tail swishing, ear movements / may be anticipating food or other stimulus)
Anxious	Worried/tense, troubled, apprehensive, distressed, jumpy, nervous, watchful, responsive to a possible threat/danger (i.e. Startled reaction to loud noise, looking around/vigilant, moving ears)
Apathetic	Having or showing little or no emotion; disinterested, indifferent, not responsive to the environment, isolated, depressed, not moving, stoic
Curious	Inquisitive, desire to investigate. (i.e. Approach person/object of curiosity)
Distressed	Much troubled, upset, afflicted, distraught, worried (i.e. High resistance to handling, attempts to escape, defecation, rearing up)
Fearful	Startled, afraid, hesitant, timid, uneasy, not rational, not necessarily linked with something going on in the environment (i.e. Flight response, back up, refuse to move further)
Friendly	Companionable, affectionate, helpful, kind, sociable, on the same side; not hostile, positive feelings toward another animal or person (i.e. The horse approaches another animal/person and expressing grooming behaviour, may sniff or interact in some way)
Happy	Feeling showing or expressing joy, pleased, lively, playful, satisfied
Playful	Very active, wanting to have fun, frisky/frolicsome, mischievous
Pushy	Assertive or forceful (i.e. Displacement of another horse, head butting out of the way)
Relaxed	Not tense or rigid, easy-going, calm, carefree, tranquil
Responsive	Active, acknowledging, receptive, aware of the environment, responding to what is going on in the environment, perhaps vocalizing or showing a flehemen response.
Uncomfortable	Painful, rough, afflicted, irritating (i.e. shooing away flies, trying to remove a too tight head-collar)
Withdrawn	Unsociable, introverted, reclusive, shy, not searching for contact with others, solitary, uncompanionable (“leave me alone!”)

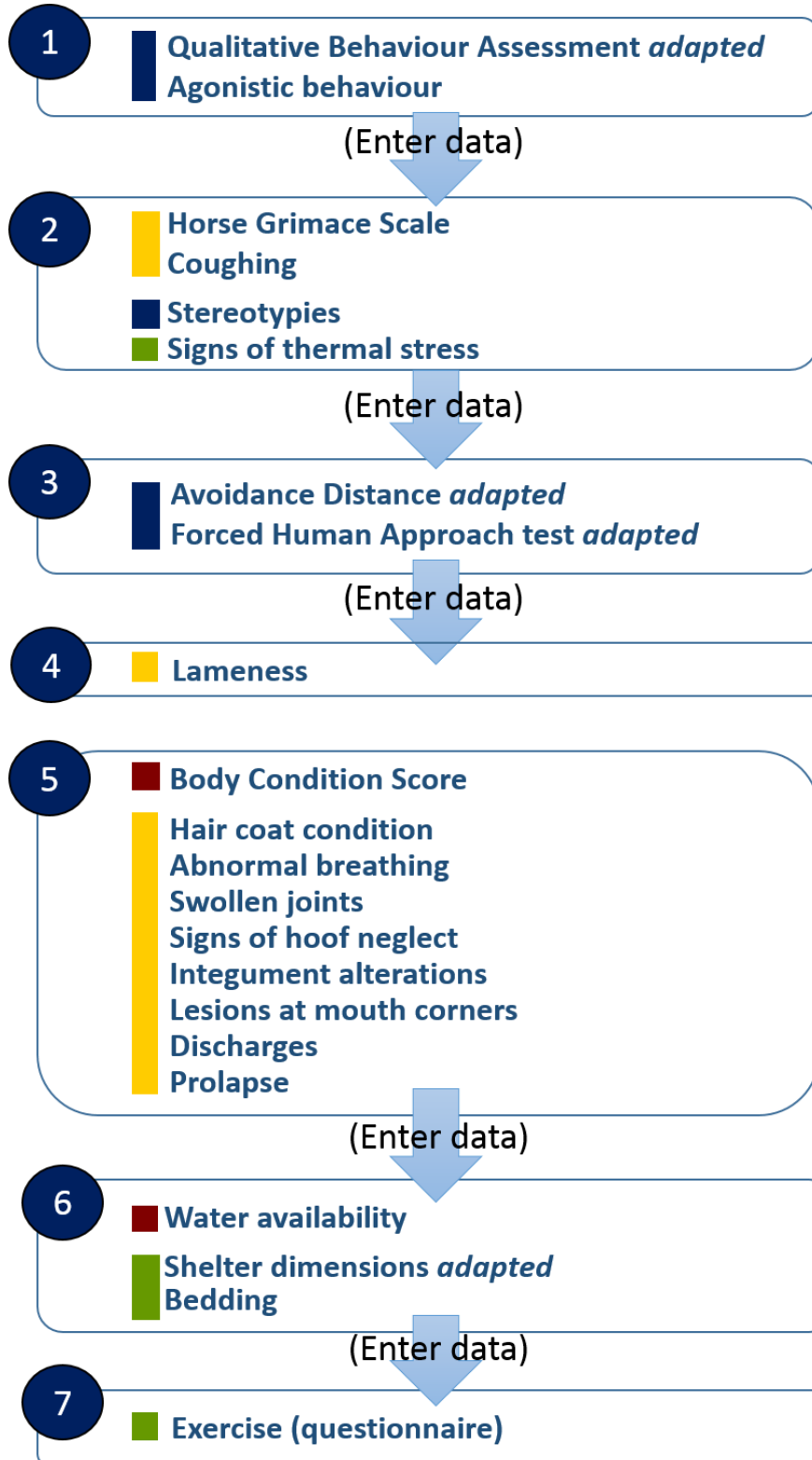
Flow of first level welfare assessment (group)

A suggested adaptation of the specific order in which the different welfare indicators should be collected and data entered in group housed horses is represented in the graph below.



Flow of second level welfare assessment (group)

A suggested adaptation of the specific order in which the different welfare indicators should be collected and data entered in group housed horses is represented in the graph below.



AWIN CONSORTIUM

	AWIN partners	Country
	Scotland's Rural College, Edinburgh	Great Britain
	Norwegian University of Life Sciences, Ås	Norway
 UNIVERSITÀ DEGLI STUDI DI MILANO	Università degli Studi di Milano, Milan	Italy
	Neiker-Tecnalia, Vitoria-Gasteiz	Spain
	Universidade Positivo, Curitiba	Brazil
	University of Cambridge, Cambridge	Great Britain



Universidade de Lisboa,
Lisbon

Portugal



Indiana University,
Bloomington

USA



Institute of Animal Science,
Prague

Czech Republic



Pferdekllinik Havelland, Equine Clinic,
Beetzsee-Brielow

Germany



Universidade de São Paulo,
Pirassununga

Brazil

Colophon

*Photographs and drawings are supplied by
Università degli Studi di Milano, unless
differently stated.*
