

Use of outcome based measures and design based measures.

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Having access to welfare indicators is important in order to identify problems and evaluate the effectiveness of improvement strategies. Welfare indicators are divided into two categories: animal indicators (measurements based on results), and environmental indicators (measurements based on the design). Animal indicators include the appearance and condition of the body, behavior and signs of illness. Also included in this category are indicators that have been derived from records, such as the prevalence and incidence of disease. The size and design of housing and pens, flooring, air quality, the quantity and quality of food, weather conditions and stockmanship are examples of environmental indicators. Although each type of indicator has its advantages and disadvantages, measurements based on results provide direct information about animal welfare. By contrast, the value of measurements based on design is limited by the effect of a given environmental factor on the welfare of animals and depends on the specific characteristics of each animal and interaction with other environmental factors. For this reason, welfare assessment should be based, wherever possible, on animal indicators. Welfare indicators should be valid, reliable and practical, and should cover all aspects included within the concept of animal welfare: absence of diseases and injuries; feeding; physical and thermal comfort; affective or emotional state, and behavior. Welfare Quality® protocols, consisting mainly of valid, reliable and practical animal indicators, represent a particularly useful example of protocols for welfare assessment. These indicators allow assessments to be made of twelve welfare criteria grouped into four principles: food, health, shelter and behavior. The presentation will include various examples of the above-mentioned indicators, and their application with respect to different production systems will be discussed.

Keywords: animal welfare indicators - environmental indicators - livestock assessment - outcome based measures - welfare assessment protocols - welfare quality.
