



CODE OF PRACTICE

FOR THE CARE AND
HANDLING OF

Pullets and Laying Hens

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DRAFT for PUBLIC COMMENT PERIOD

Introduction

Codes of Practice strive to promote acceptable standards of care for animals in such a way that achieves a workable balance between the welfare needs of animals and the capabilities of farmers. Egg production in Canada involves interaction between pullet growers who rear birds starting with day-old chicks until about 19 weeks of age, and egg farmers who care for the hens throughout the laying cycle. Canada's egg industry is committed to prioritizing the health and well-being of all birds entrusted to their care. This commitment forms the basis of the industry's national *Animal Care Program* (ACP), first introduced in 2005 and based on the previous "Recommended Code of Practice for the Care and Handling of Pullets, Layers, and Spent Fowl".

While Codes of Practice for egg layers have been relied on in Canada for more than a decade, this Code, which utilizes NFACC's science- and consensus-based process, establishes firm guidelines to which pullet growers and egg farmers will be held accountable. In addition to advancing welfare requirements in key production areas such as housing environment, health and husbandry practices, transportation, and euthanasia, this Code mandates the phase out of conventional cages, despite the health and injury and food safety related advantages associated with this housing system, so that hens may have more freedom of movement and the ability to perform a variety of natural behaviours.

This move to phase out conventional cages is a substantial undertaking that represents the most significant change ever to egg production in Canada. Since more space per bird, along with furnishings to accommodate hen behaviours are required, existing facilities will not be able to accommodate the same number of hens. As a result, new barns will have to be built in order to produce the same number of eggs. This Code includes a transition strategy that allows for housing conversions to be completed on a staggered, practical, and orderly basis. It is expected that 50% of hens in Canada will be transitioned to alternative housing systems within 8 years.

In addition to the physical and structural housing changes that will have to be undertaken, this Code also considers other elements that are important to bird welfare. Alternative housing systems to which hens will be moved present complex welfare trade-offs that are addressed in this Code. For example, significant changes to pullet rearing environments are necessary to support hen welfare in enriched systems in layer barns. In addition, new management practices in layer barns will have to be learned, and additional labour will likely be required to ensure that hen welfare needs continue to be met.

Perhaps one of the most significant undertakings of this Code involves the inclusion of specifications for the alternative housing systems to which hens will be transitioned. A great deal of thought and consideration was given to the development of this Code to ensure that the welfare needs of hens are met regardless of the housing system utilized. While increasing space and allowing for more natural behaviour, alternative housing may not result in the desired welfare improvements if the housing is not properly constructed, maintained, and managed. This Code contains robust housing and management standards for alternative housing systems that the Code Development Committee believes jurisdictions outside of Canada can also refer to.

Finally, the transition strategy that has been included in this Code represents an approach that balances the Canadian public's desire to phase out existing conventional cages with the industry's ability to do so in an

orderly manner that is practical, feasible, cost-efficient for farmers and consumers, and ensures that the market demand for eggs can continue to be met, while significantly improving the welfare of millions of hens.

This Code is a guideline for the care and handling of pullets and laying hens, and as such plays an important role in the industry's efforts to assess animal care on farms across Canada. This Code does not apply to breeders, hatcheries, egg or meat processing, or transportation beyond the farm gate. All applicable provincial and federal acts and regulations continue to take precedence.

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Glossary

The following terms and definitions refer only to how the terms are used in this document.

Ammonia	A noxious gas common in animal production that forms during breakdown of nitrogenous wastes in animal excrement.
Aviary	Refer to Multi-Tier.
Beak Treatment	A non-invasive procedure that uses specialized equipment (i.e., infra-red) that result in blunting of beaks.
Beak Trimming	Removal of a portion of the beak, usually with a specialized instrument that simultaneously cuts and cauterizes (e.g., hot blade).
Biosecurity	Measures designed to reduce the risk of introduction, establishment, and spread of animal diseases, infections, or infestations to, from, and within an animal population.
Bird	A chicken used in egg production of any age, size or weight.
Brooder	A heated area of the barn to which chicks can go for warmth. See also <i>Dark Brooder</i> .
Cannibalism	A behaviour problem in which a bird pecks and consumes the flesh of another bird.
Carts	Portable wheeled devices which are used to move birds in an upright position from barns to transport vehicles. They can also be referred to as dolly or pullet carts.
Chick	A young bird from the time of hatch up until the point it is fully feathered, which is usually between 14 to 21 days of age.
Coccidiosis	A parasitic disease in which the intestinal tract of the bird is infected by protozoal organisms called coccidia.
Competent	Demonstrated skill and/or knowledge in a particular topic, practice, or procedure that has been developed through training, experience, or mentorship, or a combination thereof.
Container	Portable enclosures, including crates and modules, that are used to transport pullets and end-of-lay hens.
Conventional Cage	A wire mesh enclosure for housing laying hens with equipment for provision of water, automated feeding, and egg collection.
Crate	A portable container designed and constructed specifically for transporting pullets and hens.
Dark Brooder	A warm, dark, enclosed resting area for chicks that is clearly distinct from surrounding well-lit activity areas.

Dark Period	No more than 20% of the light intensity of the light period.
Dust Bathing	A special sequence of behaviour patterns that functions to clean the feathers and improve their insulative value. Depending on the substrate, it may also remove parasites from plumage.
End-of-Lay	Egg laying poultry that have reached a timed point in their egg-laying cycle beyond which productivity significantly declines, and they are removed from production.
Enrichment	Enhancement of a bird's physical or social environment that adds complexity.
Euthanasia	The process of ending the life of an individual bird in a way that minimizes or eliminates pain and distress. It is characterized by rapid, irreversible unconsciousness (insensibility), followed by prompt death.
Feather Pecking	A behaviour problem in domestic birds that involves a bird pecking (or plucking) the feathers from flock mates or herself.
Forage/Foraging	The behaviour patterns involved in searching for and consuming food.
Free Range	A system where laying hens are allowed access to an outdoor pasture or range area.
Enriched Non-Cage Systems	A non-cage system that meets all the applicable requirements for non-cage housing (e.g., furnishings, space allowance) contained in this Code.
Enriched Colony Cage	A wire mesh enclosure outfitted with perches, nest area, scratch area and more head room compared to a conventional cage; group sizes in furnished cages can range from 10 to over 100 hens, depending on the model. Also referred to as "enriched cages" or "furnished cages".
Hen	A female domestic fowl that has reached sexual maturity (i.e., begun to lay eggs).
Insensible/ Insensibility	The point at which an animal no longer has the ability to perceive and respond to its environment (e.g., light).
Litter	Loose substrate, usually straw, wood shavings or a similar material, used to cover floors or for bedding in bird housing. Also includes the combination of bedding and/or bird excreta, feathers, feed, dust and other materials on floors of bird housing systems.
Module	A portable wheeled device that utilizes drawers to transport birds in an upright position from the inside of barns to the final destination (i.e. processing plant). Unlike "carts", modules can be loaded directly onto transport conveyances thus reducing the number of times that birds have to be handled.

Moulting	A natural seasonal event in which birds substantially reduce their feed intake, cease egg production, and replace their plumage. Induced or controlled moulting is a process that simulates natural moulting that extends the productive life of hens. (1)
Multi-Tier:	A non-cage system where nest, perching, food and water resources are located on multiple elevated tiers. Also referred to as aviary systems or aviaries.
Non-Cage Systems	Systems that include free run, aviary, and free range, and don't use cages to house birds.
Non-Penetrating Captive Bolt	A specially designed device used for stunning and euthanasia, that propels a blunt bolt with great force which, when applied in the correct position, causes immediate loss of sensibility.
On-Farm Depopulation	An on-farm practice that involves killing entire flocks or large numbers of birds.
Osteoporosis	A condition involving loss of bone mass leading to bone fragility and risk of fracture.
Perch	An elevated structure, usually in the form of a narrow rod or beam, which birds can use to sit or roost above the floor and/or away from activities of the flock.
Pullet	A young female domestic fowl from the point it is fully feathered and that has not yet reached sexual maturity (i.e., begun to lay eggs).
Ramp(s):	A ladder, or narrow piece of plastic or wire mesh affixed to a tier frame at varying heights, at angles that do not exceed 45 degrees.
Range	The outdoor area to which birds may have access from indoor production systems.
Rearing	The phase during which chicks and pullets are cared for prior to reaching sexual maturity (i.e., begun to lay eggs).
Roost	When a bird rests or sleeps on a perch.
Shackle Carts	Portable wheeled devices that are used to move birds in an inverted position from barns to transport vehicles.
Single Tier	A non-cage system where nests, perches, and feed and water resources are located on only one level. Also referred to as floor housing.
Terrace	A flat plastic or wire floor in non-cage systems that is not located within the main tier structure, or over a manure belt.
Training	The act that aims to impart skills and/or knowledge on a formal or informal basis (e.g., through mentoring) that results in the recipient's understanding and/or ability to perform assigned tasks.

Unfit for Transport	A bird with a reduced capacity to withstand transportation and where there is a high risk that transportation will lead to suffering.
Unfurnished Cages	Refer to <i>Conventional Cages</i> .
Useable Space	Includes the main floor and litter area, plus any elevated floor areas/tiers with at least 45.0 cm (17.7 inches) of clear headroom underneath, but excludes nest areas and any outdoor area, if applicable.

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1. Pullet Housing and Rearing

While this section covers some aspects of pullet rearing, all other sections in this Code, with the exception of Section 2: *Housing Systems for Layers*, apply to all birds, including chicks and pullets.

1.1 Pullet Housing

All housing systems for pullets include both welfare benefits and welfare challenges. In all systems, welfare improvements can be made by paying close attention to the specifics of the housing design, management practices, and choice of strain. (2) It is critical that pullets destined for aviary systems during the lay phase be reared in systems with similar features. This helps to ease the transition to the lay barn, reduces problems associated with fearfulness, and enhances physical development. (2)

Birds kept longer in rearing systems with litter need more litter space as they approach start of lay to support behavioural changes that occur at the start of egg production.

1.1.1 Housing Equipment: Design and Construction

Pullets are typically housed indoors for all phases of production. Housing needs to protect the birds from anticipated environmental conditions, including normally-expected changes in temperature, precipitation, as well as predatory animals. Premises and equipment need to be maintained in clean and orderly fashion to eliminate any refuge for rodents, wild birds, and other animals that could introduce diseases to the flock.

REQUIREMENTS

- Materials used in the construction of housing and equipment to which birds have access must not be harmful or toxic to the birds, and must be able to be thoroughly cleaned and maintained.

RECOMMENDED PRACTICES

- a. When designing barns and equipment, take into consideration how birds will be inspected.

1.1.2 Flooring

Layer pullets may be reared on wire, slats, or litter. Litter is preferred for rearing chicks. Floor coverings provide foot support, offer opportunities for natural behaviours such as scratching, foraging and dust-bathing, and promote optimum intestinal health.

REQUIREMENTS

- Flooring must be designed, constructed, and maintained in a manner that supports the birds' feet and does not contribute to trapping, injuries or deformities to the birds' legs, feet, and/or toes.
- Housing system floors must be designed and maintained to prevent manure from birds in upper levels from dropping on birds in lower levels. Modifications that are necessary to meet this requirement must be completed by January 1, 2018.

RECOMMENDED PRACTICES

- a. Ensure that the smallest gap between wires does not exceed 2.5 cm (1.0 in)
- b. Use appropriate floor covering until birds reach a size suitable for the flooring
- c. Choose a floor covering that promotes foraging and scratching (e.g., newspaper, cardboard, paper plates, fibre egg trays).

1.1.3 Feeders and Waterers

REQUIREMENTS

- Feed space and waterers (e.g., cups, nipple drinkers) must be provided as indicated in Table 1.1.
- All birds must have access to at least 2 water sources (e.g., cups, nipple drinkers).

Table 1.1: Minimum Feed Space^a and Maximum Birds per Waterer

Bird Type/Age	Minimum Feed Space/Bird	Maximum Number of Birds per Waterer	Minimum Water Space/Bird ^a
Chicks: 0 to 2 weeks	1.5 cm (0.6 in)	30	2.5 cm (1.0 in)
Pullets: 2 to 8 weeks	2.5 cm (1.0 in)	20	
Pullets: 8 weeks to Laying Barn	4.0 cm (1.6 in)	10	

^a Perimeter space for round feeders and waterers can be calculated by multiplying linear space by 0.8.

1.1.4 Space Allowance

Space allowance is typically measured and described as a minimum amount of useable area (cm² or sq in) allocated to each bird. Space should be provided based on the age and expected size/weight of the birds when they are transferred to the layer barn. Space allowance needs increase as the birds approach their mature weight. Therefore, space allowances for chicks, young pullets, and older pullets need to be adjusted as the birds grow.

REQUIREMENTS

- Birds must be able to stand up in a normal position .
- For all holdings installed, newly built or rebuilt or brought into use for the first time after January 1, 2017, each chick or pullet kept in pullet cages must be provided with a minimum space allowance as outlined in Table 1.2:
 - Column (b): *Final Space Allowance*
- For systems installed prior to January 1, 2017, where chicks and pullets are kept in pullet cages, each bird must be provided with a minimum space allowance as outlined in Table 1.2:
 - Column (a): *Interim Space Allowance* by January 1, 2020
 - Column (b): *Final Space Allowance* by January 1, 2022
- In *Single Floor Rearing Systems*, each pullet from 8 weeks of age until transfer to the laying barn must be provided with a minimum of 696.8 cm² (108 sq in / 0.75 sq ft) of space.

Table 1.2: Minimum Required Space Allowance per bird for Chicks and Pullets housed in Pullet Cages

Bird Type/Age	Column (a): Interim Space Allowance		Column (b): Final Space Allowance	
	cm ²	sq in	cm ²	sq in
Chicks: to 10-14 days	64.5	10.0	64.5	10.0
Pullets: 2-8 weeks	129.0	20.0	129.0	20.0
Pullets: 8 weeks to Laying Barn	271.0	42.0	283.9	44.0

RECOMMENDED PRACTICES

- Refer to and follow breeder management guides for recommended space allowances for specific strains
- Increase space allowances for pullets when finishing will take place during hot weather periods
- Restrict chicks housed in *Single Floor Rearing Systems* to a small area of the barn that is close to feed, water, and heat during brooding.

1.1.5 Special Considerations for Multi-Tier Rearing Systems

When calculating space allowances in multi-tier rearing systems, the space beneath the first tier is not useable space. Furthermore, birds are restricted from this space to train them to use the system during both the rearing and laying phases. Chicks and pullets that “hide” under the system may not access feed and water as often as they need to, and as a result may become compromised.

Additional space is necessary from 17 weeks of age to prevent smothering that can result as the litter area becomes attractive close to the onset of lay.

REQUIREMENTS

- Tiers must be arranged to prevent droppings from falling directly on tiers below, excluding perches, terraces and ramps/ladders.
- The number of tiers must not exceed 4, where the ground level is considered to be one tier.
- Feed and water must be provided on more than one elevation of the system, and must not be provided on the ground level litter area.

RECOMMENDED PRACTICES

- Provide sufficient space in multi-tier rearing systems to allow birds to roost and rest and so that they learn to come off the floor at night
- Refer to Table 1.3 for guidance on recommended minimum space allowances for chicks and pullets reared in multi-tier systems
- Utilize strategies to encourage birds to use platforms (e.g., locate feed/water on platforms). Restrict access to floor space under the first tier
- Increase litter space for pullets that are approaching maturity (i.e., egg production)
- Move pullets that are reared in multi-tier systems to layer barns when they reach sexual maturity (~17 weeks of age), since the risk of smothering increases after they begin to lay eggs.

Table 1.3: Recommended Minimum Space Allowances for Chicks and Pullets reared in Multi-Tier Rearing Systems

Bird Type/Age	Recommended minimum wire or slat space, including platforms (per bird)		Recommended minimum amount of <u>additional</u> litter space within same system (per bird)
Chicks: 1 to 21 days	64.5 cm ²	10.0 sq in	Provide sawdust, scratch paper, or suitable substrate for foraging
Pullets: 3-8 weeks (with internal platforms and perches)	129.0 cm ²	20.0 sq in	
Pullets: 8 weeks to 17 weeks	283.9 cm ²	44.0 sq in	138.7 cm ² (21.5 sq in) or 33% of the total floor space
Pullets: 17 weeks to Laying Barn	325.8 cm ²	50.5 sq in	

1.1.6 Perches

Birds have to learn to perch. (2) Depending on perch height, chicks begin perching at around 7 to 10 days of age, and the amount of time spent perching steadily increases over time. (2) (3) Pullets are more likely to use perches if they are introduced to them at an early age. (3) Conversely, birds reared without perches have difficulty adapting to non-cage systems during lay. (2)

Access to perches during rearing has been shown to increase nest use and decrease cloacal cannibalism during lay. Hens that were reared with perches have stronger bones. The inclusion of perches during the rearing phase promotes bird activity, can help to develop bone strength, can assist with the birds' ability to adapt when they are transferred to the laying barn, and can assist in reducing the number of floor eggs during the laying phase. (3)

The following requirements apply to any type of pullet housing system where perches are provided, except where specific housing systems are specified.

REQUIREMENTS

- Perches must be provided to chicks reared in *multi-tier* systems from 1 day of age.
- Access to perches that are located at higher levels, as well as elevated terraces must be provided from at least 21 days of age in *multi-tier* rearing systems.
- Perches must be constructed of materials that are easily cleaned and do not harbor mites.
- Perches must be designed to prevent injury to pullets that are mounting or dismounting as well as to any pullets nearby.
- Perches must be positioned to prevent trapping and allow access to feed and water.
- Perches must be positioned to minimize fecal fouling of birds, feeders, or drinkers located below them.

RECOMMENDED PRACTICES

- a. Provide perches to pullets that are destined for non-cage laying systems
- b. Cap hollow ends of perches.

1.2 Receiving and Brooding Chicks

Special care needs to be taken to ensure that newly-arrived chicks settle in well to their new environments. They need to be protected from abrupt changes in temperature and be able to locate feed and water.

Feedback on chick condition, mortality, and performance can help hatcheries evaluate their management and transport protocols.

Evaluation criteria could include:

- **Alertness:** an alert chick has wide-open bright eyes and appears curious
- **Vigour:** a vigorous chick is instantly active when disturbed and shows no signs of weakness or unthriftiness
- **Condition:** a chick in good condition will be firm. The fluff will not be matted, there are no signs of dehydration and the navel is healed. An unhealed navel can become an early access route for bacterial infections. Chicks must be handled in order to be evaluated for condition
- **Body Temperature:** the normal body temperature for chicks is 40.0 – 40.7°C (104.0 – 105.3°F)
- **Behaviour:** Chicks should not show signs of distress (e.g., huddling, open-mouth breathing, excessive vocalization)
- **Normalcy:** A normal chick has no apparent deformity or abnormality. Apparent abnormalities can be twisted toes or beaks, crippled or straddled legs, etc.

REQUIREMENTS

- Facilities must be prepared (i.e., heat, clean, feed, water, bedding) in advance of receiving chicks so that they can be placed promptly after arrival.
- Farm personnel must be present at the time of delivery and placement, and must assess the physical condition of the chicks.
- Steps must be taken to prevent chicks from becoming chilled or overheated during the unloading process.
- All chicks must be kept, treated, and handled in ways that prevent injury and minimize stress.

RECOMMENDED PRACTICES

- a. Handle boxes of chicks gently and in a level position
- b. Inspect chicks immediately upon arrival. Document any problems and provide feedback to the hatchery
- c. Provide supplementary feed and water sources (trays or paper) to ensure that chicks can locate feed easily. Remove supplementary water sources gradually as birds learn to drink from nipples
- d. Ensure that chicks can access water and that it is at the appropriate height and pressure
- e. Check chicks more than twice daily during brooding
- f. Increase the frequency of monitoring if any of the following are observed: huddling or piling, inactivity, high early mortality, or problems with equipment
- g. Prevent chicks from crowding or piling on top of each other in the corners of floor pens
- h. Confirm brooding area temperatures at chick level.

1.3 Lighting

Supplemental heat is essential in maintaining chicks' body temperature during the first few weeks of life when natural brooding is not utilized. However, the use of radiant heat lamps results in constant exposure to light. Continuous light can negatively impact eye development of newly hatched chicks and disrupts rest which affects the synchronization of chicks' activities.

Some chicks continue to rest after arrival from the hatchery, while others seek out food and water. An intermittent lighting program divides the day into resting and activity phases and can assist with synchronising chick activity to stimulate food and water intake through group behaviour. (4) Synchronizing activity has been shown to promote better rest, and can reduce the development of feather pecking by separating active and inactive birds.

In commercial settings, the positive welfare outcomes associated with brooding by hens can be achieved by providing simulated brooding cycles of light and dark periods, and/or by providing dark brooders, which are warm, dark, and enclosed areas that may simulate the effects of a brooding hen. (2) Dark brooders have been found to have long-term preventative effects on feather pecking and cannibalism, and can improve behavioural synchrony between birds, reduce disturbances during resting, and result in calmer birds. (3)

Ideally, the time of day for start of the light period (lights on) during rearing should be matched to the start of the light period in the laying barn. (2) Simulating the gradual oncoming of night (dusk) by gradually lowering lights at night will help pullets in non-cage systems locate a suitable perch for the night, or move up onto tiers while visually capable. (5) In addition, gradually increasing lighting in the morning (e.g., using dawn to dusk lighting) can enhance welfare by allowing birds to gradually wake up and leave perches.

Communication and coordination between pullet growers and egg farmers can help ease the transition to the layer barn. Refer to Section 5.1: *Pullet Sourcing and Transition to Lay* for more information.

REQUIREMENTS

- Chicks must be provided with light intensities of at least 20 lux for at least the first seven days that allow them to easily locate feed and water.
- Chicks and pullets must be exposed to a minimum of 2 consecutive hours of darkness in each 24 hour period.

RECOMMENDED PRACTICES

- a. Simulate brooding cycles for chicks by implementing cycles of light and dark periods, and/or by providing dark brooders. Utilize an intermittent light/dark schedule for chicks (e.g., 2 hours darkness followed by 4 hours light) to simulate a brooding cycle and to synchronize activities.

1.4 Pullet Rearing and Reducing Fear

The early experiences of chicks and pullets affect the welfare of the young bird, and can impact the health, behaviour, fearfulness, and welfare of the laying hen. (2) Fear can impair the ability of birds to adapt to new environments, which can make it difficult for them to utilize new resources or to interact with other birds or people. (2) Moreover, fearfulness in young birds is also associated with feather pecking behaviour.

Consistent management practices during both the rearing and lay phases will help birds adapt to the new barn. (2)

Strategies to reduce fear during rearing include providing complex rearing environments, regular exposure to humans, gentle handling, intermittent lighting strategies or the use of dark brooders. (2) Fearfulness can also be reduced by providing enrichments such as rattles, balls, colourful plastic bottles, strings or drawings on the wall (6) as well as exposing chicks to a radio playing a human voice. (7)

RECOMMENDED PRACTICES

- a. Develop protocols to ensure that stockpersons have frequent and calm interactions with chicks and pullets regardless of what type of housing system is used
- b. Give an audible signal to chicks and pullets before entering the barn (e.g., knock lightly on door)
- c. Provide enrichments to chicks and pullets, which may help to reduce fear (e.g., play music, hang objects).

2. Housing Systems for Layers

All housing systems for hens include both welfare benefits and welfare challenges. In all systems, welfare improvements can be made by paying close attention to the specifics of the housing design, management practices, rearing conditions, and choice of strain. (2)

Hens are motivated to nest, forage, perch, and dust-bathe. (2) Other natural comfort behaviours include movement and activities such as stretching legs and wings. (2) It is important that rearing environments are taken into consideration when transitioning to the layer barn. Refer to Section 5.1: *Pullet Sourcing and Transitioning to Lay* for more information.

2.1 Housing and Equipment: Design and Construction

Laying hens are typically housed indoors for all phases of production. Regardless of which type of housing is utilized, it is important that barns are of sound construction and well maintained. Smooth, hard, and impervious surfaces will enable effective cleaning and disinfection. (8)

Housing needs to protect the birds from anticipated environmental conditions, including normally-expected changes in heat, cold, and precipitation, as well as predatory animals. Premises and equipment need to be secure and maintained in clean and orderly fashion to manage the risk of disease. It is also important to design housing systems in such a manner that permits thorough inspections of birds, access to sick and injured birds, as well as the ability to remove dead birds.

REQUIREMENTS

- Materials used in the construction of housing and equipment to which birds have access must not be harmful or toxic to birds, and must be able to be thoroughly cleaned and maintained.
- Openings and access points must permit placement of pullets and removal of full grown layers of all breeds without injury.

RECOMMENDED PRACTICES

- a. When designing barns and equipment, take into consideration how birds will be inspected
- b. Site barns on well drained land
- c. Use concrete to construct ground-level floors
- d. Design, construct, and maintain buildings to prevent access by predators, wild birds, and to deter rodents
- e. Utilize migration fences to divide large flocks into smaller groups.

2.2 Flooring

There is a variety of flooring types used for layer hens in both cage and non-cage systems. The flooring design and construction, as well as cleanliness can have an impact on hen welfare from both the health and behaviour perspectives. Risks of foot problems are linked to all types of housing systems, but the type and severity can differ between systems.

REQUIREMENTS

- Flooring must be designed, constructed, and maintained in a manner that does not contribute to injuries or deformities to the birds' legs, feet, and/or toes.
- All slatted, wire, or perforated floors must be constructed to support the forward facing claws.
- The slope of the floor must not exceed 8 degrees (14%).
- Housing system floors must be designed and maintained to prevent manure from birds in upper levels from dropping on birds in lower levels.

RECOMMENDED PRACTICES

- a. Ensure that the gaps between slats do not exceed 2.5 cm (~1.0 in).

2.3 Enriched Housing Systems

Furnishings and enrichments provide opportunities for hens to perch, nest, forage, and dust-bathe, all of which are considered natural behaviours that hens are strongly motivated to perform. (2)

Also known as furnished cages, **Enriched Colony Cages** are larger than conventional cages, and can house from 10 to 100 hens in each cage. Enriched Colony Cages provide hens with more space and the resources to engage in a wider range of natural behaviours, while providing the health and hygiene benefits of conventional cages. (2)

Non-Cage systems, also referred to as “alternative” or “cage-free” systems, typically house larger groups of hens than cage systems, and may or may not be combined with access to the outdoors. Pullets and layers raised in non-cage systems generally have greater freedom of movement and have more opportunity to engage in natural behaviours than cage-housed birds. Non-Cage systems need to be carefully managed to limit risks of disease, injuries, and injurious pecking. (9)

Indoor-only systems are referred to as “free run” systems. Indoor systems may consist of a Single-Tier, or multi-level tiers, which can also be referred to as Multi-Tier or aviary systems. Indoor systems protect birds from predators and the outside environment.

2.3.1 Transitioning to Enriched Housing Systems

Unfurnished or **conventional cages**, are enclosures with wire mesh and sloping floors that typically house 4 to 8 hens. These cages provide a controllable environment that protects hens from a range of health and injury problems. However, hens are restricted from engaging in many natural behaviours due to limited space and amenities, (9) and as a result, conventional cages have begun to be phased out in Canada.

The phase-out of conventional cages is a complex undertaking. In order to facilitate a smooth changeover, transitional and final requirements are included in each of the following sub-sections as a way to improve the welfare for all hens regardless of the housing system type that is utilized. This approach recognizes that there may be structural and other challenges that may impede the ability of producers to refurbish existing installations to this Code's final housing standards until such time that barns are completely renovated or rebuilt. As such, the interim or transitional allowances apply to existing installations up until the time that the barn is renovated or replaced, unless otherwise specified.

For more information, refer to **Appendix A: Transitional and Final Housing Requirements for Enriched Colony Cages**; and **Appendix B: Transitional and Final Housing Requirements for Enriched Non-Cage Housing**.

2.3.2 Space Allowance

Space allowance refers to the minimum amount of space that is available on a per-bird basis. Sufficient space allowance provides hens with the opportunity to move around and engage in comfort behaviours (e.g., stretching, preening), as well as provide unrestricted opportunities for nesting, foraging, and dust bathing. (2) When calculating useable space allowances for non-cage systems, interior measurements are used and areas allocated for nests are not included.

Currently, there are no clear conclusions to draw on with respect to flock sizes and stocking densities for non-cage systems. (2) System designs, distribution of hens within a system, and environmental conditions have a greater effect on bird welfare than group size and stocking density. (2) However, as space allowances increase, hens are able to engage in a greater range of behaviour patterns. (2) Floor space requirements vary considerably depending on breed, ambient temperature, and whether any or all of the floor consists of wire or wooden slats. In general, the most space is required in systems with 100% litter floors, and least where the floor is entirely wire or slats.

REQUIREMENTS

Transitional Space Allowance Requirements

Effective January 1, 2017

- For cages with furnishings installed prior to July 1, 2016, each hen must be provided with a minimum space allowance of 580.6 cm² (90.0 sq in).

Effective January 1, 2020

- For Conventional Cages installed prior to July 1, 2016, each bird must be provided with a minimum space allowance of 432.0 cm² (67.0 sq in) for white birds and 484.0 cm² (75.0 sq in) for brown birds.
- For Non-Cage systems installed prior to January 1, 2017 that have at least 50% of the useable space as slats or wires, each hen must be provided with the following minimum useable space allowance (which does not include nest space):
 - 929.0 cm² (144.0 sq in/1.0 sq ft) if a minimum of 15.2 cm (6.0 in) of perch space per hen is provided, **OR**
 - 1,115 cm² (172.8 sq in/1.2 sq ft) if perch space of at least 7.6 cm (3.0 in), but less than 15.2 cm (6.0 in) per hen is provided.

Final Space Allowance Requirements

Effective for all holdings installed, newly built or rebuilt or brought into use for the first time after January 1, 2017

- A minimum height of 45.0 cm (17.7 in) must be provided between the floor and ceiling of each level.
- For Enriched Colony Cages, each hen must be provided with a minimum of 750.0 cm² (116.25 sq in) of total space, including nests, of which 600.0 cm² (93.0 sq in) does not include nest boxes.
- For Non-Cage systems, each hen must be provided with the following minimum useable space allowance (which does not include nest space):
 - **Single-Tier – All litter barns:** 1,900.0 cm² (294.5 sq in/2.05 sq ft);
 - **Single-Tier – Combination of wire, slats, litter:** 929.0 cm² (144.0 sq in/1.0 sq ft)
 - **Multi-Tier – Combination of wire, slats, litter:** 929.0 cm² (144.0 sq in/1.0 sq ft).

Effective January 1, 2017

- A minimum height of 45.0 cm (17.7 in) must be provided between the floor and ceiling of each level.

Effective January 1, 2022

- For Enriched Colony Cages, each hen must be provided with a minimum of 750.0 cm² (116.25 sq in) of total space, including nests, of which 600.0 cm² (93.0 sq in) does not include nest boxes.

2.3.3 Nesting

Nests are typically provided through the use of a curtained area or solid nest boxes. Both single bird nests, and communal nests which allow multiple hens to nest simultaneously, can be provided. Hens prefer smaller nests over larger communal nests. (10)

Mechanized nest boxes, which are used in some housing systems, need to be designed and maintained to protect hens from injury.

REQUIREMENTS

Transitional Nesting Requirements

Effective January 1, 2017

- For cages with furnishings installed prior to July 1, 2016, each hen must be provided with nest space area of a minimum of 53.0 cm² (8.2 sq in).

Final Nesting Requirements

Effective for all holdings installed, newly built or rebuilt or brought into use for the first time after January 1, 2017

- Each hen must be provided with nest space area at a minimum of 83.2 cm² (12.9 sq in) [1.0 m² (10.8 sq ft) for each 120 hens].
- For Non-Cage systems, nest space must not be included when calculating useable space allowance.
- The nest space must be enclosed on at least three sides to provide privacy and shading.
- Where nest curtains are used, they must extend close to the floor (without impeding the flow of eggs).

- The nest area must not contain drinkers, feeders, or perches.
- The space between the nest area and the useable feed trough must be at least 15.2 cm (6.0 in).
- The floor of the nest area must be covered with a surface that promotes nesting and prevents injury.

Effective January 1, 2017

- The nest space must be enclosed on at least three sides to provide privacy and shading.
- Where nest curtains are used, they must extend close to the floor (without impeding the flow of eggs).
- The nest area must not contain drinkers, feeders, or perches.
- The space between the nest area and the useable feed trough must be at least 15.2 cm (6.0 in).
- The floor of the nest area must be covered with a surface that promotes nesting and prevents injury.

Effective January 1, 2020

- For Non-Cage systems installed prior to January 1, 2017:
 - Each hen must be provided with a minimum nest space area of 83.2 cm² (12.9 sq in) [1 m² (10.8 sq ft) for each 120 hens]
 - Nest space must not be included when calculating useable space allowance.

Effective January 1, 2022

- For Enriched Colony Cages, each hen must be provided with a minimum nest space area of 83.2 cm² (12.9 sq in).

RECOMMENDED PRACTICES

- a. Clean nests regularly to prevent the accumulation of manure
- b. Provide a greater number of smaller communal nests rather than a lower number of larger communal nests
- c. Position nest boxes in locations that are easily accessible to hens. For example, they should not be so high that injuries may occur as hens ascend or descend
- d. Incorporate strategies to encourage hens to use the middle nests in rows of continual nests (e.g., create more corners by using partitions or cross-overs, provide extra substrate)
- e. Keep nest litter, when used, clean, dry, friable, and moisture absorbent.

2.3.4 Perching

Perches provide opportunities for increased exercise and roosting off the ground at night, while also increasing vertical space. (2) Perches improve bone strength, but can contribute to fractures and deformed keel bones. (2) The shape, material, and cleanliness of perches can impact foot health.

Cross-wise perches and other perch arrangements that limit hen access reduce the available perch space. (2) When calculating useable perch space, purpose-designed perches can include alighting rails in aviaries, but do not include feeder trough edges.

REQUIREMENTS

Transitional Perching Requirements

Effective January 1, 2017

- For cages with furnishings installed prior to July 1, 2016, each hen must be provided with a minimum linear length of 11.2 cm (4.4 in) of useable, purpose-designed, elevated perch space¹.

Effective January 1, 2020

- For Non-Cage systems installed prior to Jan. 1, 2017, each hen must be provided with a minimum of 7.6 linear cm (3.0 in) of useable, purpose-designed, elevated perch space^{1,2}.

Final Perching Requirements

Effective for all holdings installed, newly built or rebuilt or brought into use for the first time after January 1, 2017

- Each hen must be provided with a minimum linear length of 15.2 cm (6.0 in) of useable, purpose-designed, elevated perch space¹.
- Perches must be positioned to minimize fecal fouling of birds, feeders, or drinkers located below them.
- Perches must be constructed of materials that are easily cleaned and do not harbor mites.
- Perches must be designed to minimize injury to hens that are mounting or dismounting as well as to any hens nearby.
- Perch space must not extend into the nest, dust bathing, or foraging/scratching areas.
- Perches must be at least 1.9 cm (0.75 in) in diameter to allow hens to wrap their toes around the perch and balance evenly on it in a relaxed perching posture.
- For Non-Cage Systems:
 - At least 20% of the perch space must be elevated a minimum of 40.0 cm (15.7 in)
 - Perches must be at least 19.0 cm (7.5 inches) from walls and from the top of the perch to the ceiling or other structures
 - Adjacent perches must be at least 30.0 cm (11.8 in) apart horizontally to allow hens to perch simultaneously.

Effective January 1, 2017

- For cages with furnishings installed prior to January 1, 2017:
 - Perches must be positioned to minimize fecal fouling of birds, feeders, or drinkers located below them
 - Perches must be constructed of materials that are easily cleaned and do not harbor mites
 - Perches must be designed to minimize injury to hens that are mounting or dismounting as well as any hens nearby
 - Perch space must not extend into the nest, dust bathing, or foraging/scratching areas.

¹ When calculating useable perch space, 30.0 cm (11.8 in) must be subtracted from the total linear length for each intersection of crossed perches

² Refer to interim *Space Allowance* (2.3.2) requirement, which mandates a higher space allowance effective January 1, 2020 when linear perch space per hen of less than 15.2 cm (6.0 in) is provided

- Perches must be at least 1.9 cm (0.75 in) in diameter to allow hens to wrap their toes around the perch and balance evenly on it in a relaxed perching posture.

Effective January 1, 2020

- For Non-Cage systems installed prior to January 1, 2017:
 - Perches must be positioned to minimize fecal fouling of birds, feeders, or drinkers located below them
 - Perches must be constructed of materials that are easily cleaned and do not harbor mites
 - Perches must be designed to minimize injury to hens that are mounting or dismounting as well as to any hens nearby
 - Perch space must not extend into the nest, dust bathing, or foraging/scratching areas
 - Perches must be at least 1.9 cm (0.75 in) in diameter to allow hens to wrap their toes around the perch and balance evenly on it in a relaxed perching posture
 - At least 20% of the perch space must be elevated a minimum of 40.0 cm (15.7 in)
 - Perches must be at least 19.0 cm (7.5 inches) from walls and from the top of the perch to the ceiling or other structures
 - Adjacent perches must be at least 30.0 cm (11.8 in) apart horizontally to allow hens to perch simultaneously.

Effective January 1, 2022

- For Enriched Colony Cages, each hen must be provided with a minimum linear length of 15.2 cm (6.0 in) of useable, purpose-designed, elevated perch space³.

RECOMMENDED PRACTICES

- a. Cap hollow ends of perches
- b. Use perches that minimize keel, foot, and nail damage. Avoid sharp edges. Use oval or mushroom shaped perches
- c. Use multiple perches with variable diameters
- d. Locate perches at varying heights that allow birds to roost comfortably without coming into contact with the top of the cage
- e. Limit the angles between perches at different heights to 45° or less
- f. Limit the distance between perches at the same height to 1.0 m (39.4 in) or less
- g. Position perches over slats or manure belts to avoid build-up of manure.

2.3.5 Foraging and Dust Bathing

Foraging is a behavioural need which consists of pecking and scratching on a solid surface that is associated with searching for and ingesting food. (2) Dust bathing is considered to be a behavioural need which is difficult to accommodate in some housing systems. Sprinkling feed intermittently on a pad as a substrate to accommodate both foraging and dust bathing may serve to meet the hens' behavioural needs. Increasing foraging

³ When calculating useable perch space, 30.0 cm (11.8 in) must be subtracted from the total linear length for each intersection of crossed perches

opportunities by providing suitable substrate can reduce the incidence of feather pecking and cannibalism. (7)
Refer to *Section 5.8.1: Feather Pecking and Cannibalism* for more information.

Foraging sites in housing systems where litter is not used can include providing nutritional enrichment such as bales of hay or straw, insoluble grit, or oat hulls, or can be material that provides foraging opportunities.

Covering surfaces that hens scratch with an abrasive material can help to prevent overgrown claws. With appropriate substrate, hens are able to engage in dustbathing. (7)

REQUIREMENTS

Transitional Foraging and Dust Bathing Requirements

Effective January 1, 2017

- For cages with furnishings installed prior to July 1, 2016, hens must be provided with an area with a flooring surface that allows a minimum of 4% of hens use it for foraging simultaneously.
- For Single-Tier systems installed prior to January 1, 2017 that are fully slatted, or where less than 15% of useable space is litter, a solid surface area of at least 1.5 m² (16.0 sq ft) that contains substrate for dust bathing must be provided for each 1,000 hens. Where multiple sites are provided, they must be evenly distributed.

Final Foraging and Dust Bathing Requirements

Effective for all holdings installed, newly built or rebuilt or brought into use for the first time after January 1, 2017

- Hens housed in litter-based systems must be provided with continuous access to litter.
- In Multi-Tier systems, at least 33% of the usable space must be litter, except for a maximum period of 6 weeks after placement, when the litter may be reduced to a minimum of 15% of the useable space.
- For Single-Tier systems:
 - At least 15% of the usable space must be litter
 - Hens must be provided with at least one foraging site for each 1,500 hens (e.g., bales of hay or straw, insoluble grit or oat hulls, or other material that provides foraging opportunities). Where multiple sites are provided, they must be evenly distributed.

Effective January 1, 2017

- Hens housed in litter-based systems must be provided with continuous access to litter.
- In Multi-Tier systems, at least 33% of the usable space must be litter, except for a maximum period of 6 weeks after placement when the litter may be reduced to a minimum of 15% of the useable space.
- For Single-Tier systems, hens must be provided with at least one foraging site for each 1,500 hens (e.g., bales of hay or straw, insoluble grit or oat hulls, or other material that provides foraging opportunities). Where multiple sites are provided, they must be evenly distributed.
- For Single-Tier systems that are re-tooled after January 1, 2017:
 - At least 15% of the usable space must be litter
 - Hens must be provided with at least one foraging site for each 1,500 hens (e.g., bales of hay or straw, insoluble grit or oat hulls, or other material that provides foraging opportunities). Where multiple sites are provided, they must be evenly distributed.

Effective January 1, 2022

- For Enriched Colony Cages, hens must be provided with an area with a flooring surface that will allow a minimum of 5% of hens use it for foraging simultaneously.

RECOMMENDED PRACTICES

- a. Hang or wall-mount additional foraging sites in Multi-Tier systems
- b. Locate the foraging area in such a way that hens can access it from as many sides as possible and allows hens to dust bathe as a group
- c. Utilize smooth surfaces that can be easily cleaned (e.g., mats, pads)
- d. Scatter feed or substrate in the foraging/dust bathing area
- e. Avoid locating foraging/dust bathing areas under areas where birds can perch, or take measures to prevent birds from perching on structures above the foraging/dust bathing area
- f. Provide a ramp between the scratch area and the slats to aid movement between the areas
- g. Provide foraging sites that consist of nutritional enrichment such as bales of hay or straw, insoluble grit, or oat hulls
- h. Inspect foraging material for quality, contaminants, and hazards
- i. Provide a variety of foraging materials
- j. Introduce ingestible foraging material gradually to the flock and provide in combination with insoluble grit.

2.3.6 Final Deadline for Transitioning to Enriched Housing Systems

The transition of Canada's hens from conventional to enriched housing systems is a complex undertaking that requires a nationally coordinated approach with participation and support from industry and all stakeholders. For example, to support hen welfare needs in enriched systems in layer barns, significant changes to pullet rearing housing systems are also necessary. In addition, since egg farmers will have to take hens out of production while new housing systems are being built, there is a need to coordinate housing conversions to ensure that market demand for eggs can continue to be met.

In addition, alternative housing systems to which hens will be moved present complex welfare trade-offs that must be considered from the perspectives of the housing structures, the furnishings, and management. This Code represents the first time in Canada that housing standards for enriched housing systems are clearly defined so that egg producers have both guidance and flexibility in meeting the welfare needs of hens.

The industry commits to a minimum of 85% of hens to be transitioned from existing conventional cage systems to alternative housing systems that meet the requirements of this Code within 15 years, and will aim to transition 100% of hens within the same time frame. It is expected that 50% of birds will be transitioned within 8 years. The transition will be overseen by industry and its stakeholders, and reviewed within 10 years to assess and evaluate the status of the transition.

If any hens remain in conventional cages after 15 years, greater space allowance that represents as much as a 34% increase in space must be provided. Hens removed from these systems will move to enriched housing systems that meet the requirements of this Code.

The transition strategy that the CDC has developed represents an approach that balances the Canadian public's desire to phase out existing conventional cages with the industry's ability to do so in an orderly manner that is practical, feasible, cost-efficient for farmers and consumers, and ensures that the market demand for eggs can continue to be met.

The industry is committed to supporting ongoing and new research into providing birds with greater freedom of movement and more opportunities for engaging in natural behaviour, and to implement practical solutions as they become available. The outcomes of these shared endeavours will inform the next Code revision.

REQUIREMENTS

- All housing systems must support nesting, perching, and foraging (pecking and scratching) behaviour.
- If any hens have not been transitioned from conventional cages by July 1, 2031, each of those hens still kept in conventional cages must be provided with a minimum space allowance in those systems of 580.6 cm² (90.0 sq in) effective July 1, 2031.
- All hens must be housed in enriched housing systems that meet this Code's requirements by July 1, 2036.

2.4 Special Considerations for Multi-Tier Systems

A ramp between the scratch area and the slats aids movement between the areas, and may help to reduce the risk of floor eggs, feather pecking, and bone fractures.

REQUIREMENTS

- Birds must be placed on the system near feed and water sources when moving birds to Multi-Tier systems.
- A minimum height of 45.0 cm (17.7 in) must be provided between all tiers, including the floor level.
- Tiers must be arranged to prevent droppings from falling directly on tiers below, excluding perches, terraces and ramps/ladders.
- The number of tiers must not exceed 4 where the ground level is considered to be one tier.
- Raised tiers must have a system for removal of manure that does not interfere with the birds or cause injury.

RECOMMENDED PRACTICES

- a. Use ramps or ladders with angles that are less than 45° to facilitate movement between levels
- b. Remove litter from the floor level periodically to maintain the minimum height clearance of 45.0 cm (17.7 in)
- c. Utilize one manure belt for each elevated tier.

2.5 Feeders and Waterers

Hens have access to feed at all times so it is not necessary for all birds to feed simultaneously. When calculating the feed space, the age of the birds, their body weight and other factors need to be taken into consideration. The feed trough provides access on one side or two sides, depending on the design of the housing. If growth or egg production rates are lower than expected, it may be because there are too many birds for the available space resulting in birds crowding at the feeders.

REQUIREMENTS

- In Conventional and Enriched Colony Cages, accessible feed space must be provided at a minimum rate of 7.0 cm (2.8 in) per bird⁴.
- In Non-Cage systems, accessible feed space must be provided at a minimum rate of 10.0 cm (3.9 in) per bird⁴.
- All birds must have access to:
 - A minimum of one waterer for every 12 birds, and
 - At least 2 water sources (e.g., nipple drinkers, cups), or a minimum of 1 bell drinker/100 hens, or a minimum of 1.3 linear cm (0.5 in) of water trough space when straight troughs are used.

RECOMMENDED PRACTICES

- a. Provide additional accessible feed space where feeding strategies (e.g., feeders are not run during peak nesting hours) are used that result in more hens feeding simultaneously
- b. Position feeders and waterers in such a way to prevent birds from defecating in them
- c. Use well-designed drinkers, and ensure that they are used and operated in such a way so as to avoid leaks and excessive spillage
- d. Position nipple drinkers and cups a minimum of 15.0 cm (5.9 in) apart from each other on each water line
- e. Add more feed space if over-crowding at the feeders is observed
- f. Set feed trough heights so that birds do not have to perch to feed (i.e., can stand on the floor)

2.6 Access to Outdoors

“Free-range” systems provide access to an outdoor, uncovered area, usually with some vegetation, to which hens have access via doors or pop holes in the wall. Outdoor ranges may also have a covered verandah. Free-range systems provide birds with access to the outdoors when the climate permits. Restricting birds from using the outdoor range may be necessary when birds are at risk for exposure to disease or other threats to health and welfare.

⁴ Perimeter space for round feeders and waterers can be calculated by multiplying linear space by 0.8.

2.6.1 Housing and Range: Design and Construction

REQUIREMENTS

- Birds must have easy and continuous access to a structure that protects them from environmental conditions, and meets the temperature and hygiene needs of the birds.
- Door openings from the barn to the range must be a minimum of 35.0 cm (13.8 in) high and 40.0 cm (15.7 in) wide and must be evenly distributed.
- There must be a means to restrict access to outdoors when bird health or welfare are at risk.
- Perimeter fencing must be provided and maintained to protect birds from ground predators.
- The openings to the range must be designed to minimize the adverse effects of weather to maintain good litter quality (Refer to *Section 3.5: Litter Management*).

RECOMMENDED PRACTICES

- a. Provide one or more shade structures in the outdoor area
- b. Provide openings along the entire length of the barn at a rate of 40.0 cm (15.7 inches) of width per 200 hens to encourage hens to use the range
- c. Install eaves troughs and drainage to control and direct water runoff
- d. Provide an overhang along with concrete, pea gravel, sand or like material just outside the entrances/exits so as to reduce the potential for mud holes. This is particularly important in high rainfall areas
- e. Minimize direct sunlight penetration into the barn through openings by using awnings or overhangs above the openings.

2.6.2 Range Management

There are additional challenges associated with raising birds in free-range systems, including pests, predators, and the risk of disease transmission from other birds and animals, and the difficulty of sanitizing facilities.

REQUIREMENTS

- The range area must be kept free of debris that may shelter pests.
- The outdoor range must be sited and maintained to manage range conditions that can negatively affect bird health or welfare.

RECOMMENDED PRACTICES

- a. Check to make sure that land is free of poisonous plants, dangerous chemicals, and disease-causing organisms that could impair the health of birds
- b. Ensure that the majority of the range area is covered in vegetation
- c. Ensure stocking density of range birds on pasture does not exceed the pasture's ability to maintain vegetation

- d. Rotate range areas if possible to allow vegetation to re-grow between flocks. This may also help to reduce the risk of disease (11)
- e. Provide windbreaks where there is a likelihood of strong winds
- f. Utilize strategies to reduce the risk of predation (e.g., use electric fencing outside enclosures; use fine netting over enclosures; bury portion of fence to prevent ground predators from entering; attach kites to barns and/or feeders to discourage aerial predators).

2.6.3 Feeders and Waterers: Access to Outdoors

Birds housed in free-range systems with access to outdoors should have the same feeding space and diet as birds housed in Non-Cage, indoor systems. However, appropriate measures need to be taken to protect feed from adverse weather conditions to ensure that the nutritional integrity of the feed is not compromised.

REQUIREMENTS

- When feed and water are provided outdoors, it must be in such a way that discourages access by wild birds.

RECOMMENDED PRACTICES

- a. Protect feed from adverse climatic conditions
- b. Prevent access to potentially contaminated water sources
- c. For birds with access to the outdoors, provide feed and water indoors.

3. Environmental Management

Conditions in barns need to be capable of maintaining an environment that reduces the risk of either overheating or chilling of birds and that maintains suitable air quality. The heating and ventilation systems go hand-in-hand. A change in temperature will change ventilation requirements.

3.1 Ventilation and Air Quality

Ventilation provides fresh air and removes stale, contaminated air. It assists in managing temperature, humidity, noxious gases (e.g., ammonia, methane, carbon dioxide, carbon monoxide), dust and other airborne particles, and affects litter quality. Birds can detect ammonia at 5 ppm, and find it aversive at 25 ppm. (6) Exposure to ammonia can impair health, reduce immune function, and contribute to feather pecking. (12) Ammonia problems are more likely to occur in early morning and during the winter, when humidity levels may be higher.

Reliable tools to measure ammonia levels are necessary. Relying solely on smell is not sufficient since individuals' sense of smell can become accustomed to the odour. (13) Carbon dioxide levels could be harmful if they exceed 5,000 ppm. The build-up of noxious gases is more of a risk when combustion-type heat systems are used.

Dust is a potentially harmful air contaminant, particularly in combination with ammonia and other gases. It may directly harm the respiratory tracts of poultry and also act in the transmission of infectious agents. (12)

Water vapour from the respiration of birds, and moisture from heaters produce humidity. (14) Well-constructed buildings with good insulation can help to achieve good air quality and temperature control. Ideal relative humidity range for poultry is between 55 and 65%. (14)

Internal air circulation is also a very important factor in that it helps to distribute fresh air and supplemental heat, as well as to eliminate temperature differentials. (14)

Sudden or extreme variations in barn conditions can be a source of stress to birds, and may contribute to feather pecking. (15)

REQUIREMENTS

- Environmental control systems must be designed, constructed, and maintained in a manner that allows for fresh air and hygienic conditions that promote health and welfare for birds.
- Action must be taken to manage ammonia levels if they reach a harmful level (i.e., 20 ppm).

RECOMMENDED PRACTICES

- a. Monitor humidity in the barn and target to maintain relative humidity levels of less than 70% as a primary step to maintaining good air quality
- b. Remove manure frequently to reduce both humidity and ammonia levels
- c. Monitor and record ammonia levels on a weekly basis. Increase monitoring frequency during cold and/or humid weather

- d. Take steps to control ammonia levels from exceeding 20 ppm. (6), (e.g., remove manure prior to cold weather, increase ventilation, adjust feed composition, apply manure treatments, gradually adjust temperatures to acclimatize birds to lower temperatures)
- e. Utilize internal air circulation to help evenly distribute fresh air and supplemental heat.

3.2 Temperature

Optimal temperature ranges are not the same for all birds or stages of production. Generally, birds can maintain their body temperature after the first few days of age through a variety of behavioural mechanisms, assuming that the ambient temperature is within certain limits. Breeder management guides are valuable resources.

Bird behaviour can be used as a reliable indicator of thermal comfort. Signs that indicate that temperature is too high include:

- Frequent spreading and flapping of wings
- Panting

Conversely, signs that indicate a temperature is too low include:

- Feather ruffling
- Rigid posture
- Trembling
- Huddling or piling on top of each other
- Distress vocalization

Newly hatched chicks have a poor ability to control body temperature and require supplementary heat to bring their environmental temperature up to their comfort range. When operating under conditions of minimum ventilation during chick start-up, there can be a build-up of CO₂ levels.

REQUIREMENTS

- Temperatures inside housing systems must be maintained within a range that contributes to good health and welfare of the birds.
- Birds must be monitored for signs of cold or heat stress. Upon discovering birds showing signs of cold or heat stress, remedial action must be taken immediately.
- Contact surfaces for newly placed chicks must be pre-heated to breed-specific temperatures, and maintained at a level that promotes good chick health and welfare.

RECOMMENDED PRACTICES

- a. Protect birds against cold drafts, cold areas, and extreme heat
- b. Record minimum and maximum inside temperatures daily
- c. Measure the temperature at bird level
- d. Monitor for signs of cold or heat stress, particularly when ambient temperatures are extreme
- e. Utilize temperature alarms that relay alerts if the temperature in barns deviates from set points (high and low)
- f. Utilize override devices that allow operation of ventilation and/or heat systems in the barn in the event of a controller failure

- g. Adjust temperature ranges for hens with significant feather loss to prevent cold stress
- h. Provide supplemental heat in layer barns to maintain optimal air quality and temperature
- i. Maintain temperatures inside housing systems throughout the growth cycle in accordance with breed-specific guidelines.

3.3 Noise

Constant background or ambient noise, such as music, can be helpful with habituating birds to their environments. However, sudden and loud noises (e.g., yelling, slamming doors) can be stressful to birds. Continual high background noise (i.e., 80 decibels) is thought to alter behaviour and can negatively impact egg production in the early laying phase. (16)

RECOMMENDED PRACTICES

- a. Minimize sound levels; avoid constant loud or sudden noise
- b. Ensure that ventilation fans, feeding machinery or other equipment is constructed, placed, operated and maintained in such a way that they are operating properly and cause the least possible noise
- c. Expose birds to background noise (e.g., music, voices on radio). This can be particularly helpful with preventing birds from becoming startled from sudden, unexpected, or planned (e.g., construction) noise.

3.4 Lighting

Vision is an important sense in domestic poultry. (12) Birds rely on visual cues when judging what is safe to eat and drink, as well as for navigation and social behaviour. (17) Controlling light and balancing light intensities in both the pullet and laying barns is an essential tool in managing bird health and welfare.

Light needs to be bright enough to allow birds to see one another and their surroundings, locate feed and water, as well as access perches and nests. Brighter lighting in the scratch area can help reduce the risk of eggs being laid on the floor. Conversely, lowering light intensity to levels below 5 lux can help to reduce feather pecking. (2) But low light can lead to poor eye health and injuries from difficulty judging landings from perches. Sudden increases in brightness can trigger feather pecking when lights are raised for inspections. (2)

Simulating the gradual oncoming of night (dusk) by gradually lowering lights at night will help hens in non-cage systems locate a suitable perch for the night, or move up onto tiers while visually capable. (5)

Birds are less fearful during catching and handling in lighting that is lower than their normal light environment. (5)

The average light intensity can be calculated by measuring intensities in the darkest and lightest areas, as well as one or two mid-points.

REQUIREMENTS

- Light intensity must be at least an average of 5 lux at feeders during the light phase where birds are kept in cages. Light intensity may only be reduced to correct injurious behaviour (e.g., feather pecking).
- Light intensity must be at least an average 10 lux in the hens' environment in non-cage systems during the light phase, so that hens can navigate their surroundings.
- Where hens are housed in non-cage systems under artificial light, the light intensity must be raised gradually or staged over a minimum period of 5 minutes and lowered gradually or staged over a minimum period of 15 minutes to give them sufficient time to roost and come off perches without causing injury.

RECOMMENDED PRACTICES

- a. Introduce and follow a regular lighting schedule that provides a minimum of eight hours of darkness in each 24-hour period, where hens are housed under artificial light
- b. Ensure that light control systems are working well and are well maintained
- c. Temporarily reduce light intensity in order to assist in addressing behavioral problems such as feather pecking or cannibalism
- d. Avoid sudden increases in light intensity, as this may cause flight reactions in some strains
- e. Avoid areas of direct sunlight or intense brightness inside the barn
- f. Coordinate the pullet and layer lighting regimes (e.g., intensity, source, start of light phase time)
- g. Measure and record light intensities on a regular basis using reliable equipment
- h. Utilize poultry-specific light sources that provide a broad spectrum of light wavelength that supports the complex visual systems of the birds.

3.5 Litter Management

Moisture is a key determinant in Litter quality. (12) Litter moisture can be affected by type and management of drinkers, humidity, season, ventilation, consistency and amount of fecal material, and stocking density. (12) Different types of litter have different absorption qualities. (12) Although low litter moisture increases dust levels, litter wetness is considered to be a primary cause of footpad dermatitis, (12) and can increase the risk of coccidiosis and necrotic enteritis.

Litter should be deep enough to insulate birds from direct contact with the floor and to mix with the manure, but not so deep that it encourages egg laying on the floor. The optimum depth depends on the choice of litter material, as well as stocking density and length of time in the barn. Low temperatures in winter lead to low ventilation rates, and the resulting higher humidity levels may lead to wet litter.

REQUIREMENTS

- Litter must be of a good quality, friable, and free from contaminants.
- Litter condition must be monitored and managed to avoid levels of dustiness or dampness that could cause leg, respiratory, or other health problems such as the build-up of parasites, or diseases.
- Used litter must be removed between flocks.

RECOMMENDED PRACTICES

- a. Start with a minimum 1.0 cm (0.4 in) of litter, and gradually build up to a depth of 3.0 cm (1.2 in) or more. Balance depth of litter in such a way so as to minimize dust, absorb moisture to prevent caking, as well as to prevent eggs from being laid on the floor
- b. Evaluate litter condition throughout the barn. Pay special attention to litter around feeders and drinkers, which is often wetter than elsewhere in the barn, and may need corrective action
- c. Ensure that if used, wood shavings are dry and from non-treated wood
- d. Balance moisture levels in litter to avoid excessive dust (too dry) or caking (too wet)
- e. Increase the frequency of ammonia testing where litter is used.

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4. Feed and Water

4.1 Feed and Water Management

Feed and water are important for welfare because they contribute to overall bird health and well-being. Working with a qualified advisor (e.g., poultry nutritionist) can assist with ensuring birds are provided with nutritionally balanced diets. Nutrient composition, quantity and availability of feed that is contaminant-free are all important components of the feed management system, as is access to feeders. Recording feed and water consumption is an important practice since increases or decreases in consumption can be an early indicator of problems.

Aggressive behavior may occur when birds are forced to compete for resources. In normal circumstances, all layers and pullets should have access to feed at all times.

REQUIREMENTS

- Access to feed must be provided at all times and delivered in ways that minimize aggression, poor body condition, and injuries.
- Access to water in sufficient quantities must be provided to all birds at all times in normal circumstances, up until the time of depopulation. Interruptions for the purposes of vaccinations or water system maintenance are acceptable.
- Feed that has become stale, mouldy, or contaminated must not be used, and must be replaced immediately.
- Feeding and watering equipment must be monitored daily, and corrective action promptly taken when necessary.
- A plan must be in place to ensure that adequate supplies of suitable feed and water are available at all times, as well as in the event of on-farm emergencies such as power interruptions, mechanical breakdowns, and/or the need to remove and replace feed.

RECOMMENDED PRACTICES

- a. Aim to limit interruptions to the water supply to less than 4 hours during the light period
- b. Protect the feed supply from contaminants at all times
- c. Source feed and water ingredients from suppliers that test for contaminants and provide quality assurance.

4.2 Nutrition

Nutritional and metabolic disorders that may not be infectious can spread quickly through a flock if not identified and treated. For example, caged layer fatigue (CLF) and fatty liver syndrome (FLS) can occur when there are nutritional imbalances. (18)

Insoluble grit is beneficial for the hens' digestive systems.

The contamination of feed with mycotoxins poses a serious threat to the health and productivity of poultry. (19) Generally, younger animals are more susceptible to the toxic effects of all mycotoxins.

REQUIREMENTS

- All birds must receive feed that meets their daily nutrient requirements to maintain good health, meet physiological demands, and avoid metabolic and nutritional disorders.

RECOMMENDED PRACTICES

- Match feed formulations and particle sizes to the different growth stages of birds, and feeding and housing systems
- Provide insoluble grit at levels and particle sizes appropriate to the birds' ages
- Monitor and record daily feed consumption and investigate to determine the cause if feed consumption declines
- Monitor growth rates regularly by weighing representative samples of birds in each location and age group
- Monitor the effectiveness of the feeding regime using body weight, egg quality and production
- Analyse feed, and mineral composition of water, when bird health indicates a nutrient imbalance or that feed may be contaminated (e.g., mycotoxins). Consult a qualified advisor for guidance.

4.2.1 Nutrition to Manage Bone Health

Bone metabolism in laying hens differs from that of other animals because of the high demand placed on hens for egg production. (2) As a result, laying hens are susceptible to osteoporosis and fractures regardless of the type of housing system used. (2) The risk of osteoporosis increases as hens age. (2)

Adequate inclusion of calcium, vitamin D and phosphorous are important during the rearing period in order to maximize bone strength. (2) Increasing consumption of these nutrients after the onset of osteoporosis has little effect on bone quality in affected hens. (2)

The recommended base calcium content in the pullet diet is around 1%. Both the timing and amount of calcium increases are critical for pullet bone development. Research suggests that between 2 and 3 weeks prior to the anticipated onset of lay is an appropriate timeframe to increase calcium in the ration. (2) However, incorporation of high levels of calcium too early in life can result in detrimental physiological effects, especially kidney stones and gout. Optimal timing is dependent on a combination of the age, body weight and strain. Consulting breed-specific management guides and/or a qualified advisor can offer guidance.

Feeding large particle size calcium (e.g., >2.5 mm) can be beneficial for pullets and hens, since it provides a more constant supply of calcium.

RECOMMENDED PRACTICES

- Consult breed-specific management guides and/or qualified advisors for guidance when formulating feed for pullets and hens
- Increase calcium levels in feed at least 2 weeks before anticipated onset of lay (2)
- Feed a portion of the calcium in the ration as large particle calcium (2)
- Consider calcium and available phosphorous ratios when making feed changes and/or adding supplemental calcium.

4.3 Water

Water is the birds' most important nutrient. As such, it is important that water that is palatable and safe and is supplied continuously to birds of all ages. The age and body weight of birds, along with ambient temperatures will affect water requirements.

Consumption rates can be affected by factors such as air temperature, relative humidity, and production level or phase (20). Water consumption of laying hens will increase in hot weather. Providing cooler water during warm weather by flushing lines will encourage consumption to keep birds hydrated.

The quality of water, which includes temperature, salinity, and impurities affecting taste and odour, will also affect consumption (20). For a variety of reasons, mineral and microbiological content in water can change. Protocols for testing and treating water, as well as checking equipment can be developed and followed to ensure water quality and availability.

Careful observation of birds is necessary to ensure they are drinking adequate amounts of water. A variety of watering appliances are used for poultry of different ages. These include nipples, round water dispensers, trigger cups, and open troughs. Birds need to learn how to operate watering devices. If birds are not familiar with the drinker types in the layer barn, adjustments to the drinkers may be necessary to ensure adequate water consumption.

REQUIREMENTS

- Water must be palatable and not harmful to bird health.
- Water must be tested at least annually for the presence of coliforms and faecal coliforms, and corrective action must be taken if necessary.

RECOMMENDED PRACTICES

- a. Provide watering appliances in numbers such that most birds can drink frequently, especially in warm weather
- b. Keep water cool in warm weather
- c. When testing water, take samples from where birds drink (e.g., drinker at or close to the end of the water line)
- d. Use drinkers that are designed to prevent water spillage
- e. Record water consumption daily
- f. Install a water meter to assist with monitoring consumption rates
- g. Monitor and control water pressure when using automatic watering devices
- h. Flush water lines regularly
- i. Ensure that drinkers are functioning properly, and that water pressure is appropriate immediately prior to placing day-old chicks and moving birds. Check manufacturer recommendations
- j. Ensure that birds are drinking after placement, and that equipment is functioning properly. Adjust water pressure and drinker height as necessary
- k. Use the same type (e.g., nipple, cups) of drinker in both the pullet and layer barns .

5. Health Management and Husbandry Practices

Disease control and good husbandry practices (e.g., in rearing, handling), are integral parts of bird welfare.

5.1 Pullet Sourcing and Transition to Lay

Efforts to match the rearing environment to the adult environment can ease the transition to the layer barn and has the potential to reduce problems such as feather pecking and cannibalism. (2) Providing environmental conditions (e.g., temperature, feeding and watering systems, lighting, perches, litter) during the rearing phase that are similar to those birds will encounter during the laying phase will help them adapt to the new barn. Access to perches and more complex environments (e.g., ramps, ladders, elevated terraces) during rearing is critical for birds destined for non-cage multi-tier systems, because feed and water is provided on elevated tiers. Perching is beneficial for birds destined for all non-cage systems, however, in single tier systems, food and water are provided at ground level. Communication and coordination between pullet growers and egg farmers can help ease the transition to the layer barn.

The move from the rearing facility to the laying barn can be stressful for the birds. A stress-free or low-stress transfer and careful acclimatization of the flock to the new management system is important for bird welfare. (4) Moving pullets in advance of the expected onset of lay helps to ensure that pullets become familiar with their new surroundings before they start laying. (4)

It is important that the birds are quickly able to locate feed and water. Effective ways of encouraging pullets to eat include reducing the barn temperature, running the feeding lines more frequently to attract birds to feeders, and the use of feed supplements to increase feed intake. (4)

REQUIREMENTS

- Hens that will be housed in non-cage multi-tier systems must be sourced from non-cage rearing systems in which pullets had access to perches.

RECOMMENDED PRACTICES

- a. Source pullets from suppliers that utilize similar pullet rearing facilities and practices to those that the birds will experience in the layer barn
 - Avoid sourcing pullets from cage rearing systems if they will be housed in single tier non-cage systems during lay
 - Source pullets from multi-tier rearing systems if hens will be housed in multi-tier housing
 - Source pullets destined for all non-cage laying systems from environments where perches were provided
- b. Aim to transfer pullets from the rearing to the laying facility a few days in advance of the expected start of lay
- c. Source pullets from suppliers that are in close proximity to the laying facility to minimize time in transit
- d. Coordinate the pullet and layer lighting regimes (e.g., intensity, source, start of light phase time)

- e. Coordinate the temperatures between end of the rear phase and beginning of the lay phase so that birds experience consistent temperatures during transition to lay.

5.2 Relationship between Bird Health and Bird Welfare

Pain and discomfort caused by health issues impact an animal's well-being such that good animal welfare requires good animal health.

5.3 Health Management Plan

An effective Health Management Plan contributes to bird well-being by providing a strategy for disease prevention, rapid diagnosis, and effective treatment. Prevention of disease rather than treatment is better for welfare and is more economical for producers. A veterinarian can assist with recommending appropriate vaccinations and other measures to prevent infectious disease, as well as internal and external parasitism.

A Health Management Plan may include:

- vaccination protocols
- protocols for dealing with internal and external parasites
- observation of all animals for injury, signs of disease, and changes in behaviour
- complete, accurate and reliable record keeping, including treatment records
- protocols for the prevention, detection and treatment of disease or injury, including setting targets for measuring incidences of disease and injuries
- protocols for pest control
- protocols for individual bird or group identification and treatment records
- training programs and protocols for handlers
- protocols for introducing new birds to the flock
- protocols for managing sick and injured birds
- Protocols for culling birds, including at the end of production cycles
- a record of deaths that occur on-farm for purposes of tracking mortality rates
- protocols for on-farm biosecurity.

Veterinarians play a key role in helping producers attain animal health objectives. Although the specific regulations vary among provinces, a valid Veterinarian/Client/Patient Relationship (VCPR)¹ must be in place in order for veterinarians to prescribe some classes of medications and vaccines.

Records are an essential aid to management.

¹ A Veterinarian/Client/Patient Relationship exists when all of the following conditions have been met: (35)

- The veterinarian has assumed the responsibility for making clinical judgments regarding the health of the animal(s) and the need for medical treatment, and the client has agreed to follow the veterinarian's instructions
- The veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s) or by medically appropriate and timely visits to the premises where the animal(s) are kept
- The veterinarian is readily available for follow-up evaluation, or has arranged for emergency coverage, in the event of adverse reactions or failure of the treatment regimen.

REQUIREMENTS

- Contact information for a veterinarian who is knowledgeable in poultry medicine must be available on site.

RECOMMENDED PRACTICES

- a. Develop a Health Management Plan in consultation with a poultry veterinarian
- b. Maintain records on disease outbreaks, health problems, abnormal conditions noted and causes if known, and remedial actions taken.

5.4 Skills Related to Flock Management

It is essential that sufficient, well-motivated and competent personnel carry out all necessary tasks, and that personnel are well managed and supervised, fully conversant with their tasks, and competent in the use of equipment. Personnel need to have compassionate, humane, and respectful attitudes, and need to be able to anticipate and avoid many potential welfare problems, and have the ability to identify those that do occur and respond to them promptly.

REQUIREMENTS

- Personnel must be knowledgeable of normal bird behaviour and signs of poor health, distress, and behaviour problems, or must work in conjunction with experienced personnel.

RECOMMENDED PRACTICES

- a. Ensure personnel receive instruction in and are knowledgeable of the basic needs of the birds entrusted to their care
- b. Provide training or verify that competence is demonstrated in specialized tasks (e.g., regular inspections) for all those who are required to perform such tasks
- c. Establish a methodical routine in completing the range of tasks (e.g., checking that systems are operating properly, behaviour) required to ensure the welfare of birds
- d. Develop and implement an Animal Welfare Policy and a Code of Conduct for all on-farm personnel
- e. Ensure that personnel receive instruction in and are knowledgeable in bird handling and moving techniques
- f. Ensure personnel talk and move quietly when working in the barn or with birds, particularly around birds in non-cage housing.

5.5 Disease Prevention and Management

Biosecurity is an important tool to protect against the introduction and spread of diseases. An effective biosecurity program is based on two main concepts: i) Exclusion (keeping disease out of the flock); and ii) Containment (preventing disease spread within premises or to other flocks). (21) Consultation with a poultry veterinarian or a qualified advisor can assist with developing a biosecurity program to suit specific situations and needs.

The egg sector has developed a comprehensive biosecurity standard, which includes detailed sections on disease prevention, and that commercial producers in Canada are required to follow. For non-commercial

operations, refer to **Appendix E: Resources for Further Information** for references on developing a biosecurity program.

It is important to be aware of general clinical signs of disease in birds, so that biosecurity practices may be heightened. (21)

People, including on-farm personnel and visitors may inadvertently carry infectious agents into barns. Designated clothing, hand-washing stations, changing footwear, and other strategies can reduce this risk.

REQUIREMENTS

- A biosecurity protocol must be developed, followed, and reviewed annually.
- All farm personnel must be aware of and understand their responsibilities in adhering to the biosecurity protocol.
- Visitors must not be allowed into the barn without proper supervision or permission, and access to property by visitors must be controlled and recorded.
- Barns must be left empty for a minimum of 7 days between flocks.
- If signs of a disease are recognized or suspected, or if birds are showing signs of altered behaviour, or mortalities are greater than expected, action must be taken without delay to establish the cause, and/or appropriate intervention must be undertaken by a suitably qualified person.
- Mortalities must be recorded daily.

RECOMMENDED PRACTICES

- a. Manage the site with an “all in-all out” approach to facilitate effective cleaning
- b. Clean and disinfect housing facilities to prepare for receiving birds
- c. Practice strict hygiene and disinfection procedures for all individuals who are in contact with the birds
- d. Allow only necessary personnel in poultry buildings. If it is necessary to enter more than one building, personnel should move from the youngest to the oldest birds, and from the healthiest to the least healthy birds
- e. Undertake alterations to housing when no birds are present
- f. Minimize movement of equipment and personnel between buildings, but if it is unavoidable, take precautions to maintain biosecurity
- g. Maintain a list of names and contact information of visitors, along with the day and time of the visit.

5.5.1 Sanitation

Facilities and equipment need to be cleaned and sanitized regularly to prevent the accumulation of organic waste and potentially infectious agents in the birds’ environments.

Effective sanitation measures will help to prevent disease transfer from one flock to the next one. Sanitizers are most effective when used on clean surfaces free of organic material such as straw and manure.

If outdoor ranges are used, they also should be kept clean. It is beneficial to allow range areas to dry thoroughly prior to bird placement (22)

REQUIREMENTS

- Poultry barns must be cleaned and disinfected following each flock.

RECOMMENDED PRACTICES

- a. Clean all feeding, watering, and ventilation equipment between flocks
- b. Develop and follow a water sanitization program to maintain clean water lines while birds are in the barn
- c. Allow outdoor runs to thoroughly dry prior to bird placement
- d. Keep outdoor runs as dry as possible when birds are present; consider alternating runs
- e. Remove loose dust from barns on a regular basis.

5.5.2 Pest Control

Monitoring barns is an important step in preventing and/or controlling rodent populations. (23) Damage caused by rodents takes many forms, including consumption and contamination of feed, along with damage to buildings and insulation. Directly related to health, rodents are carriers of many diseases, which has an impact on biosecurity. (23)

It is important to be able to recognize the signs of rodent infestation. Given the extreme difficulty of eliminating rodents, prevention should be the primary objective. Management programs that eliminate entrances, nesting sites, along with food and water supplies (23) can help to reduce rodent numbers.

Fly control is important in poultry facilities due to possible disease spread, mortality, and food safety concerns.

Refer to **Appendix E: Resources for Further Information**.

REQUIREMENTS

- Measures must be taken to control pests including rodents, small animals, wild birds, insects, and predators.

RECOMMENDED PRACTICES

- a. Learn to recognize signs of rodent infestation
- b. Eliminate or reduce the number of places rodents can use for shelter, (e.g., clutter, garbage, or heavy vegetation around buildings)
- c. Store feed in rodent-proof facilities; keep feed and garbage bins covered; prevent spillage
- d. Minimize the presence of wild birds around layer and pullet facilities as they may be carriers of infectious disease
- e. Keep on-farm storage facilities for items such as bedding and crates dry and inaccessible to wild birds and other pests.

5.6 Inspections

Regular inspections are essential for the early detection and correction of any flock health or management issues. In particular, signs of discomfort or distress, bird condition, alterations in behaviour, and feed and water consumption need to be observed.

REQUIREMENTS

- Flocks must be inspected a minimum of twice daily. Such inspections must include: listening to and looking at the birds, checking for bird health and well-being; checking access to and availability of feed and water; operating condition of equipment; environmental conditions; and disposing mortalities.
- Appropriate methods or devices must be available to allow inspection of all birds.

RECOMMENDED PRACTICES

- a. Provide sufficient lighting (fixed or portable) to allow birds and equipment to be clearly visible during inspections
- b. Remove birds that are observed to be unthrifty or have difficulty accessing feed and water, and house them separately, or euthanize promptly
- c. Release birds that are entrapped and repair or adjust equipment as necessary
- d. Promptly capture and attend to escaped birds
- e. Talk and move quietly when inspecting birds.

5.7 Sick and Injured Birds

Maintaining daily records of egg production, water consumption and where possible, feed intake, is a good management practice that can provide early warnings of declining health.

Flock owners, veterinarians and laboratories are required to immediately report the presence of an animal that is infected or suspected of being infected with a reportable disease to the appropriate federal or provincial authority.

Reportable diseases are listed in the Reportable Disease Regulations under the Health of Animals Act. Refer to **Appendix E: Resources for Further Information**. Producers need to be aware of applicable provincial reportable/notifiable disease requirements, as well.

REQUIREMENTS

- Sick or injured birds must be promptly treated or euthanized (Refer to Section 7: *Euthanasia*).
- Any suspected cases of reportable diseases must be reported to a veterinarian immediately.
- Birds that have been identified as sick or injured must be monitored at least twice daily, or at a frequency appropriate to their conditions. If not showing signs of recovery, birds must be euthanized in accordance with the On-Farm Euthanasia Plan (Refer to Section 7.1: *On-Farm Euthanasia Plans*).
- Medication, vaccines, and supplements must be used only in accordance with the manufacturers' instructions unless veterinary advice has been given to vary from the directions.

RECOMMENDED PRACTICES

- a. Check birds periodically for parasitic infections, particularly in aviary and free-range systems. Treat as necessary
- b. Segregate sick and injured birds with a likelihood of recovery, as well as those that are failing to thrive to a less-competitive environment.

5.8 Harmful Behaviour

Harmful behaviour includes severe feather pecking, vent pecking, and cannibalism, as well as panic and hysteria, which can lead to smothering. It is important to observe flocks to establish what normal behaviour for the flock is, and to utilize management strategies to prevent the outbreak of harmful behaviour.

RECOMMENDED PRACTICES

- a. Quietly and periodically observe flocks for durations of at least 10 to 20 minutes to assess behaviour
- b. Select the most appropriate bird strain and the methods of rearing to suit the type of housing and management practices in use, to prevent or reduce severe behavioural problems
- c. Analyze and adjust feed form and composition if birds display harmful behaviour (e.g., injurious feather pecking, toe pecking, cannibalism). (2) Seek guidance from veterinarians and/or qualified advisors about feed composition as a way of preventing or minimizing feather pecking within the flock.

5.8.1 Feather Pecking and Cannibalism

Outbreaks of feather pecking and/or cannibalism may occur among layers or pullets in any type of housing system, representing a significant welfare and production problem. Gentle feather pecking can escalate to severe levels that can lead to cannibalistic pecking. (15)

Once established, these behaviours are harder to control. (2)

There are multiple risk factors for these behaviours including beak form, lighting, genetics, nutrition, foraging opportunities, and flock size, as well as fearfulness during rearing. (2) The greater the number of protective factors implemented, the lower the risk of feather pecking and cannibalism. (2) Refer to *section 1.4: Pullet Rearing and Reducing Fear* for more information.

REQUIREMENTS

- Corrective action must be taken at the onset of an outbreak of feather pecking or cannibalism.

RECOMMENDED PRACTICES

- a. Examine and make adjustments to environmental factors (e.g., enrichments, foraging, lighting, barn temperature) should an outbreak of feather pecking or cannibalism occur, or an outbreak appear imminent
- b. Use lighting intensities and strategies to help synchronize activities within flocks (e.g., a short dark period in the middle of the day)
- c. Segregate injured birds and birds observed to be instigating pecking as soon as possible.

5.8.1.1 On-Farm Beak Trimming

Beak trimming is an effective method for reducing cannibalism and severe feather pecking. (2)

Typically, beak trimming, if deemed necessary, is performed at hatcheries, where it is recommended that the procedure be done as early in the chicks' lives as possible. For more information, refer to the *Code of Practice for the Care and Handling of Hatching Eggs, Breeders, Chickens, and Turkeys* (www.nfacc.ca).

REQUIREMENTS

- When planned on-farm, beak trimming of the new flock must be performed prior to 10 days of age.
- Beak trimming must not be performed on birds that are older than 10 days of age, unless deemed necessary for emergency welfare reasons after all other measures to control cannibalism have been exhausted. In such cases, beak trimming must be carried out with veterinary consultation and oversight.
- Beak trimming must be performed only by competent persons using industry approved methods that minimize bird discomfort, and equipment that is properly maintained.
- The producer or a competent designated representative must be readily available throughout the beak trimming process.
- Do not remove more than one-third of the top beak, as measured from the tip to the entrance of the nostrils.

RECOMMENDED PRACTICES

- a. Monitor beak condition and provide feedback to pullet growers, hatcheries, or beak trimming crews
- b. Avoid routine trimming on-farm. Ensure that chicks have been beak-trimmed at the hatchery, and where possible, using the infra-red method
- c. Adopt new beak treatment methods that enhance bird well-being
- d. Avoid subjecting birds that have had to be re-trimmed to stressful conditions (e.g., handling, moving, vaccination) for one to two weeks following beak trimming
- e. Add an electrolyte solution containing vitamin K to the water approximately two to three days before and two to three days after beak trimming, to facilitate blood clotting, to alleviate stress, and to reduce dehydration
- f. Monitor feed and water consumption after trimming, until beaks are healed. Feed levels should be raised and water pressure may have to be lowered, or waterers manually triggered for several days following trimming. Follow breeder recommendations for changes in feed to minimize weight loss
- g. Monitor crews responsible for beak trimming for quality control.

5.8.2 Panic, Hysteria, and Smothering

Panic is an occasional but significant problem that can occur in both cage and non-cage housing systems. (24) Triggers that can cause panic in poultry include noise (24), changes in lighting (25), potential predators, and human interventions (24), such as personnel carrying out unfamiliar behaviours (e.g., equipment and/or housing repairs). Hysteria is panic that occurs for no apparent reason.

Smothering is characterized by birds huddling together, to the point where death by suffocation occurs. (25) Panic smothering can occur at any time. Nest box smothering is most common when birds come into lay and is the result of birds crowding into recently used or vacated nest boxes. (25) Creeping or recurring smothering typically involves fewer birds; however, it appears to be more common. Possible triggers include birds coming into lay or to peak lay, post-lay, and seasonal temperature fluctuations. (25)

RECOMMENDED PRACTICES

- a. Talk and move quietly when working in the barn or with birds, particularly around birds in non-cage housing. If it is necessary to move equipment, this should be done as quietly and smoothly as possible
- b. Incorporate a protocol to ensure attendants working with the same groups of birds wear clothing of similar appearance during the whole production cycle. This will help to minimize excitement of the birds
- c. Take measures to prevent birds from crowding or piling on top of each other in corners, particularly when working in the barn or checking birds
- d. Use caution when approaching birds to perform duties that are different from the normal routine
- e. Give the same, easily perceptible signal (such as a distinct number of knocks on the door) before entering a barn with non-cage systems, to prevent the birds from being startled. This practice is particularly important when the light intensity or noise is greater outside the barn than inside
- f. Expose birds to background noise (e.g., music, voices on radio), and talk in a calm voice when around birds. This can be particularly helpful with preventing birds from becoming startled from sudden, unexpected, or planned (e.g., construction) noise
- g. Carry out routine activities consistently and according to a schedule
- h. Monitor nest boxes for signs of over-crowding in non-cage housing systems when flocks are coming into lay.

5.9 Controlled Moulting

Controlled moulting is not routinely practiced in laying flocks in Canada. However, in the event of an emergency (e.g., disease outbreak), controlled moulting may be undertaken on healthy birds with proper supervision. Controlled moulting can be accomplished primarily with lighting programs and diet formulation.

REQUIREMENTS

- Controlled moulting must not be undertaken unless in emergency situations, at which time both nutritionist and veterinarian oversight is necessary.
- When necessary, controlled moulting must be induced using methods that do not involve feed withdrawal, and water must be available at all times.

5.10 Emergency Management and Preparedness

Preparedness encompasses activities, programs, and systems developed prior to a disaster or emergency, that are used to support and enhance prevention, response, and recovery efforts. (26) In the context of animal welfare, advanced planning helps to protect the life, health and welfare of poultry from the impacts of natural, man-made, or accidental emergencies (e.g., power failure, fire, flooding, inclement weather).

REQUIREMENTS

- An emergency plan for reasonably foreseeable problems that may affect bird welfare must be prepared and reviewed with all personnel.
- Emergency contact information must be readily available.
- At least one responsible individual must be available at all times to take necessary steps in the case of an emergency.
- A backup power system, where applicable, must be available to ensure that all electrically dependent mechanical systems necessary for bird health and well-being continue to operate during a power outage.
- All alarms and fail safe devices, including alternate power supply, must be regularly tested.

RECOMMENDED PRACTICES

- a. Keep the Emergency Plan in a location where it can be easily be seen or found
- b. Review the plan annually as well as after an incident or any significant change in farm operations
- c. Review emergency management protocols with personnel annually
- d. Consider emergency management protocols when designing or renovating facilities
- e. Install and maintain fire extinguishers in each building housing birds. Check annually for charge and working order
- f. Ensure an adequate supply of feed and water is on hand in case of predicted extremes in weather (or other events) that might interrupt regular deliveries
- g. Develop a back-up plan to make sure that water is readily available in case of interruptions in the water supply
- h. Install an alarm or monitoring system to alert personnel of failures of critical systems (e.g., ventilation, feed, water, electrical power).

6. Handling and Transportation

This Code focuses on the aspects of the transport processes that take place on-farm and are thus under the control of the producer. Information regarding transportation of poultry beyond the farm gate is covered in the Recommended Code of Practice for the Care and Handling of Farm Animals: Transportation. Refer to **Appendix E: Resources for Further Information**. Additional provisions pertinent to the transportation of hatching eggs and chicks are dealt with in the Hatcheries section of the Code of Practice for the Care and Handling of Hatching Eggs, Breeders, Chickens, and Turkeys.

Catching and transportation of end-of-lay hens are services typically provided by catching crews and transporters. All parties have a responsibility and obligation to ensure catching, transfer and holding on-farm, are undertaken in such a manner that minimizes stress and injury. It is the producer's responsibility to oversee animal care on-farm and to coordinate with catchers, transporters, and processors to help ensure animal care is maintained as birds leave the farm.

The federal requirements for animal transport are covered under the Health of Animals Regulations, Part XII (Transportation of Animals). (27)

6.1 Pre-Transport Planning

Planning is an important component in the transportation process. This includes confirming the actual number of birds to be shipped to assist the catching crews and transporters in ensuring the appropriate number of carts or crates can be loaded with the optimum number of birds in each, taking into consideration factors such as the type of housing birds are to be loaded from, weather conditions, and scheduled delivery times. This includes ensuring that all personnel (e.g., catching, transporting) are competent in their assigned tasks. Decisions made in the planning phase have a significant impact on welfare during transit.

REQUIREMENTS

- The catching and loading processes must be planned in advance to minimize bird handling, the amount of time needed to load birds, and to ensure that the vehicle can leave promptly after loading.
- Pre-transport planning must take into consideration the type of housing system, the number of birds that will be shipped, and the number of containers that will be needed to ensure that maximum loading densities are not exceeded.

RECOMMENDED PRACTICES

- a. Complete paperwork and provide to the transporter prior to loading so that the vehicle can leave immediately after loading
- b. Confirm the actual number of birds to be shipped among producer, catching crew, transporter, and processor before load out commences
- c. Replace crates with carts when replacing equipment, and where practical and possible
- d. Monitor weather conditions to avoid the loading and transporting of birds during extreme heat or cold, or other adverse weather conditions

- e. Ensure that carriers are both competent and experienced with transporting live birds, and that they utilize equipment that is compatible with the farm's loading system.

6.1.1 Feed and Water: Pre-Loading

Feed is typically withdrawn from birds ahead of transport to reduce the risk of contamination of carcasses during slaughter. Withdrawal times are usually determined by the processor. However, total withdrawal times should not be so excessive so as to negatively affect bird welfare (i.e., hunger). Length of time in transport without feed and water is covered under the Health of Animals Regulations (Part XII: Transportation of Animals). (27)

REQUIREMENTS

- Pre-transport feed withdrawal must be managed to minimize the time that birds are off feed.
- Hens must be fed an appropriate layer ration until feed is withdrawn to maintain bone strength (6).
- Water must be available to the birds until catching commences.

RECOMMENDED PRACTICES

- a. Withdraw feed from end of lay hens at least 3 hours, and no more than 6 hours prior to catching, but withdrawal of feed should not exceed 24 hours in total prior to slaughter.

6.2 Fitness for Transport

Pre-selection and removal of birds that are unfit for transport prior to the arrival of vehicles can assist with expediting the catching and loading process, which can improve welfare. A plan that clearly lays out humane and effective procedures for appropriate treatment or euthanasia for birds that are not fit for transport can assist with a consistent approach to bird welfare.

REQUIREMENTS

- In preparation for transport, the flock must be evaluated for fitness and those birds that are deemed unfit for transport must be euthanized, separated, or transported for veterinary assessment or treatment only.
- Birds that are not loaded for transport must continue to be cared for in accordance with relevant sections of this Code (e.g., feed and water, temperature, ventilation, euthanasia).
- Birds that are visibly sick, injured, or wet, or birds otherwise deemed unfit for transport, must not be loaded.

RECOMMENDED PRACTICES

- a. Refer to **Appendix C: Guidelines for Transporting Poultry** to assist with determining fitness for transport
- b. Communicate with the transporter and/or processor about any changes in the flock condition prior to loading.

6.3 Handling and Catching

Birds are prey animals, and as such, their natural response to predator-induced fear is to react defensively (e.g., running, wing flapping, bunching up and/or pecking and striking out at the threat). If one bird becomes startled, surrounding birds will also react. It is important for handlers to move smoothly and quietly around birds.

Hens have weak bones by the end-of-lay. As a result, there is a high risk of bone fractures when hens are handled prior to transport. Care in handling, such as catching end-of-lay hens by both legs rather than one, reduces bone breakage. (6) If layer hens are carried by one leg only, there is a greater chance of birds suffering from fractures and hip dislocations.

Methods that allow birds to remain in an upright position while being removed from cages are utilized by some producers. In addition, the use of wheeled carts in place of crates can significantly improve welfare in that birds do not have to be transferred multiple times. With a well-trained crew, catching birds in an upright position may not take any longer than using traditional methods if wheeled carts or dollies are used.

Low intensity light helps to encourage a calm and resting condition. Night vision goggles have been used so that birds can be caught in the dark without impacting catcher safety. When handled calmly, birds can be herded. Range birds can be loaded more easily by moving them in small groups.

REQUIREMENTS

- Crews must be overseen by the producer or a competent designated representative, who must be readily available throughout the catching and loading process.
- Corrective action must be taken if crews or individuals are observed handling birds in ways that compromise their welfare.
- All on-farm and contracted personnel involved in catching must be competent in handling birds, and must not handle birds in such a manner that causes injury or distress (e.g., catch by legs, not wings).
- Birds must be placed in transport containers gently and in a manner that allows them to rapidly regain an upright position.
- When catching birds, light intensity must be low enough to keep birds calm.
- Easy access to each cage must be provided for catchers.

RECOMMENDED PRACTICES

- a. Use catchers that have been trained in humane catching and handling methods, and that have been certified as such where available
- b. Limit the number of times that birds are transferred between catchers and minimize the need to manually handle birds as much as possible
- c. Place containers as close as possible to the birds prior to catching
- d. Use humane methods when restraining birds
- e. Release birds by setting them down on their breast or their feet
- f. Verify flocks and barn condition with the Catching Supervisor prior to catching
- g. Check for hindrances from fixtures and fittings, especially sharp edges or protrusions, prior to catching birds

- h. Move birds housed in Free Range with Access to Outdoors Systems inside prior to catching
- i. Catch individually and hold in a comfortable upright position with both hands as birds are transferred to the transport container. If not possible, birds should be carried by both legs, and care should be taken to minimize pressure on the legs by appropriately limiting the number of birds carried in each hand
- j. Corral birds with a net or screen at the loading door when loading from floor systems
- k. Use the lowest light level possible that will not compromise worker safety, or use blue lights, which will calm the birds while providing better visibility for catchers
- l. Consider catching in the dark, with catchers utilizing night vision goggles.

6.4 Loading and Unloading

Birds can be moved from barn to barn or farm to farm (e.g., pullets to laying facilities), or can be depopulated at the end of lay for transport to slaughter. Regardless of who provides the equipment (producer; for-hire carrier), it is essential that the equipment used is purpose-designed, well-constructed, and properly maintained.

In Canada, poultry can be transported on flat deck trailers using a loose crate or cart systems. With loose crate systems, crates are removed from the trailer, loaded with birds, and then returned to the trailer. With carts, birds are loaded in an upright position in the barn, and the carts are wheeled directly onto the trailer for transport.

Carts are preferred because they can be brought to the birds, and birds can be loaded directly from the cage to the cart to reduce handling. Commercial producers have started to implement transportation systems that use carts for both pullets and end-of-lay hens. Birds can be kept in carts in the barn until most carts are ready to load on the vehicle which is better for bird welfare in adverse weather. Regardless of what system is used, it is essential that containers are clean and free from protrusions or sharp parts that will injure birds.

The average body weight and actual number of birds to be shipped is provided to the transporter. The number of birds per container will depend on the available container floor space, body weight of the birds, and prevailing environmental conditions at the time of loading. Loading densities are included in the Health of Animals Regulations (Part XII: Transportation of Animals). (27)

Being in an inverted position (upside down) for any length of time is stressful for birds and causes discomfort. (34) The industry acknowledges that the use of shackle carts for removing end of lay hens from barns is not ideal. Responsibility is shared between producers, transporters, and processors to find better ways of removing birds from barns that are destined for processing. The industry is committed to phasing out the use of shackle carts on-farm within 5 years from the date of this Code's publication by developing viable solutions that improve the welfare of hens when loading on-farm.

REQUIREMENTS

- The design, construction, space, state of repair, and use of containers and equipment must allow the birds to be loaded, conveyed, and unloaded in ways that minimize stress and/or injury.
- Containers with birds must be handled, moved, securely positioned on vehicles, and unloaded in a manner that minimizes stress and/or injury to birds.
- Measures must be taken to prevent birds from becoming too hot or too cold during loading.

- Steps must be taken to minimize the amount of time birds are kept in an inverted position during loading.
- The number of birds in each container must be determined prior to loading, taking into consideration the available container floor space, body size/weight, prevailing environmental conditions, and duration of transport.
- Birds must be loaded in containers in such a way that permits all of them to rest on the floor at the same time when evenly distributed.

RECOMMENDED PRACTICES

- a. Use carts (e.g., pullet carts, drawer carts) that can be directly loaded onto vehicles to move end-of-lay hens and pullets, as opposed to crates
- b. Visually inspect containers to ensure that no parts of birds are trapped prior to loading on the vehicle
- c. Keep loaded carts appropriately spaced in the barn to permit air flow around the entire cart in hot weather conditions. Care should be taken not to have carts on the transport vehicle for too long while loading or unloading. When carts are full, load vehicle and commence driving as soon as possible
- d. Acclimatize the birds to the outside weather conditions by gradually lowering the barn temperature 2 to 3 hours prior to shipping when loading in cool or cold weather
- e. Protect birds from getting wet during loading, especially in cold weather conditions and particularly with end of lay hens that have poor feathering
- f. Minimize the impact of wind, rain and adverse weather conditions when loading birds
- g. Set conveyor angle to prevent tilting of crates that causes birds to pile up, if a conveyor is used for loading or unloading containers of live birds
- h. Take precautions when stacking crates with live birds; attention should be paid to temperature, ventilation, and spacing
- i. Avoid sliding crates when stacking to prevent toes from being caught
- j. Check the load and surrounding area for loose birds before allowing the vehicle to leave
- k. Consider weather conditions when determining load densities
- l. The recommended maximum density is 63 kg/m² (12.9 lb/sq. ft.) (28). This should be reduced by 15 to 25 percent in summer months
- m. Refer to Table 6.1 for a guideline on recommended maximum loading densities.

Table 6.1: Guidelines for Maximum Loading Densities

Loading Conditions	Density (kg/m ²)	Density (kg/sq ft)
Normal	63.0	5.9
15% Reduction (Summer Months)	53.6	5.0
25% Reduction (Summer Months)	47.3	4.4
To calculate the number of birds per crate or module, the following formula can be used:		
$\frac{\text{Density (kg/m}^2\text{)} \times [\text{crate/module surface area (m}^2\text{)}]}{\text{Average weight of birds (kg)}}$		

6.5 Facilities Design and Maintenance

Owners and operators of poultry operations have a responsibility to provide facilities and equipment that make bird handling, loading, and unloading possible without causing injury or suffering. Well-designed buildings can help to improve the humane handling of birds and discourage transfer of birds between handlers. Unobstructed laneways and yards can ensure that transport vehicles, including tractor-trailer units, can safely move birds to and from the farm, and between barns. Unobstructed access for transport vehicles to the barn is important as well.

REQUIREMENTS

- When building new barns or renovating existing barns or yards, the way in which birds are moved into and out of barns and/or cages must be taken into consideration with a view to facilitating safe and humane transfer of birds to and from the transport vehicles (e.g., tractor-trailer).
- Driveways and yards must be maintained to facilitate unobstructed, safe, and easy access by transport vehicles.

RECOMMENDED PRACTICES

- a. Consult with stakeholders (e.g., processors, catchers, transporters) when building new barns, or renovating existing barns or yards to ensure that the facilities can safely accommodate vehicles and equipment
- b. Ensure that building design discourages transfer of birds between handlers
- c. Adapt building design to the catching and loading equipment used and have sufficient number and size of doors or openings
- d. Assess and adopt new practices and technologies that can help improve bird welfare during all stages of catching and loading
- e. Maintain level and safe driveways and yards by regular grading, snow removal, and salting and/or sanding
- f. Ensure that loading/unloading areas and equipment permit efficient and humane bird handling
- g. Design facilities to minimize the risk of birds getting wet during the loading process (e.g., install continuous eaves troughs over doorways)
- h. Protect doorways from falling ice and snow.

7. Euthanasia

Euthanasia is the term used to describe ending the life of animals using methods that minimize or eliminate pain and distress. (29) Put more technically, it is a method of killing that minimizes pain, distress, and anxiety experienced prior to loss of consciousness, and causes rapid loss of consciousness followed by cardiac or respiratory arrest and death. (29)

7.1 On-Farm Euthanasia Plans

Comprehensive on-farm euthanasia plans provide consistent guidance about when euthanasia should be applied, by whom, and the methods that should be used. It is important that responsible personnel be made aware of and trained in following the plan.

REQUIREMENTS

- An on-farm written euthanasia plan, that at a minimum includes the following elements, must be developed and followed
 - Methods of euthanasia
 - Which birds have to be euthanized (refer to *section 7.3: Decision Making around Euthanasia*)
 - A protocol to ensure that euthanasia is carried out in a timely manner
 - Who is authorized to perform euthanasia
- The on-farm euthanasia plan must be reviewed annually, and revised as necessary.
- On-farm personnel who are responsible for identifying birds to be euthanized or for performing euthanasia must be aware of the plan and kept apprised of all amendments.

RECOMMENDED PRACTICES

- a. Consult a poultry veterinarian or a qualified advisor for assistance in developing the on-farm written euthanasia plan
- b. Develop clear criteria around when to euthanize a bird to ensure consistent application of euthanasia procedures
- c. Keep records that distinguish between culls and found mortality to help assess the effectiveness of the On-Farm Euthanasia Plan.

7.2 Skills and Knowledge

Personnel involved in euthanasia need to understand how to apply the method being used and the expected outcome, and be able to assess whether equipment being utilized (if any) is in good working order. They must be able to recognize when the bird is insensible, and be able to apply a secondary euthanasia method if the first method was ineffective. It is important that those responsible for culling birds are knowledgeable and competent in making decisions around euthanasia (Refer to *section 7.3: Decision Making around Euthanasia*).

REQUIREMENTS

- Personnel must be competent in identifying birds that need to be euthanized.

- Individuals who euthanize birds must be competent in the appropriate euthanasia methods, as well as in determining insensibility.
- Personnel must be supervised until proven to be competent in their ability to euthanize birds.

RECOMMENDED PRACTICES

- a. Utilize formal training programs that assess for competency, and that specialize in euthanasia of birds
- b. Evaluate on-farm personnel annually to review competence in all aspects of euthanasia
- c. Confirm that service providers who euthanize birds are competent in the appropriate methods of euthanasia.

7.3 Decision Making around Euthanasia

Poor health, disease, injury, and loss of productivity are just a few reasons that may lead to the decision to euthanize a bird. (30) Frequent routine inspections of flocks is important to identify birds that may require segregation, medical attention, or euthanasia. Euthanasia may be necessary when a sick or injured bird is not responding to treatment, has a poor prognosis, is unable to access feed or water, or has lost body condition. Additionally, health and welfare risks to the rest of the flock need to be considered (e.g., disease transmission; injurious feather pecking). There are two possible management options:

- Treatment and/or Segregation – if appropriate and/or proven medical treatment is available
- Euthanize – euthanasia may be the best option for welfare reasons

When a farm has a written policy that clearly states the conditions when an animal should be euthanized, on-farm personnel are able to more easily perform euthanasia. (30) It is important that when the decision to euthanize is made, the bird be euthanized in a timely manner. (30)

REQUIREMENTS

- Personnel must be competent in identifying birds that need to be euthanized.
- Sick or injured birds that are suffering and unlikely to recover must be euthanized without delay.

RECOMMENDED PRACTICES

- a. Ensure that on-farm personnel understand and follow protocols on when birds must be euthanized, as outlined in the on-farm euthanasia plan.

7.4 Methods of Euthanasia

Very little research has been done on the humaneness of various methods of euthanasia. (12) On-farm euthanasia options for individual birds include gas inhalation, cervical dislocation, blunt force trauma, captive bolt, and decapitation.

Death may not occur immediately but is the result of eventual respiratory and cardiac failure, which can take several minutes. (30) It is therefore essential that birds be swiftly rendered and remain insensible until death. For this reason, euthanasia methods that affect the brain first are preferred. (31)

Immediate application of the same or an alternate approved euthanasia method is required when signs of sensibility are observed. Signs of sensibility include:

- Bird blinks when the surface of the eye is touched (corneal reflex)
- Rhythmic breathing (check for abdominal movement in the vent area)

Absence of these signs indicates that the bird is insensible. Death is confirmed by cessation of breathing and heartbeat.

Each farm should select euthanasia methods based on criteria such as humaneness of the method, skill level and abilities of the individuals performing euthanasia, safety for personnel, emotional impact on those applying or observing euthanasia, environmental impacts, carcass disposal methods and use, and practicality.

REQUIREMENTS

- An acceptable method for euthanizing birds must be used. Refer to **Appendix D: Acceptable Methods of Euthanasia**.
- The method used to euthanize birds must be administered by a competent individual in a manner that minimizes pain or distress.
- Prior to being euthanized, birds must be handled in any manner that minimizes pain or suffering
- All equipment used for euthanasia must be well maintained, used correctly, and not overloaded, so that it operates effectively and efficiently.
- The effectiveness of the application used must be evaluated, and action taken (e.g., repair, replace, alternative method employed) when failure occurs.
- An alternate back-up euthanasia method must be readily available whenever birds are euthanized, in case the primary method fails.
- Birds must be inspected to confirm insensibility immediately after the euthanasia method has been applied.
- If signs of sensibility are observed, a second application of an acceptable method must be immediately administered.
- Death must be confirmed before leaving birds and disposing carcasses.

RECOMMENDED PRACTICES

- a. Start training for cervical dislocation using carcasses prior to training using live birds
- b. Minimize pre-euthanasia handling as much as possible
- c. Monitor the effectiveness of euthanasia methods and/or equipment and assess periodically for increases in failure rates.

7.5 On-Farm Depopulation

In some cases, poultry are required to be humanely destroyed on-farm in an emergency such as a disease outbreak, natural disaster, or other unexpected event (e.g., labour or market disruptions, extreme weather, food safety). In addition, on-farm depopulation of end-of-lay hens is an alternative to shipping hens to slaughter plants, as this will eliminate the transportation stress on these birds. (12)

Destroying an entire flock may employ euthanasia techniques, but not all methods used for on-farm depopulation meet the criteria for euthanasia. (29) Despite this, the methods employed for destroying large numbers of birds need to be as humane as possible given the situation. Methods used for on-farm depopulation planned at end of lay should meet a higher welfare standard than methods used in emergency situations. Resources for methods for destroying large numbers of birds or entire flocks can be obtained from appropriate authorities.

A written protocol detailing Standard Operating Procedures provides guidance for situations where humane destruction of flocks on-farm is warranted. Protocols will need to be reviewed and updated on a regular basis as new and better methods are developed and approved.

The written humane on-farm depopulation protocol should include (32) (adapted):

- Method(s) of destruction (planned and emergency)
- Continuous monitoring procedures
- Biosecurity considerations
- Identification of appropriately trained individuals to take control of the process
- Reporting procedures to designated authorities
- Personnel considerations, including emotional and physical stress (33)

REQUIREMENTS

- In consultation with a veterinarian or other qualified advisor, a written protocol for planned on-farm depopulation must be developed for operations that depopulate on-farm.
- An on-farm depopulation plan for emergency situations must be developed.
- Methods for destroying entire flocks on-farm must be as humane as possible given the circumstances, and the need to balance the risk for further negative impacts on bird welfare.
- Death must be confirmed before disposal.

RECOMMENDED PRACTICES

- a. Conduct a planning discussion with personnel to coordinate activities, review safety practices and expectations, etc. prior to planned on-farm depopulation event
- b. Designate one competent individual who is knowledgeable about the procedure(s) being used and the associated risks, to be in charge of the event
- c. Coordinate observation by qualified and competent individuals if on-farm depopulation is a first or infrequent event, to review and provide feedback on the impact of welfare outcomes
- d. Develop a plan in advance of each on-farm depopulation event for the appropriate disposal of birds
- e. Develop a plan for on-farm depopulation events that are carried out due to disease outbreak that includes a decontamination protocol. Seek qualified guidance as necessary.

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Appendix A: Transitional and Final Housing Requirements for Enriched Colony Cages

Code Section	Transitional ¹ and Final Requirements: Effective January 1, 2017	Final Requirements: Effective January 1, 2022 ²
2.3.2: Space Allowance	<ul style="list-style-type: none"> A minimum height of 45.0 cm (17.7 in) must be provided between the floor and ceiling of each level 	<ul style="list-style-type: none"> For <u>Enriched Colony Cages</u> each hen must be provided with a minimum of 750.0 cm² (116.25 sq in) of total space, including nests, of which 600.0 cm² (93.0 sq in) does not include nest boxes
	<ul style="list-style-type: none"> For <u>cages with furnishings</u> installed prior to July 1, 2016, each hen must be provided with a minimum space allowance of 581.0 cm² (90.0 sq in) 	
2.3.3: Nesting	<ul style="list-style-type: none"> The nest space must be enclosed on at least three sides to provide privacy and shading Where nest curtains are used, they must extend close to the floor (without impeding the flow of eggs) The nest area must not contain drinkers, feeders, or perches The space between the nest area and the useable feed trough must be at least 15.25 cm (6.0 in) The floor of the nest area must be covered with a surface that promotes nesting and prevents injury 	<ul style="list-style-type: none"> For <u>Enriched Colony Cages</u> each hen must be provided with nest space area at a minimum of 83.2 cm² (12.9 sq in)
	<ul style="list-style-type: none"> For <u>cages with furnishings</u> installed prior to July 1, 2016, each hen must be provided with nest space area at a minimum of 53.0 cm² (8.2 sq in) 	
2.3.4: Perching	<ul style="list-style-type: none"> Perches must be positioned to minimize fecal fouling of birds, feeders, or drinkers located below them. Perches must be constructed of materials that are easily cleaned and do not harbor mites Perches must be designed to minimize injury to hens that are mounting or dismounting as well as any hens nearby Perch space must not extend into the nest, dust bathing, or foraging/scratching areas Perches must be at least 1.9 cm (0.75 in) in diameter to allow hens to wrap their toes around the perch and balance evenly on it in a relaxed perching posture 	<ul style="list-style-type: none"> Each hen must be provided with a minimum linear length of 15.2 cm (6.0 in) of useable, purpose-designed, elevated perch space³
	<ul style="list-style-type: none"> For <u>cages with furnishings</u> installed prior to July 1, 2016, each hen must be provided with a minimum linear length of 11.2 cm (4.4 in) of useable, purpose designed elevated perch space³ 	
2.3.5: Foraging and Dust Bathing	<ul style="list-style-type: none"> For <u>cages with furnishings</u> installed prior to July 1, 2016, hens must be provided with an area with a flooring surface that allows a minimum of 4% of hens use it for foraging simultaneously 	<ul style="list-style-type: none"> For <u>Enriched Colony Cages</u>, hens must be provided with an area with a flooring surface that allows a minimum of 5% of hens use it for foraging simultaneously

¹ Transitional Requirements are indicated in shaded boxes. All other Requirements form final housing standards for Enriched Colony Cages

² Final requirements take effect on January 1, 2017 for all holdings installed, newly built or rebuilt or brought into use for the first time after January 1, 2017, or on January 1, 2022 for cages with furnishings that were installed prior to January 1, 2017

³ When calculating useable perch space, 30.0 cm (11.8 in) must be subtracted from the total linear length for each intersection of crossed perches

Appendix B: Transitional and Final Housing Requirements for Enriched Non-Cage Housing

Effective Date	Transitional ¹ Requirement	Final Requirement ²
2.3.2: Space Allowance		
Jan. 1, 2017	<ul style="list-style-type: none"> A minimum height of 45.0 cm (17.7 in) must be provided between the floor and ceiling of each level 	
Jan. 1, 2020	<ul style="list-style-type: none"> For <i>Non-Cage</i> systems installed prior to January 1, 2017 that have at least 50% of the useable space as slats or wires, each hen must be provided with the following minimum useable space allowance (which does not include nest space): <ul style="list-style-type: none"> – 929.0 cm² (144.0 sq in/1.0 sq ft) if a minimum of 15.2 cm (6.0 in) of perch space per hen is provided, OR – 1,115.0 cm² (172.8 sq in/1.2 sq ft) if perch space of at least 7.6 cm (3.0 in), but less than 15.2 cm (6.0 in) per hen is provided 	<ul style="list-style-type: none"> For <i>Non-Cage</i> systems, each hen must be provided with the following minimum useable space allowance (which does not include nest space):³ <ul style="list-style-type: none"> – Single-Tier - All litter barns: 1,900.0 cm² (294.5 in²/2.05 sq ft) – Single-Tier - Combination of wire, slats, litter: 929.0 cm² (144.0 in²/1.0 sq ft) – Multi-Tier - Combination of wire, slats, litter: 929.0 cm² (144.0 sq in/1.0 sq ft)
2.3.3: Nesting		
Jan. 1, 2017	<ul style="list-style-type: none"> The nest space must be enclosed on at least three sides to provide privacy and shading Where nest curtains are used, they must extend close to the floor (without impeding the flow of eggs) The nest area must not contain drinkers, feeders, or perches The space between the nest area and the useable feed trough must be at least 15.2 cm (6.0 in) The floor of the nest area must be covered with a surface that promotes nesting and prevents injury 	
Jan. 1, 2020	<ul style="list-style-type: none"> For <i>Non-Cage</i> systems installed prior to Jan. 1, 2017: <ul style="list-style-type: none"> – each hen must be provided with a minimum nest space area of 83.2 cm² (12.9 sq in)[1.0 m² (10.8 sq ft) for each 120 hens] – Nest space must not be included when calculating useable space allowance 	

¹ Transitional Requirements are indicated in shaded boxes. All other Requirements form final housing standards for Non-Cage Housing systems

² Unless otherwise specified, all final requirements take effect for all holdings installed, newly built or rebuilt or brought into use for the first time after January 1, 2017

³ A minimum of 15.2 cm (6.0 in) of perch space per bird must be provided. Refer to *Perching* (2.3.4)

Effective Date	Transitional ¹ Requirement	Final Requirement ²
2.3.4: Perching		
Jan. 1, 2020	<ul style="list-style-type: none"> ▪ For <u>Non-Cage</u> systems installed prior to Jan. 1, 2017 each hen must be provided with a minimum of 7.6 linear cm (3.0 in) of useable, purpose-designed, elevated perch space^{4, 5} 	<ul style="list-style-type: none"> ▪ Each hen must be provided with a minimum linear length of 15.2 cm (6.0 in) of useable, purpose designed, elevated perch space⁵
Jan. 1, 2020	<ul style="list-style-type: none"> ▪ Perches must be positioned to minimize fecal fouling of birds, feeders, or drinkers located below them. ▪ Perches must be constructed of materials that are easily cleaned and do not harbor mites ▪ Perches must be designed to minimize injury to hens that are mounting or dismounting as well as any hens nearby ▪ Perch space must not extend into the nest, dust bathing, or foraging/scratching areas ▪ Perches must be at least 1.9 cm (0.75 in) in diameter to allow hens to wrap their toes around the perch and balance evenly on it in a relaxed perching posture ▪ For <u>Non-Cage</u> systems: <ul style="list-style-type: none"> – at least 20% of the perch space must be elevated a minimum of 40.0 cm (15.7 in) – perches must be at least 19.0 cm (7.5 inches) from walls and from the top of the perch to the ceiling or other structures – adjacent perches must be at least 30.0 cm (11.8 in) apart horizontally to allow hens to perch simultaneously 	
2.3.5: Foraging and Dust Bathing		
Jan. 1, 2017	<ul style="list-style-type: none"> ▪ Hens housed in litter-based systems, must be provided with continuous access to litter ▪ In <u>Multi-Tier</u> systems, at least 33% of the usable space must be litter, except for a maximum period of 6 weeks after placement, when the litter may be reduced to a minimum of 15% of the useable space 	
Jan. 1, 2017	<ul style="list-style-type: none"> ▪ For <u>Single-Tier</u> systems that are re-tooled after January 1, 2017: <ul style="list-style-type: none"> – At least 15% of the usable space must be litter – Hens must be provided with at least one foraging site for each 1,500 birds (e.g., bales of hay or straw, insoluble grit or oat hulls, or other material that provides foraging opportunities). Where multiple sites are provided, they must be evenly distributed 	
Jan. 1, 2017	<ul style="list-style-type: none"> ▪ For <u>Single-Tier</u> systems installed prior to January 1, 2017 that are fully slatted, or where less than 15% of useable space is litter, a solid surface area of at least 1.5 m² (16.0 sq ft) that contains substrate for dust bathing must be provided for each 1,000 hens. Where multiple sites are provided, they must be evenly distributed 	<ul style="list-style-type: none"> ▪ For <u>Single-Tier</u> systems at least 15% of the usable space must be litter
Jan. 1, 2017	<ul style="list-style-type: none"> ▪ For <u>Single-Tier</u> systems, hens must be provided with at least one foraging site for each 1,500 birds (e.g., bales of hay or straw, insoluble grit or oat hulls, or other material that provides foraging opportunities). Where multiple sites are provided, they must be evenly distributed 	

⁴ Refer to interim *Space Allowance* (2.3.2) requirement, which mandates a higher space allowance effective January 1, 2020 when perch space of less than 7.6 linear cm (6.0 in) is provided

⁵ When calculating useable perch space, 30.0 cm (11.8 in) must be subtracted from the total linear length for each intersection of crossed perches

Appendix C: Guidelines for Transporting Poultry

Updated 2012

SHOULD THIS BIRD BE LOADED?

Guidelines for Transporting Poultry

DO NOT LOAD DO NOT TRANSPORT

- Weak and/or not alert
- Dark red, purple, or black combs or wattles
- Discharge from eyes/nostrils
- Swollen head/neck
- Skin on head or neck is dark red or very pale (Exception: Toms may have bright blue skin in this area)
- Bloody and/or prolapsed vents
- Emaciated and weak: very thin, easily felt breastbone (Exception: End-of-lay hens may have pronounced breastbones but if emaciated they must not be loaded)
- Dislocated, broken, or exposed bones (Including injury due to handling)
- Unable to rise or walk due to physical abnormality or injury

Birds not loaded should be segregated according to on-farm protocol. Notify farm manager of birds left on the farm before leaving.

CAUTION

Conditions requiring assessment before loading

Environmental

- Wet birds in cool or cold weather
- Heat and/or humidity
- Cold and/or wind chill
- Road closures

Individual Bird

- Minor trauma, wounds or bleeding (including injury due to handling)

Flock

- Diarrhea
- Coughing and sneezing -"snickling"
- If a flock is diagnosed with a disease by a veterinarian or laboratory, special provisions for loading may be required.

Assessment and joint decisions should be made by the producer, catching crew, hauler and processing plant when faced with CAUTION conditions.

LOAD & TRANSPORT HEALTHY BIRDS

Regulations
No person shall load or caused to be loaded... an animal that by reason of infirmity, illness, injury, fatigue or any other cause cannot be transported without undue suffering during the expected journey.
Health of Animals Regulations; Part XII, 136, 2a

DO NOT

- Transport a sick or injured bird
- Load or unload a bird in a way likely to cause injury or suffering
- Crowd birds to such an extent as to cause injury or undue suffering

www.inspection.gc.ca

Violators of the Health of Animals Act

- ⇒ Fines up to \$10,000
- ⇒ Increased fines for repeat offenders
- ⇒ Repeat offenders posted on CFIA website

See the "Should This Bird Be Loaded" Handbook for more information.

CRIIOD

Updated 2012

Guidelines for Dealing with Poultry

Identification of Sick or Injured Birds



Weak, not alert



Emaciated



Unable to walk



Unable to rise/walk due to physical abnormality
(Do not confuse with fatigue)



Swollen head



Discoloured comb



Broken leg

LOAD & TRANSPORT HEALTHY BIRDS

1. Identify
2. Cull
3. Dispose

CFIA Livestock Emergency Transport Line
1-877-814-2342



Environmental Considerations

Maximum Loading & Transport Guidelines	Moderate Density	Extreme Heat Density
Broiler Chickens	63 kg/m ²	54 kg/m ²
Broiler Breeders	66 kg/m ²	56 kg/m ²
Turkeys	98 kg/m ²	83 kg/m ²
End-of-Lay Hens	63 kg/m ²	54 kg/m ²

Reference: The Recommended Code of Practice for the Care and Handling of Farm Animals - Poultry

Factors to Consider

- Duration of transport (including loading and lairage)
- Weather at load out, along travel route and at processing plant
- Time of day of load out
- Number of birds in the barn
- Ventilation in barn
- Condition of barn (eg. litter)

Recommended Code of Practice for the Care & Handling of Farm Animals

Air temperature **in load** should be maintained at 5°C to 30°C for all birds, except end-of-lay hens, which should be maintained at 13°C to 30°C

Recent research (Mitchell and Kettlewell, 2008) recommends for broilers, an upper **in load** temperature limit of 24°C.

DRAFT - Code of Practice for the Care and Handling of Pullets and Laying Hens | (Jun. 2016)

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Appendix D: Acceptable Methods of Euthanasia¹

The following list consists of euthanasia methods for individual birds² for use on-farm. The chart is based on the information that was available at the time of publishing. Further peer-reviewed research may result in new, acceptable equipment and/or euthanasia methods, or the elimination of some currently accepted practices.

For any method to be considered acceptable, it must render the bird insensible rapidly and the bird must not return to sensibility prior to death. Individuals who euthanize birds must be competent in the appropriate methods. Minimize handling and the time that the bird is restrained, as both are stressful for the bird.

Method	Special Considerations
Physical Methods	<ul style="list-style-type: none"> Euthanasia method should be chosen based on the welfare of the bird, human safety, skill and training of personnel, availability of equipment, and the ability to adequately restrain the bird (29)
Manual Cervical Dislocation	<ul style="list-style-type: none"> There are a variety of techniques that may or may not be appropriate in that some methods do not result in rapid insensibility. The site of the dislocation must be as close to the head as possible. Other methods should be considered when large numbers are to be euthanized due to operator fatigue.
Blunt force trauma to the head	<ul style="list-style-type: none"> There are a variety of instruments that may be used. The method of restraint and the location where the force is applied has a significant impact on whether rapid insensibility is achieved. This method may be preferred over cervical dislocation for birds that have broken or injured legs Can be used to render a bird insensible as the first step in a two-step method of euthanasia (e.g., cervical dislocation, decapitation) Due to the impact on operators and observers, other methods should be considered, especially when large numbers are to be euthanized
Non-Penetrating Captive Bolt	<ul style="list-style-type: none"> Ensure that the device is designed and set to deliver the required amount of force, and that it is placed in the proper position on the head.
Decapitation	<ul style="list-style-type: none"> Instrument must be sharp The head must be completely severed from the body in one stroke Requires adequate restraint and containment
Inhaled Agents: Carbon dioxide (CO ₂), Carbon monoxide (CO), Argon (Ar), Nitrogen (N)	<ul style="list-style-type: none"> Acceptable only with properly-maintained, proven effective, purpose-designed equipment When inhaled gases are used for euthanasia, birds should be checked to verify death because they may appear dead but can regain consciousness if the exposure time or the concentration of the agent is insufficient (29) CO is dangerous to operators, and must be used in a well-ventilated area. Euthanasia gases must be delivered in pure and commercially available form
Anesthetic Overdose	<ul style="list-style-type: none"> Must be administered by a licensed veterinarian

¹ Further research under the oversight of a regulated research body may result in new, acceptable equipment and/or euthanasia methods that may be developed and become available during the life of this Code.

² Adapted from (29); (32); (12).

Appendix E: Resources for Further Information

Housing Systems for Layers

- *Urban Agriculture Business Information Bundle*. Ontario Ministry of Agriculture, Food and Rural Affairs. Online: (<http://www.omafra.gov.on.ca/english/livestock/urbanagbib/poultry.htm>)
- *Small Flock Poultry Health*. BC Ministry of Agriculture. Online: (http://www.agf.gov.bc.ca/ahc/poultry/small_flock_manual.pdf)

Health Management and Husbandry Practices

- The Alberta Environmental Farm Plan Company (2008) *Rural Emergency Plan*. Online: <http://www.ruralemergencyplan.com/>
- Canadian Food Inspection Agency (2009) *National Avian On-Farm Biosecurity Standard*. Online: <http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/avian-on-farm/eng/1375193894256/1375193980266#sec2>
- Canadian Food Inspection Agency (updated 2014) *General Producer Guide – National Avian On-Farm Biosecurity Standard*. Online: <http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/general-producer-guide/eng/1398640321596/1398640379048>
- Canadian Food Inspection Agency (Updated 2012) *Biosecurity for backyard flock and small bird owners*. Online: <http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/bird-health-basics/eng/1323643634523/1323644740109>
- *Improving Feather Cover – A guide to reducing the risk of injurious pecking occurring in non-cage laying hens*. FeatherWel-Promoting Bird Welfare. University of Bristol. Online: http://www.featherwel.org/Portals/3/Documents/Advice_guide_%20V1.2%20%20May%202013.pdf
- A guide to the practical management of feather pecking & cannibalism in free range laying hens. Department for Environment, Food and Rural Affairs (DEFRA). UK. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69374/pb10596-feather-pecking-050309.pdf
- **Lang, B., Dam, A. and Taylor, K.** *Rodent Control in Livestock and Poultry Facilities*. Toronto : Ontario Ministry of Agriculture and Food and Ministry of Rural Affairs, 2013. ISSN 1198-712X. <http://www.omafra.gov.on.ca/english/livestock/dairy/facts/13-057.pdf>
- **Alberta Agriculture and Rural Development, Environmental Stewardship Division.** A Guide for the Control of Flies in Alberta Confined Feeding Operations. *Alberta Agriculture and Rural Development*. [Online] 2008. [Cited: November 17, 2014.] [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/epw12257](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/epw12257). Agdex 400-651-1.
- Canadian Veterinary Medical Association. Forced Moulting of Poultry - Position Statement. *Canadian Veterinary Medical Association*. [Online] June 30, 2009. [Cited: June 20, 2015.] <http://www.canadianveterinarians.net/documents/forced-moulting-of-poultry>.
- Charmley L.L. & Trenholm H.L. (2012) **Fact Sheet - Mycotoxins**. Canadian Food Inspection Agency. <http://www.inspection.gc.ca/animals/feeds/regulatory-guidance/rg-8/eng/1347383943203/1347384015909?chap=1#s1c1>

- Government of Canada. *Reportable Diseases Regulations*. <http://laws-lois.justice.gc.ca/eng/regulations/sor-91-2/page-1.html>

Handling and Transportation

- Ontario Farm Animal Council, Poultry Industry Council, Ontario Ministry of Agriculture Food and Rural Affairs (2012) *Should this Bird be Loaded? A Guide for Preparing, Loading, and Transporting Poultry*. www.poultryindustrycouncil.ca/wp-content/uploads/2012/03/DT-Handbook-final.compressed.pdf
- Farm & Food Care Ontario; Poultry Service Association (2015) *Ontario Poultry Handling and Transportation Manual*. www.poultryserviceassociation.com/resources.html
- Ontario Ministry of Agriculture and Food; Ontario Ministry of Rural Affairs; (Date) *Humane Catching of End-of-Lay Hens for Catching Crews and Loading Crews*. Contact: Al Dam, Poultry Specialist, Ontario Ministry of Agriculture, Food and Rural Affairs (URL pending)
- Canadian Agri-Food Research Council (2001) *Recommended code of practice for the care and handling of farm animals – Transportation*. www.nfacc.ca/codes-of-practice/transport