

# THE WELFARE OF MEAT CHICKENS IN AUSTRALIA AND NEW ZEALAND



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## I INTRODUCTION I

Chickens bred for meat production, known as 'broilers' by the industry, are a ubiquitous farmed animal globally. Consumer demand for inexpensive chicken meat products, particularly over the past 60 years, has resulted in pressure on the meat chicken industry to increase the amount of meat produced per bird in as short a timeframe as feasible in order to be economically competitive.<sup>1</sup> Genetic selection programmes have led to rapid growth rates and vastly increased meat yield, dramatically decreasing slaughter age and the amount of feed and energy required to raise these birds to market weight.

Unfortunately, these changes have had severe negative consequences for the welfare of chickens. Animal welfare science was still in its infancy when selection for more efficient genetics commenced, with the result that negative effects on bird welfare were given little consideration. The impacts on the birds themselves of these genetic selection pressures, paired with modern intensive farming methods, are now well recognised. However, they also have implications for product demand by a contemporary consumer who places consideration, and dollar value, on animal welfare standards.<sup>2</sup> A failure to recognise and address welfare deficiencies risks not only animal welfare, but an industry being left behind in a modernising world.

Globally, chickens reared for meat make up the vast majority of terrestrial farmed animals.<sup>3</sup> The total number of meat chickens slaughtered annually is approximately 750 million in Australia,<sup>4</sup> and 120 million in New Zealand.<sup>5</sup> Production is frequently measured in terms of weight of dressed meat produced rather than the number of individual birds slaughtered. Global chicken meat production in 2025 was estimated to be in the order of 108 million metric tonnes.<sup>6</sup> Australia produces 1.55 million metric tonnes per annum,<sup>7</sup> and New Zealand 230,000 tonnes per annum,<sup>8</sup> accounting for approximately 1.5% and 0.2% of global production, respectively.

Chicken meat consumption has increased steadily in recent years with chicken now being the most widely consumed meat in the region.<sup>9</sup> Meat chickens typically reach target weight for slaughter at 34-39 days old, at a weight of approximately 2.0kg.<sup>10,11</sup> Annual per capita consumption averages 41kg in New Zealand, and 53kg in Australia, which equates to 20-27 birds per person.<sup>12,13</sup>

In Australia and New Zealand, the majority of meat chicken farming is in conventional indoor housing, with free-range and/or organic farming constituting 28% and 27% of the market share in Australia and New Zealand, respectively.<sup>13,14</sup> In both countries, demand for organic and free-range chicken is rising.<sup>1</sup> Production has a high degree of vertical integration; in

Australia, 54% of production is via four companies (Inghams, Bartter, Turosi and Golden Cockerel), who will often manage their own breeding farms, hatcheries, and processing plants in addition to the standard growing farms.<sup>1,13</sup> The situation is similar in New Zealand, with Tegel, Inghams, Brinks and Turks being the major industry players.<sup>15</sup> Vertical integration may extend to feed mills, transportation and veterinary services.<sup>1,15</sup> Improved standards by one company can hence have considerable flow-on effects and implications for welfare standards throughout the production chain.

The importance of animal welfare in food production is increasingly front of mind for the consumer and has taken large strides since the initial intensification of the meat chicken industry. Minimum legal standards – Standards and Guidelines in Australia and Codes of Welfare in New Zealand – are no longer considered sufficient for many customers of chicken products, especially given the lack of enforceable regulations.<sup>16–18</sup> This has resulted in the emergence of two major third-party certification systems run by animal welfare organisations, specifically RSPCA Certified (formerly RSPCA Approved) in Australia and SPCA Certified in New Zealand, to give consumers assurance that chicken products they purchase meet a higher welfare standard.<sup>19,20</sup> Over 97% of chickens in Australia<sup>19</sup> and approximately 75% of New Zealand chickens are now farmed under these schemes. However, with this level of market saturation, further welfare improvements have only occurred in small increments when certification standards are reviewed.

The physical features of fast-growing chickens, selected genetically for decades, are incompatible with positive welfare outcomes. This is exacerbated by the environmental constraints placed on meat chickens, particularly in intensive systems where most diseases and adverse effects in birds are multifactorial. The following sections discuss these factors in more detail, and explain how changing both the bird's genetics and the way in which they are reared and slaughtered are fundamental to improving the welfare of meat chickens. The Better Chicken Commitment (BCC), which sets out key minimum requirements for meat chicken production that cover breed, living conditions and slaughter, provides a globally recognised mechanism to achieve this aim.

## BREED AND HEALTH

### 2.1 GENETIC SELECTION

Different breeds of chickens are available for commercial chicken production, but two fast-growing breeds dominate the global industry: the Ross 308 and the Cobb 500. The vast majority of commercial chicken production in Australia and New Zealand uses these two breeds.<sup>12</sup>

The meat chickens produced today are genetically selected to grow as large as possible, as quickly as possible, using as little feed as possible. While there may be economic advantages to this, it comes at a significant cost to health and welfare. The genetic selection of meat chickens has led to a 400% increase in their growth rate, achieving market weight in 60% less time than meat chickens 50 years ago.<sup>21,22</sup> The amount of breast meat on an individual bird has increased by two-thirds.<sup>21</sup> These chickens achieve the target live weight of 2.0–2.5kg in around 34–39 days,<sup>4,10,11</sup> in comparison to 16 weeks back in the 1950s.<sup>10</sup>

Achieving the best feed conversion ratio for the premium cut of breast meat is the key economic driver for the meat chicken industry we have today. The experience of the animal is not part of the economic program. However, chickens are cognitively sophisticated, intelligent, they can demonstrate self-control, they communicate with one another in a complex way and have the capacity for reason and logic.<sup>23</sup> Fast-growing meat chickens spend less time carrying out important natural behaviours such as walking, running, scratching, pecking and perching, and more time sitting, eating and drinking than slower growing birds.<sup>24</sup> Although fast-growing birds are motivated to perform their natural behaviours if their environment allows for this, their physical ability becomes increasingly restricted as they reach slaughter weight.<sup>24–26</sup> This rapid growth and increased breast muscle size comes at a direct cost to the bird as they suffer an increased incidence of musculoskeletal and cardiovascular disorders.<sup>27–29</sup> The effects of genetic selection for rapid growth are not just a welfare issue; they are also costly to poultry producers in terms of output loss, resource wastage and prevention costs.<sup>2,30</sup>

## 2.2 SKELETAL ISSUES AND LEG HEALTH

One of the most serious welfare problems in meat chicken production is the high incidence of skeletal disorders, particularly those that lead to impaired mobility or lameness.<sup>22,30</sup> The development of many of these conditions is related to genetic selection and management for rapid growth, since they are rarely seen in higher welfare, slower growing breeds.

The development of large muscle mass on an immature skeleton leads to locomotor problems in fast-growing chickens, with the highest levels of lameness seen in the fastest growing birds.<sup>2,31–33</sup> In essence, the skeletal body frame cannot ‘keep up’ with an enlarging muscle demand. A study of lameness using gait scores (where 0 is normal agility and 5 is incapable of walking), conducted in New Zealand by the Ministry for Primary Industries, found that, in all weight categories, just over 30% of birds had a gait score of 3 or more; for heavier birds (2.9–3.6kg) this was almost 56%.<sup>34</sup> Lameness causes pain; even meat chickens assessed to have moderate lameness (gait score  $\leq 3$ ) have been shown to have impaired walking ability due to painful leg disorders, with increased mobility in response to administration of an anti-inflammatory analgesic (pain relief) agent.<sup>35</sup> Chickens given the

ability to self-medicate with feed containing painkillers have been found to consume a significantly higher proportion of feed as the severity of lameness increased.<sup>36</sup>

Bacterial chondronecrosis and osteomyelitis (BCO) is the most common cause of severe leg health issues in meat chickens. Lameness due to BCO is reported to be a major economic and welfare problem in commercial meat chickens in Australia.<sup>37</sup> A study of 20 commercial farms in Victoria (Australia) showed that BCO occurs throughout the life of meat chicken flocks at an alarmingly high rate, and was detected in 28% of the mortalities and culled cases.<sup>38</sup> The equivalent condition to BCO in companion mammals, such as dogs, often necessitates partial amputation or total hip replacement to be curative, making clear the negative welfare implications and severity of the disease.<sup>39,40</sup>

High stocking densities (see Section 3.1) negatively affect chickens' walking ability, exacerbating anatomical concerns.<sup>41</sup> Fast-growing meat chickens with poor leg health spend an increased amount of time sitting and long periods of time spent on soiled litter can lead to painful conditions such as footpad dermatitis, hock burns and breast blisters (see Section 2.6).<sup>42</sup> The ability to walk is also necessary to avoid pecking from other birds in the flock, which in turn is exacerbated by a lack of enrichment opportunities.<sup>16,43,44</sup> Likewise, skeletal conditions prevent birds from engaging in normal behaviours, leading to adverse mental states such as frustration and boredom.<sup>45</sup>

In severe cases of poor leg health, birds may lose the ability to walk and become unable to access basic resources such as food and water, leading to dehydration, starvation, and, if not culled, a slow and painful death.<sup>45</sup>

## 2.3 ASCITES

Ascites, also known as 'water belly',<sup>46</sup> is an accumulation of fluid in the coelomic cavity, the avian equivalent of the abdomen.<sup>47</sup> Since ascites develops gradually and takes time to cause death, the birds suffer for an extended period before they die.<sup>48</sup> It is a multifactorial disorder, however, the main contributor of the condition is believed to be an increased oxygen demand by the fast-growing muscle in fast-growing breeds, and the resultant strain on the heart to meet the metabolic demand.<sup>46,47</sup> While the increase in metabolic demand is the chief factor implicated, ascites may also be associated with exposure to cold temperatures which further increase metabolic demand, excessive periods of light, poor ventilation or air contamination making oxygen less available to birds, and nutritional factors promoting even more rapid early growth.<sup>47,49,50</sup>

Ascites is more common in male chickens and mortality can be up to 30% in meat chicken flocks:<sup>47,51,52</sup> this could equate to mortalities of up to 261 million birds per annum in Australia and New Zealand. A study comparing the cause of carcass condemnation in traditional

fast-growing and slower growing meat chicken breeds demonstrated the incidence of ascites to be up to 6.5 times higher in fast-growing breeds.<sup>53</sup>

## 2.4 SUDDEN DEATH SYNDROME

Sudden death syndrome (SDS), or 'flipover', is a condition in which apparently healthy fast-growing meat chickens die unexpectedly from no apparent cause.<sup>54,55</sup> Birds may die suddenly, or show terminal signs such as wing flapping and vocalisation followed by rapid death.<sup>54,56</sup> The condition is estimated to cause mortality of 0.5 to 4.0% in meat chicken flocks, with males again predominantly affected.<sup>54</sup> There are invariably no clinical signs of disease in affected birds, though mortalities attributable to SDS often result in deceased birds being found in dorsal recumbency (on their backs); this may be associated with the terminal flapping observed in many cases of the disease.<sup>54,57</sup>

The cause of SDS in meat chickens is still unknown; while it is generally accepted to be multifactorial, nutrition and anatomy are thought to be the key contributing factors.<sup>54-57</sup> The condition has been found to be controllable via reducing growth rate, especially within the first three weeks of life.<sup>54,56,57</sup> Studies have also shown that fast-growing meat chicken breeds are also predisposed to cardiac arrhythmias, likely due to the increased workload on the heart.<sup>58</sup> Stress-induced arrhythmias appear to be the immediate cause of death in some SDS cases.<sup>58</sup> Stressful events may precipitate arrhythmias in meat chickens, which may progress to mortalities days after the stressor has passed. SDS can occur as early as three days of age and continues until birds reach market weight; peak mortality usually occurs between days 21 and 28.<sup>54</sup>

## 2.5 BREAST MUSCLE MYOPATHIES

Breast muscle myopathies, or diseases of the muscle tissue, impact both bird welfare and meat quality. They are more commonly seen today than historically, as all are associated with the intensive genetic selection of meat chickens to increase their growth rate, body weight, and breast yield.<sup>59-61</sup> Deep pectoral muscle myopathy (DPM) has been studied for some time, while other abnormalities such as 'wooden breast' (WB), 'white striping' (WS), and 'spaghetti meat' are more recent concerns.<sup>62,63</sup> Myopathies have been reported in Australia and New Zealand along with the EU, USA, Canada, Japan and Brazil, with WS being the most prevalent reported issue.<sup>63</sup>

Deep pectoral muscle myopathy occurs when the main 'breast' muscle, the pectoralis major, compresses the smaller muscle underneath it (the pectoralis minor), restricting its blood supply and causing it to atrophy and become necrotic.<sup>60-63</sup> It is also known as 'green muscle disease' due to the colour of necrotic lesions within the muscle tissue.<sup>63,64</sup> The incidence of

DPM is highly variable, but spontaneous disease development is reported to affect 3-17% of birds and appears higher in fast-growing breeds and male birds.<sup>60-63, 65</sup> The lesions caused by DPM are usually removed during carcass dressing as they are off-putting to consumers, which also negatively impacts costs for producers.<sup>64</sup>

Wooden breast is a related condition where necrotic muscle fibres are replaced by connective tissue which causes a palpably firm consistency and may give the muscle a bulging appearance as well as a yellow exudate on the surface.<sup>60,62,66</sup> White striping occurs via a similar process and is visible as white striations running parallel to the muscle fibres.<sup>66,67</sup> Studies have not definitively determined the cause of WB or WS but genetics, metabolic factors and growth rate have all been implicated in disease development.<sup>60,62,66-69</sup>

Globally, it is estimated that 5-10% of commercially produced chicken fillets exhibit signs of WB, with the incidence rate increasing.<sup>62,69</sup> Anecdotal reports suggest that affected flocks may have up to 50% of birds with the disease.<sup>70</sup> Affected chickens are most likely to be those that grow faster, have greatest feed efficiency, heaviest body weight and higher breast muscle yield.<sup>60-62</sup> Studies have also found that WB is associated with impaired gait and mobility, and may thus be partly linked to the common skeletal and mobility abnormalities in meat chickens.<sup>71,72</sup>

Meat from birds suffering from WB or WS has a harder, more chewy texture, holds less water, and has poorer nutritional value.<sup>63,73</sup> White striping has been found to increase the fat content and decrease the protein content of affected fillets, with the striping giving the meat an unappealing fatty appearance.<sup>74,75</sup> These conditions result in the downgrading of meat due to the lack of aesthetic appeal.<sup>59</sup>

More recently, a new muscular abnormality termed 'spaghetti meat' has emerged. Often associated with WS, spaghetti meat is characterised by poor muscle cohesiveness and a loss of structural integrity due to immature intramuscular connective tissues.<sup>60-62</sup> The affected pectoralis major muscle is so loose that the fibre bundles can be pulled apart easily, like spaghetti.<sup>60-62</sup> Meat chickens displaying higher breast size seem to be more affected, with incidence as high as 20% in affected flocks.<sup>76,77</sup> Unlike the other breast muscle myopathies, the incidence of spaghetti meat appears to be higher in female than male birds.<sup>77</sup> While the condition is not thought to affect the welfare of living birds, it results in further waste through the downgrading of meat and carcass condemnation.<sup>61</sup>

## 2.6 FOOTPAD DERMATITIS AND SKIN DISEASES

Footpad dermatitis, also called pododermatitis and ‘bumblefoot’, is a necrotic condition of the underside of the foot in chickens, causing pain, lameness, and in commercial terms, unsaleable chicken feet due to the associated blemish.<sup>78</sup> Like most diseases, footpad dermatitis is a multifactorial condition, with a high interplay between genetics and physical attributes within the environment. The disease can manifest in a range of severities, from superficial ulceration to deep abscessation, with or without bacterial involvement.<sup>78</sup> Precipitating causes of footpad dermatitis include prolonged standing on soiled or poor quality litter (as such, the risk is higher in birds with skeletal problems who do not move around, with higher stocking densities, and with lack of accessible perches) and nutritional deficiencies.<sup>78,79</sup> The large body size of meat chickens, and associated high pressure on the underside of the foot, invariably exacerbates the progression of footpad dermatitis lesions. Similar to skeletal conditions, the pain and immobility associated with the condition has negative behavioural outcomes for affected birds.

Related dermatological conditions, hock burns and breast blisters, often occur secondary to prolonged sitting due to the musculoskeletal issues detailed above, as well as footpad dermatitis. Hock burns involve lesions such as ulceration to the skin overlying the hock joint of the leg,<sup>80</sup> whereas breast blisters involve the development of cystic change and swelling associated with the sternal bursa, a natural fluid-filled structure of the keel of the chicken which provides padding for the underlying muscle when sitting.<sup>81</sup> Increased time spent in the sitting position due to pain, overcrowding or other illness or debility further predispose to these conditions.

Control of all of these diseases is achievable through reduced pressure on the feet and joints via an appropriate growth rate and body size, a hygienic living environment, including good quality, friable litter, with appropriate stocking density, perches and promotion of general good health via appropriate diet and disease prevention.

# ENVIRONMENT AND HUSBANDRY

## 3.1 STOCKING DENSITY

Stocking density is considered one of the most important factors impacting the welfare of meat chickens, second only to breed.<sup>82</sup> Although there is unequivocal evidence that keeping meat chickens at high stocking densities (>30 kg/m<sup>2</sup>) compromises health and welfare,

birds continue to be given very little space to move around, with various high densities allowed by law depending on jurisdiction.

High stocking densities in meat chicken sheds restrict chickens' behaviour and cause subsequent health problems, as previously described. Studies have shown that higher stocking densities decrease locomotor activity, stretching behaviour, walking, eating and preening.<sup>83,84</sup> Jostling of other birds, disturbance of resting birds, birds climbing on top of one another and fights are also observed more at higher stocking densities, leading to increased risk of injury.<sup>84,85</sup> This in turn can result in bruising, scratching and poorer feathering, leading to reduced carcass quality and resultant condemnations.<sup>86</sup> The restriction of space and locomotor activity in crowded sheds can also reduce the consumption of feed, which may decrease feed conversion efficiency.<sup>84,86</sup>

High stocking density also leads to greater litter moisture, increased microbial activity, and increased temperature and ammonia concentration which can give rise to hock burn, footpad dermatitis, breast blisters and respiratory diseases.<sup>42,47,87,88</sup> High levels of ammonia can compromise the immune system, increasing the birds' vulnerability to infections.<sup>88,89</sup>

In New Zealand, the Code of Welfare - Meat Chickens ('the Code') advises that best practice is a stocking density of less than 30 kg/m<sup>2</sup> at all times, however it permits a maximum stocking density of 38 kg/m<sup>2</sup> (approximately 19 birds/m<sup>2</sup> when slaughtered at 2 kg).<sup>17</sup> The requirement for free-range systems and chickens under the SPCA Certified scheme is 34 kg/m<sup>2</sup> inside the sheds.<sup>17</sup>

In Australia, stocking densities depend on the type of ventilation in the shed. The Australian Animal Welfare Standards and Guidelines for Poultry (Standards and Guidelines) require a maximum of 38 kg/m<sup>2</sup> for tunnel-ventilated or extractive systems, 38 kg/m<sup>2</sup> (winter) and 36 kg/m<sup>2</sup> (summer) for other mechanically ventilated systems, and 28 kg/m<sup>2</sup> year round for non-mechanically ventilated systems.<sup>16</sup> Under the standard RSPCA Certified scheme, allowable densities are 34 kg/m<sup>2</sup> for tunnel-ventilated or extractive systems (until 2031) and 30 kg/m<sup>2</sup> for the "enhanced welfare" standard which also requires slower-growing birds.<sup>90</sup>

The BCC requires a maximum stocking density of 30 kg/m<sup>2</sup> for all systems, in line with the New Zealand Code of Welfare best practice recommendation.<sup>17</sup> This aims to ensure meat chickens have sufficient space to reduce the behavioural compromise and health issues detailed above.

## 3.2 THINNING

Thinning is a process where a proportion of the chickens in a shed are removed and taken for slaughter, days or weeks before the remaining birds are removed.<sup>91</sup> Thinning allows a larger number of birds to be initially placed in a given shed, and maximum stocking density is not

exceeded as partial depopulations occur. This also allows the commercial demand for different carcass sizes to be met.

Thinning is a highly stressful process for both the birds removed and those left behind. The process involves withdrawal of feed and water, the presence of unfamiliar stockpeople (catchers), potential pain and injury during handling, with birds usually carried upside down by the legs (see Section 4), and disruption to normal daily routine. The repeated presence of stockpeople and potential contaminants (such as clothing, boots or husbandry equipment) in the thinning process increases the risk of a biosecurity breach and introduction of disease to the remaining birds in the shed.<sup>92</sup> Likewise, the stress associated with the process significantly increases the risk of immune compromise of birds, with associated potentiation of shedding of bacteria such as *Campylobacter*, which is a human health concern (see Section 3.6).<sup>93,94</sup> There are no restrictions under Australian or New Zealand codes or standards on the number of times thinning can be carried out.<sup>16,17</sup> Under New Zealand SPCA Certified standards, a maximum of two thins per production cycle is allowed and the RSPCA Certified scheme allows for up to three thins per production cycle, before the final chickens are removed for slaughter.<sup>90,95</sup> Given the severe impacts of thinning on chicken welfare, the BCC only allows a maximum of one thin.

### 3.3 LIGHT

The majority of meat chickens produced in both Australia and New Zealand are reared in environmentally controlled buildings without windows, where artificial light is provided. Low light intensities and short periods of continuous darkness (2–4 hours) have been routinely used by producers to decrease bird activity and increase feed intake, with the intention of maximising growth rate and production. Light is an important factor for both welfare and health. Light cycles allow birds to establish natural body rhythms related to important physiology such as feeding, digestion, body temperature and growth regulation, reproduction and sleep.<sup>96</sup> Under natural conditions, birds are active during the daytime light period and rest and sleep at night when it is dark. Atypical photoperiods such as extended day lengths can cause sleep deprivation, which can negatively impact welfare, with both behavioural and physiological factors affected experimentally.<sup>97,98</sup>

Low light intensity has a negative effect on chicken welfare as it impacts activity level, behaviour patterns, performance of comfort behaviours, foot and eye health.<sup>99-104</sup> When offered the option, meat chickens will access different ambient light intensities depending on their current activity, with a preference to perform more active behaviour, such as foraging, under brighter light.<sup>105</sup> It has been shown that lighting programs with a minimum intensity of 50 lux stimulate higher diurnal activity levels in meat chickens without negatively

affecting weight gain.<sup>106</sup> Recent research found that the body weight gain, feed intake, feed conversion efficiency, carcass weight and meat quality of chickens exposed to light intensities of 5, 20, 35 and 50 lux were equitable.<sup>107</sup> However, chickens exposed to 5 lux of lighting showed signs of physiological stress, notably, significantly higher levels of circulating stress hormone (corticosterone) as compared to chickens reared with higher ambient light intensities.<sup>107</sup>

Research has shown that increasing the length of the uninterrupted dark period resulted in decreased mortality, leg and foot problems, rates of sudden death syndrome and ascites, and improved nonspecific immunity.<sup>96,108</sup> Providing longer periods of darkness (6-8 hours) encourages birds to rest together, reduces disturbance, and is associated with lower fear levels and increased activity during the light period.<sup>109</sup>

The New Zealand Code of Welfare for Meat Chickens stipulates a minimum of 20 lux light intensity, with a minimum of three hours (if more than four hours is provided) or minimum of four hours (if provided in one consecutive block) continuous darkness.<sup>17</sup> Best practice details the use of dimmers/gradual light changes to better replicate natural lighting, more than four hours of continuous darkness per day, and a minimum brightness of 50 lux for adult birds.<sup>17</sup> The Code advises 50 lux is light of a sufficient intensity to allow the reading of a newspaper held out at arm's length.<sup>17</sup> The SPCA Certified program requires a minimum six hours darkness per 24-hour period, of which at least four must be continuous (with an exception for the first four days after birds are introduced to a shed) and requires a minimum light intensity of 20 lux at bird head height.<sup>95</sup>

The Australian Standards and Guidelines require a light intensity of at least 20 lux, measurable at bird head height, for the first three days after introduction to a shed, with a minimum of one hour continuous darkness until 7 days of age.<sup>16</sup> Similar to the New Zealand Code of Welfare, after this introductory period, the Standards and Guidelines allow a darker shed with increased darkness hours for maturing birds: a minimum of 10 lux is required with a minimum six hours of darkness per day, at least four of which must be continuous.<sup>16</sup> Further stipulations are that light changes should be gradual, lighting should be evenly distributed, and that deviations from the requirements are allowable under veterinary advice.<sup>16</sup> The RSPCA Certified scheme lighting requirements require an average of 20 lux for the baseline Standard (30 lux after 2031 with a requirement for variable light intensity up to 50 lux).<sup>90</sup> The "enhanced welfare" level requires an average of 30 lux plus variable light intensity plus 8 hours total darkness.

The BCC requires a minimum of 50 lux brightness for adult birds in daytime hours and six hours darkness per day (of which a minimum four hours must be uninterrupted darkness), in line with evidence demonstrating improved welfare as well as practical evidence of commercial feasibility.

An additional factor which fails to be addressed by current regulations is the provision of natural light wavelengths. For avian species, UV light falls within their visible spectrum, and this is withheld from commercially farmed chickens housed indoors, with shed lighting type optimised for human vision.<sup>110</sup> Withholding the UV spectrum denies birds a key opportunity to interpret their environment. Experimentally, the provision of natural light reduces the percentage of time that meat chickens spend lying and improves leg health.<sup>111</sup> Chickens spend more time drinking, exploring, moving, and foraging in natural light compared to artificial lighting.<sup>112</sup> The BCC requires access to natural light for both indoor and free-range systems to enable this increased behavioural repertoire.

### 3.4 LITTER

An appropriate flooring for the rearing of chickens is critical for good health and welfare. An ideal litter substrate must be clean, deep enough to support the feet, limbs and heavy bodies of growing meat chickens, friable to promote natural behaviours such as foraging, scratching and dustbathing, and able to stay hygienic throughout the entirety of bird placement until all birds are removed for slaughter.<sup>79,113-115</sup>

Wood shavings are used in most meat chicken production in New Zealand.<sup>116</sup> Litter choice is more variable in Australia, based on regional availability, and includes wood shavings, sawdust, rice hulls, straw, and paper products.<sup>113</sup>

Under typical commercial practice, the litter is not changed while birds are present and may also be reused for multiple batches of chickens.<sup>91</sup> It is acknowledged by industry that litter management is crucial to avoid excess moisture buildup, which predisposes birds to dermatological conditions, such as footpad dermatitis and breast blisters, and excess ammonia which is aversive to their respiratory tract.<sup>113</sup> Conversely, litter that is too dry can cause dehydration in chicks and predispose chickens to respiratory disease.<sup>113</sup> Fresh litter at an adequate depth is most likely to provide welfare benefits, with fresh litter also shown experimentally to encourage more active behaviours in meat chickens.<sup>114</sup>

Australian and NZ minimum standards reference the need to manage litter but do not set a minimum litter depth.<sup>16,17</sup> The BCC requires use of fresh, friable litter at a depth of 5cm throughout the shed. Both the SPCA Certified and RSPCA Certified schemes include detailed standards for litter depth and management that exceed BCC requirements.<sup>90,95</sup>

The BCC also requires ammonia levels, which serve as an indicator of litter moisture and management, to be below 20ppm at the level of the birds' heads. The Australian Standards and Guidelines, the NZ Code of Welfare, SPCA and RSPCA Certified already meet or exceed this requirement.<sup>16,17,90,95</sup>

### 3.5 ENVIRONMENTAL ENRICHMENT

Environmental enrichment is defined as "an improvement of the environment of captive animals which increases the behavioural opportunities of the animal and leads to improvements in biological function".<sup>117</sup> Enriched environments enhance the wellbeing of animals by allowing them to perform more of their species-specific behavioural repertoire and accommodate a larger range of behavioural choices.<sup>118</sup> In contrast, most meat chicken sheds are relatively barren environments.<sup>119</sup> The addition of various enrichment items to sheds has been shown to increase activity levels and the expression of comfort behaviours.<sup>119-121</sup> Experimentally, birds in enriched sheds show higher levels of several important resting, foraging and comfort behaviours, even in areas of the shed where no enrichment items are present.<sup>122</sup>

Enrichment items aim to stimulate a greater range of natural behaviours of birds, via encouragement of behaviour associated with obtaining something desirable. This can include stimulating foraging behaviour (such as via the provision of loose grain on shed floors or bales of straw to search through), exploratory behaviour (via hanging items such as rope with which the birds can engage), making food access more challenging such that the bird must problem solve in order to access their ration (for example, via the use of barriers between the living area and the ration), perches or platforms to stimulate perching behaviour, panels to subdivide the living space and provide refuge, dustbaths, and novel food items or lights with which the birds can interact.<sup>119-121</sup> Provision of perches has been associated with the reduction of pushing and trampling between birds<sup>123</sup> and a reduction in the number of birds affected by hock burns and footpad dermatitis.<sup>124</sup> Meat chickens have been observed to use perches from as early as six days of age, and on average from nine days of age.<sup>125</sup> Platforms have been found to positively affect leg health, as birds with access to platforms have improved gait scores and lower prevalence and severity of tibial dyschondroplasia, another common bone disease.<sup>125</sup> Provision of panels has been observed to reduce disturbances during rest and also serve as shelter areas.<sup>126,127</sup> Provision of straw bales and pecking objects, such as bundles of string, in environments with natural light, have a positive impact on walking ability and decrease time spent lying down.<sup>111,128</sup>

Both the SPCA Certified and RSPCA Certified schemes require the provision of perches, at a length of 3m per 1,000 birds and 2.7m per 1,000 birds, respectively, compared with 2m per 1,000 birds for the BCC.<sup>90,95</sup> Both schemes also require at least one form of (pecking) environmental enrichment, evenly distributed throughout the shed.<sup>90,95</sup> The BCC requires the provision of at least two pecking substrates per 1,000 birds and this is emulated in the RSPCA Certified "enhanced welfare" level.

### 3.6 ZOONOSES

Rearing farmed animals intensively, at high stocking densities, with compromised immune function and health challenges, has serious implications for the development and spread of infectious disease.

Of relevance to meat chicken farming, and currently a global public health concern, is the emergence of high pathogenicity avian influenza (HPAI).<sup>129</sup> While the low pathogenic variant of the virus circulates naturally in wild bird populations, research shows that when the virus enters industrial poultry sheds, the close confinement of thousands of birds accelerates pathogen evolution, leading to the emergence of the highly pathogenic variant.<sup>130</sup> HPAI outbreaks are generally associated with intensive domestic poultry production.<sup>130</sup>

Australia had multiple outbreaks of an H7 strain of HPAI in 2024, with the majority of cases occurring on layer hen and meat chicken farms.<sup>131</sup> New Zealand also experienced its first case of HPAI (H7N6) in 2024.<sup>132</sup> Under current biosecurity requirements, these outbreaks necessitated depopulation via the mass killing of all birds on infected farming premises.<sup>131,132</sup> In 2026, the H5N1 bird flu strain, which has caused mass mortalities of birds and mammals globally, was detected in wild birds in Australia and New Zealand; concerns are high that poultry farms will be affected and amplify viral spread.<sup>133</sup> During outbreaks, free-range birds are prevented from accessing outdoor areas to help reduce the spread of HPAI. This confinement poses a welfare concern as buildings may not be suitable for long-term confinement and may undermine welfare assurances that birds have free-range access.<sup>134</sup>

Avian influenza is usually introduced to domestic bird populations via wild birds, typically waterfowl, coming into contact with or contaminating the feed of domestic species; the virus is highly infectious and can be spread via objects contaminated with the virus (known as fomites).<sup>129</sup> Transmission of HPAI into a meat chicken shed has devastating effects, with rapid disease spread both within the affected farm, and potentially between farms, given the movement of equipment between sheds and farms and the difficulty in eliminating contact with wildlife. Globally, the majority of HPAI outbreaks are associated with intensive poultry operations.<sup>130</sup>

While HPAI causes debilitating disease in affected birds themselves, it is also a zoonotic disease, capable of infecting and causing disease in humans.<sup>129</sup> High stocking densities of birds with concurrent disease and poor immunocompetence increase the likelihood of infection and disease spread. Recent research has shown that HPAI likely originated from genetic changes occurring in low pathogenicity viruses after they were originally transmitted from wild birds to intensive poultry farms.<sup>135</sup> This further shows the inherent link between intensified meat chicken production and the risk of severe disease, including the risk of future pandemics. Addressing this risk requires broader action that is outside the scope of the BCC.

## STUNNING AND SLAUGHTER

The welfare of animals during slaughter in Australia and New Zealand is underpinned by additional mandatory codes: the Model Code of Practice for the Welfare of Animals: Livestock at Slaughtering Establishments in Australia (currently under review), and the Code of Welfare – Commercial Slaughter in New Zealand.<sup>136,137</sup> Both Codes discuss the principles with which slaughter is to be considered humane and detail the need, and legal requirement, for effective stunning.<sup>136,137</sup>

The most common method of poultry stunning and slaughter in both countries is the use of an electrical waterbath system followed by severing of the major blood vessels of the neck after loss of consciousness.<sup>136,137</sup> With this highly automated method, conscious birds are hung upside-down by the legs on a moving metal shackle line and their heads pass through an electrified waterbath before having their throats cut.<sup>138</sup>

Electrical waterbath stunning (EWS) was created to allow fast processing of birds in order to meet consumer demand and ensure maximum profitability for meat chicken producers. However, there are many inherent welfare problems associated with this system and additional risks to the birds if the process is not correctly performed. The process begins with individual birds being removed by hand from their transport crate and hung upside down on an automated shackling line; a process that induces fear, anxiety, distress and pain in conscious birds.<sup>139</sup> The birds' legs are compressed during shackling, causing pain, especially in birds with thicker legs or suffering from lameness due to leg diseases.<sup>140</sup> Bird inversion significantly increases the levels of stress that poultry are subjected to during shackling.<sup>139</sup> Rough shackling can significantly contribute to wing flapping, in turn predisposing to dislocations and fractures. Pre-stun electric shocks, with associated pain and distress, can occur if the birds' wings make contact with the waterbath before their heads do, and electrical stunning is not always completely effective.<sup>141,142</sup> Some birds avoid being stunned by raising their heads and missing the water or, when their heads do enter the waterbath, the current may be too low to induce unconsciousness in larger birds.<sup>138,141,143</sup> This results in birds progressing to slaughter (severance of the neck vessels) while fully conscious and aware.

Controlled atmosphere stunning (CAS), or gas stunning, has become increasingly common internationally over the last 20 years, mainly as a result of animal welfare and product quality advantages in comparison with EWS.<sup>142</sup> Controlled atmosphere stunning involves exposing

chickens to either a mixture of inert gases (nitrogen and/or argon) or heightened concentrations of carbon dioxide (CO<sub>2</sub>), causing a reduction in available oxygen (O<sub>2</sub>), thus inducing loss of consciousness in the birds.<sup>142</sup> In comparison to EWS, one major advantage of CAS is that direct handling and shackling of live poultry can be completely eliminated, reducing the risk of pre-slaughter stress and injury.<sup>141,144</sup> However, carbon dioxide is an acidic gas, causing the birds to experience discomfort and stress before loss of consciousness if inhaled at high concentrations.<sup>145</sup> In multi-phase stunning systems, the birds are first exposed to relatively low concentrations of CO<sub>2</sub> ( $\leq 30\%$ ) to be less aversive, and then, once the birds are unconscious, a higher concentration (80-90%), sufficient to induce a deeper state of unconsciousness or death.<sup>142,145</sup> Controlled atmosphere stunning is experiencing a rapid uptake overseas, with the percentage of meat chickens in Europe slaughtered by CAS reaching 47% in 2021.<sup>146</sup> It is estimated that over 50% of meat chickens are stunned using CAS in Australia. In New Zealand, all slaughter is via EWS, although CAS is mentioned in the Code of Welfare for Commercial Slaughter.<sup>137</sup>

A newer stunning technique, low atmospheric pressure stunning (LAPS), induces unconsciousness in birds with a slow, continuous, controlled decompression causing a gradual reduction of oxygen tension in the stunning chamber, leading to progressive hypoxia.<sup>147</sup> Loss of posture, which is seen to represent loss of consciousness when exposed to LAPS, occurs on average at 80 seconds.<sup>148</sup> One study which assessed loss of consciousness via electroencephalogram found loss of perception likely happened within 40 seconds.<sup>147</sup> The major welfare benefits of LAPS over EWS are similar to CAS: no handling of live birds, no live shackling (since the birds are stunned in the modules used to transport them), no risk of pre-shocks, and no risk of ineffective stunning as LAPS reliably and irreversibly stuns all the birds.<sup>147,149</sup> Some researchers consider LAPS to be superior to CAS since LAPS does not use any gases during the stunning process, is safer for humans, and is a less aversive method to the animals.<sup>149,150</sup> While promising, the use of LAPS remains speculative in Australia and New Zealand at this time.

Given the significantly increased risk of adverse welfare outcomes associated with electrical waterbath stunning, the BCC advises the adoption of CAS for pre-slaughter stunning of meat chickens. Non-inversion electrical stunning of individual birds could also be considered, thus avoiding the stress of shackling, though this is not yet a commercially available option in Australia or New Zealand.<sup>151</sup> Given that currently all production of meat chickens in New Zealand is required to meet halal slaughter standards – which may not allow CAS – the Australia-New Zealand Better Chicken Commitment gives the option for companies to sign a version with a halal addendum. This version allows time for non-inversion electrical stunning to be developed commercially.<sup>152</sup>

## ■ BREEDER BIRDS ■

While the above has focussed on meat chickens bred specifically for direct consumption by the consumer, there are additional welfare issues which affect the breeder birds used to produce these animals.

Given their rapid growth rate, breeder birds have impaired reproductive performance when fed to satiety, but they can achieve higher hatching egg production under feed restriction. For this reason, chicken producers restrict the feed of breeding birds to prevent obesity, ensure birds are able to reach sexual maturity and physically copulate, minimise the health issues associated with a high body weight, such as leg problems, and reduce feed costs.<sup>153,154</sup> In turn, this gives rise to the secondary welfare issue of chronic hunger. While attempts have been made to satiate breeder birds with increased fibre in their feed, this doesn't resolve their caloric deficit and associated hunger.<sup>155,156</sup> These issues are so prevalent that the balance between musculoskeletal health, reproductive health, and welfare has become known as the 'broiler breeder paradox' globally.<sup>153</sup>

Meat chicken breeder birds are often characterised as more aggressive than standard meat chickens, which is likely to be a function of chronic hunger as well as behaviours associated with sexual maturity of the male birds.<sup>154</sup> Mating injuries are also frequent. Interventions such as beak trimming (a mutilation that causes pain and restricts expression of natural behaviours) have been used historically in attempts to control feather pecking.<sup>154</sup> The use of slower growing commercial strains of meat chickens means one or both of the parent birds are from slower growing strains, thus removing or reducing the need for feed restriction.

## ■ HIGHER WELFARE BREEDS ■

Many of the welfare issues associated with fast growth can be reduced by using meat chicken breeds which are selected to grow at a slower, but still commercially viable rate (less than 55g/day compared to over 60g/day).<sup>157</sup> Slower growing meat chicken breeds are less susceptible to leg disorders, skin conditions, heart problems and sudden death, resulting in a lower mortality rate than typical commercial fast-growing meat chickens and dramatically improved welfare throughout the life of the birds. They also have improved immunocompetence and reduced susceptibility to infectious disease.<sup>158</sup> Slower growing birds are more active: perching, running and walking more than conventional breeds.

While the uptake of farming higher welfare, slower growing breeds is in its infancy in Australia and New Zealand, they are becoming more prominent globally. These breeds

currently make up nearly 4% of the market in the United States, 5% in the UK and 8% in the EU.<sup>159-162</sup> Significant increases in the market share of slower growing breeds have occurred in several EU member states recently, and they now account for 6-10% of the market in Austria, 21-30% in France, and 100% of the fresh retail market in the Netherlands, with associated positive effects on measured welfare parameters and meat quality.<sup>160-162</sup> The Norwegian chicken industry has announced it will completely phase out fast-growing chicken breeds by 2027.<sup>163</sup>

In other countries, several animal welfare certification schemes require the use of higher welfare, slower growing breeds for all or some of their labels/tiers. This includes RSPCA Assured<sup>164</sup> and Red Tractor in the UK,<sup>165</sup> Beter Leven in the Netherlands,<sup>166</sup> Deutscher Tierschutzbund in Germany,<sup>167</sup> and Label Rouge in France.<sup>168</sup> The welfare implications of extreme genetic selection have also been challenged legally. In 2024, a British court ruled that under Paragraph 29 of Schedule 1 to the UK's Welfare of Farmed Animals Regulations 2007, keeping animals that suffer due to their genetics is unlawful, regardless of any commercial benefits.<sup>169</sup>

Slower growing breeds are required under RSPCA's "enhanced welfare" tier, but not under the standard RSPCA Certified Standard. They are not currently required under New Zealand SPCA Certified standards, although SPCA has signposted that changes are needed in the future on this key welfare issue. Ultimately, the genetic selection of commercially used meat chickens is the single most effective factor in improving welfare in the chicken meat industry in Australia and New Zealand.

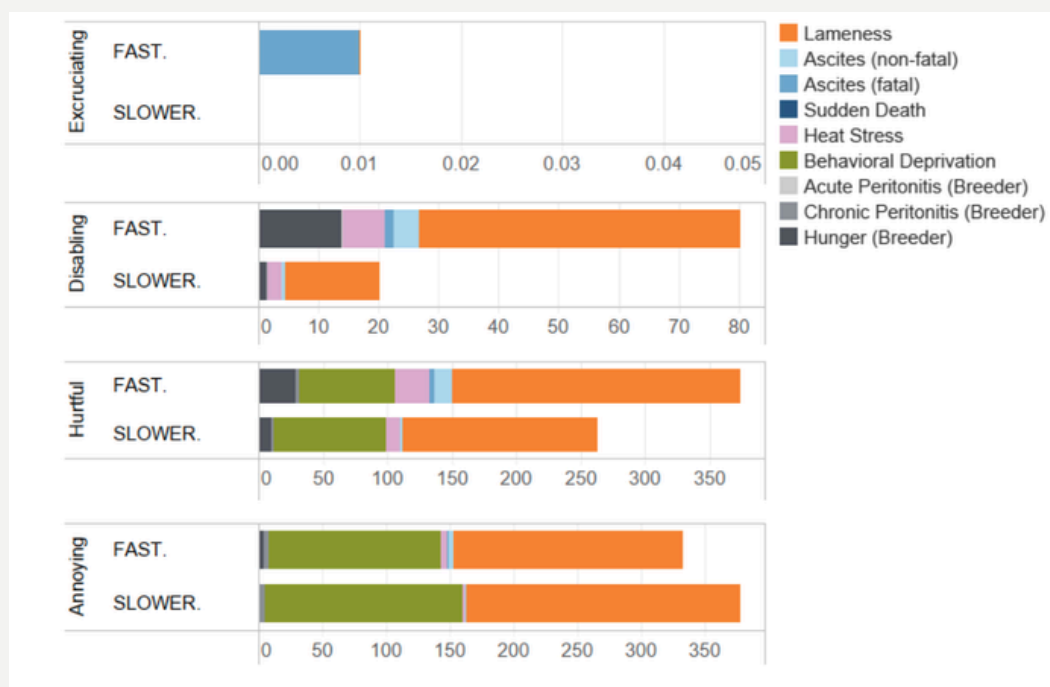
## I COMPREHENSIVELY ADDRESSING WELFARE I

While a transition to slower growing breeds is key to improving the lives of meat chickens, the multifactorial nature of chicken welfare means that the most benefit will be achieved through addressing breed and living conditions in unison. Switching to slower growing breeds without addressing environmental factors such as stocking density, lighting, perch access and enrichment, will result in birds who are more physically able to express natural behaviours but do not have the space or environmental complexity to do so.

The BCC aims to address chicken welfare in an holistic way by including key requirements for breed, living conditions and slaughter. Recent research conducted by the Welfare Footprint Project has measured the combined impact on bird welfare of all these requirements by directly comparing the pain experienced by fast-growing birds reared under conventional production systems versus slower growing birds under BCC requirements.<sup>170</sup> The study estimated that the adoption of the BCC results in a significant reduction in the amount of

pain each bird endures, particularly the most intense levels of pain (Figure 1).<sup>170</sup> Under BCC requirements, ‘excruciating’ pain is reduced by 80%, ‘disabling’ pain by 67%, and ‘hurtful’ pain by 25% compared to conventional systems.<sup>170</sup> This equates to the prevention of 79 hours of hurtful pain, 33 hours of disabling pain, and 24 seconds of excruciating pain across the life of the chicken by adopting the BCC.<sup>170</sup> For the lowest level of pain, adopting the BCC caused an increase of 23% or 24.3 hours of ‘annoying’ pain.<sup>170</sup> This increase in ‘annoying’ pain is primarily because all chickens experience periods of minor discomfort (due to potential lameness and behavioural deprivation, see Figure 1) which is extended for slower-growing breeds living for 15 more days on average to reach the same slaughter weight.<sup>170</sup>

**FIGURE 1: AVERAGE EXPECTED TIME IN PAIN — CONVENTIONAL VS BCC PRODUCTION**



**Figure 1.** Average expected time in pain (hours) endured by fast-growing birds in a conventional system (FAST) versus slower-growing birds in a BCC system (SLOWER). Time scales are specific for each pain intensity category for greater clarity. Only hours awake are considered. Categories of pain are defined as:

**Excruciating** - an extreme, overwhelming pain that dominates consciousness and demands immediate relief.

**Disabling** - A severe pain that significantly limits or prevents normal activities and functioning.

**Hurtful** - A moderate pain that clearly causes distress and affects behaviour or well-being.

**Annoying** - A mild discomfort that slightly distracts but does not impair normal functioning.

Source: Adapted from Welfare Footprint Institute, Impact of the Better Chicken Commitment and the Adoption of Slower-Growing Breeds on the Welfare of Broiler Chickens, <https://welfarefootprint.org/broilers/> (2022).

## I CONCLUSION I

The meat chicken industries in Australia and New Zealand are currently defined by high-volume production of fast-growing chickens, a model that prioritises economic efficiency over the welfare of individual birds. The scientific evidence detailed throughout this paper demonstrates how the pursuit of rapid growth and high breast meat yields has introduced systemic health issues, including debilitating leg weakness, heart failure, and painful muscle damage.

Improving the lives of meat chickens in Australia and New Zealand requires a transition away from fast-growing genetics, as the physical makeup of these birds is fundamentally at odds with good health. Moving to slower-growing breeds is essential to reduce lameness and metabolic disease. Alongside genetic changes, environmental improvements are also needed to support the birds' natural behaviours. This includes reducing stocking densities to allow for better movement and drier litter, as well as providing all birds with natural light and adequate enrichment.

The industry must also address the welfare risks present at the end of a bird's life. The fear and pain associated with traditional electrical waterbath stunning, particularly the stress of hanging conscious birds upside down, remains a major concern. Shifting to controlled atmosphere stunning offers a significant improvement by removing the need for live handling, inversion and shackling and ensuring a more reliable transition to unconsciousness.

Beyond animal welfare, these changes have broader implications for public health and biosecurity. Intensive farming at high densities increases the risk of zoonotic diseases, such as highly pathogenic avian influenza, which can have devastating effects.

Ultimately, the long-term success of the poultry industry in Australia and New Zealand depends on its ability to demonstrate that production methods align with modern animal welfare science. The requirements of the BCC provide a realistic, measured framework to vastly improve meat chicken welfare throughout the birds' lives, from genetic selection, housing and enrichment through to slaughter. Adopting the higher standards of the BCC will allow the industry to meet the ethical expectations of today's consumers and help to ensure millions of birds experience a life worth living.

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