Sharing success –

the global business case for higher welfare for pigs raised for meat

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Executive summary

Higher welfare – good for business, good for animals

Globally, more than1.2 Billion pigs were raised for meat in 2018[1]. Most experienced one or more mutilations (painful procedures) such as tail docking, castration, teeth reduction. The majority were also subjected to early weaning and lack of enrichment in barren farming environments.

These common practices negatively affect pigs' welfare, causing animals pain and stress. They are also generally associated with higher antibiotic use and other potential negative impacts on meat quality and safety.

Consumers and retailers are increasingly concerned with animal welfare and meat quality and are demanding higher welfare pork products.

This Global Business Case presents the production, economic and sustainability benefits of raising higher welfare pigs for meat, to meet those consumer and retailer expectations.

Consumer concerns

Routinely carrying out painful procedures on piglets in farming systems is considered unacceptable by consumers in many parts of the world. World Animal Protection commissioned global research, conducted by Voodoo Research, with more than 9,000 people in 11 countries and five continents between October 2017 and March 2018.

The aim was to better understand people's pork consumption habits, their understanding of the conditions in which pigs are raised, and their attitudes to pigs and their welfare. They were also asked if they would change their pork consumption habits to higher welfare products and if and how they would switch to different retailers to do so.

Key results include the following:

- More than two thirds in each market surveyed: Australia, Brazil, Canada, Chile, China, Denmark, New Zealand, Thailand, UK, and US said they found imagery of intensive pig farming 'upsetting, wrong or shocking'.
- In some markets, up to 86% of people were worried about antibiotics in pork production.
- More than 60% in each market said they would 'probably' or 'definitely' not buy pork from a supermarket that sourced from where piglets experience teeth grinding, cutting or tail docking and castrations, sometimes without pain relief'.
- 80% to 93% of people surveyed in each market believe 'it is important that pigs are reared with higher welfare standards.'

Investing in welfare

Farm animal welfare is important to investors too. A 26-member investor group, responsible for more than US$3.3 trillion in assets, has focused on links between farm animal welfare practices, investment opportunities and risks[2].

Rabobank 2018 'Sustainability Policy'[3] showcases how animal welfare policies are providing direction. "[Rabobank] strongly encourage[s] all of our clients to have transitioned to cage-free housing systems for laying hens and group housing for sows by 2025."

Rabobank's 'Sustainability Policy' also highlights the importance of the "promotion of positive experiences". It states this involves:

"Improving welfare above the survival minimum by providing animals with enriching opportunities to engage in behaviours that increase their comfort, confidence and capacity to make rewarding choices. These principles support the contemporary recognition that acceptable animal welfare management should include both the minimization of negative experiences and the provision of opportunities to have positive experiences."

The Business Benchmark for Farm Animal Welfare[4] also focuses on the mutilation (painful procedures) issue. Founded in 2012, and supported by World Animal Protection, the Benchmark offers a respected annual ranking of the world's biggest food companies' animal welfare policy and performance reporting. A key Benchmark question focuses on policy and progress to avoid routine painful procedures; the answers contribute to a company's overall score and tier ranking.

Showcasing success

To meet consumer and supplier demand for higher welfare products, some of the world's leading pig producers in Australasia, Europe, Latin America and North America are avoiding painful procedures. They are also weaning piglets later and enriching and innovating systems to improve the animals' housing.

Consequently, they are rapidly finding that welfare improvements make all pigs in the production chain, from piglets to finishing pigs, more robust. The animals behave more naturally; they have better immunity and growth, suffer less stress, disease and need fewer antibiotics. The meat quality is also better, which is also beneficial for producers, customers and businesses.

In this report, producers share, in their own words, examples and stories of improving animal welfare. They reveal what they have learned, their motivations, challenges, their successes and how they started and then extended welfare improvements. Where possible, they also include production and economic figures.

[1] USDA 2019 Livestock and Poultry World Markets and Trade, p11. https://apps.fas.usda.gov/psdonline/circulars/livestock_poultry.pdf last accessed 24 April 2019

[2] https://www.bbfaw.com/investors/investor-statement/ last accessed 6 May 2019

[3] https://www.rabobank.com/en/images/sustainability-policy-framework.pdf

[4] https://www.bbfaw.com/

Why higher welfare systems for pigs raised for meat?

World Animal Protection has developed a comprehensive Global Pig Welfare Framework outlining our position on unacceptable, acceptable and good pig welfare practice for indoor systems. We want pig producers to publicly commit to systems that allow better pig welfare.

Within the Global Pig Welfare Framework, early weaning (below 25 days) and overcrowded, barren environments are unacceptable. A plan to phase out painful procedures is also required.

Pigs raised for meat in intensive farming systems suffer physically and psychologically much of their short lives. Painful procedures, including tail docking, teeth reduction, ear identification/notching and surgical castration are often done together during a piglet's first week of life.

These painful procedures are often conducted at the same time, where the animals are turned upside down, and the procedures carried out with little regard to pain and welfare. Regardless of piglet age, weight or procedure variations, these procedures inflict considerable and cumulative pain for 100% of piglets involved.

They also affect a piglet's behaviour, ability to suckle, its growth, immunity and their social and maternal bonding. Although these procedures were introduced to prevent damage to some pigs caused by the unnatural behaviour of others, they clearly and negatively affect all pigs in a herd. These procedures are also mask abnormal pig behaviour and health problems caused by the intensive farm model.

Pain, distress and complications

Pigs suffer pain and distress during the procedures and nerve pain for weeks afterwards[1]. They also feed less and experience prolonged sensitivity to pain and fear. Some also experience complications such as infection, herniation or docking-associated tail tumours.

These procedures also prevent natural behaviours including normal suckling and communication. To communicate with each other pigs use their ears and tails. Tails help pigs communicate with people too; full, active, curly tails are important indicators to farmers of good pig welfare.

Early weaning, which can occur as early as 18 days in conventional intensive farming, has other significant impacts as it prematurely exposes piglets to major stress. It involves removal from their mothers and in some cases littermates, a different diet, system and environment- new groups, different pens and management practices – at a vulnerable stage of development.

It also predisposes pigs throughout their lives to fear people. Early weaning affects their growth rates and lowers their immunity exposing them to a higher disease risk. This in turn means increased antibiotic use to mask or tackle the problem. Piglets are also given high doses of antibiotics during painful procedures and weaning to pre-empt infection or disease.

Weaned piglets are routinely kept until slaughter in barren, crowded housing. Such conditions prevent their natural instincts to forage and explore, cause great stress and frustration, and drive them to behave abnormally. Abnormal behaviours may include belly nosing, sham chewing, tail biting and excessive fighting.

Gastric ulcers are also common among pigs raised for meat, particularly associated with a lack of insoluble fibre in their diets. Gastric ulcers have been found at processing. In some cases, more than 70% of the herd are affected[a b].

Affecting health, antibiotic use and production

Mass prophylactic use of antibiotics for piglets is linked with painful procedures and early weaning. Pigs raised for meat routinely also face higher risk of disease when confined to crowded, mixed groups in stressful, barren housing conditions.

Sick pigs, commonly those with respiratory or enteric disease or lameness, behave differently to healthy pigs; they have an increased risk of receiving tail biting. Evidence suggests that even low-grade inflammation may decrease pig activity and increase attacks by other pigs.

Body lesions and pressure sores are an added source of stress, pain and infection which in turn leads to antibiotic use. These conditions can be difficult to detect and hard to treat in large, crowded groups. Caretakers may also be reluctant to treat sick pigs close to slaughter due to treatment withdrawal periods.

Body lesions indicate aggression from other pigs, while ear or tail lesions are associated with bites from pen mates who are trying to forage or explore as they would naturally. Ear and tail biting are costly to production in terms of energy loss (and poorer feed conversion), risk of secondary infection, and are associated with the greatest reduction in growth.[5]

The ongoing stress caused by overcrowding, competition and boredom also fundamentally reduces pig immunity. It predisposes pigs to disease, increased antibiotic use and possible antibiotic resistance. This can then be transferred to workers, the food chain and to supermarkets selling the pork.

These health and welfare problems have a negative financial impact on production; as antibiotics used to tackle them increase cost and unresolved problems hinder optimal production. Improving systems to avoid painful procedures and weaning later can further contribute to better pig health and reduce the risk of bacterial resistance to antibiotics on farm and in the food chain.

Satisfying basic needs

Avoiding painful procedures, weaning later and providing enrichment materials have many benefits over conventional production systems. These improvements allow the growing pigs to avoid unnecessary pain, fear and stress. They help them become more robust and able to satisfy their basic needs to better cope, socialise, forage, and explore.

Providing adequate space and enrichment also helps reduce rates of repetitive abnormal behaviours (stereotypies), body lesions, tail biting, gastric ulcers and other negative effects on production. Good enrichment is also associated with increased growth rate and pork tenderness, due to an increase in intramuscular fat and water holding capacity.[c d e f]

Technological solutions, good management and environmental conditions, including enrichment provision, make painful procedures unnecessary.

Key features of higher welfare growing pigs are outlined in table 2.

[5] http://www.assurewel.org/Portals/2/Documents/Pigs/Pigs%20explanation%20of%20measures.pdf. Assurewel provides a farmer friendly (scientifically based) explanation to understand the causes of body, ear and tail lesions and other welfare indicators to assist on farm observation.

Photo: Credit: World Animal Protection

Commercial practice – the solutions to avoiding painful procedures

Introducing welfare changes requires time, investment in staff learning and workers with a strong, baseline understanding of pig behaviour. However, these changes allow workers to avoid unwanted tasks and related antibiotic use; they also improve animal welfare, worker observational skills, pork quality and optimise housing with a range of production benefits. Higher welfare also provides companies with a marketing edge and reputational boost in fulfilling consumer expectations and achieving positive business rankings.

Avoiding surgical castration

"Surgical castration is one of the most traumatic procedures in the pig industry, if not the most traumatic."

Sergio Gomez, production director of ALIAR S.A. – Colombia's largest pig producer.

Surgical castration, the most painful routine procedure, involves incision of skin, deep tissue and organs. Piglets show severe behavioural and physiological responses indicating pain both during and for several days after the procedure.

Farmers generally find surgical castration impractical, disruptive and less productive.

"There is more piglet welfare in not castrating, I look forward to the day it ends", says Danish farmer, Kristina Ager of Søndergaard Farms.

A Swedish farmer told us she: "Castrates in a separate room to avoid the (piglet) noise upsetting the sows and would prefer to use immunocastration because it also improves productivity."

Castration is performed to avoid boar taint in pork where animals are slaughtered at heavier weights following onset of puberty. Boar taint has an unpleasant odour and taste, and naturally occurs in a small percentage of entire (uncastrated) males[6]. It is made up of two main compounds that increase after puberty in entire males.

Spotlight

Understanding castration pain

Signs of piglet pain during castration include high-pitched squeals and screams, kicking and other escape attempts. Afterwards the piglets may wag their tails repeatedly, huddle, tremble, rub the wound on pen surfaces, experience spasms or stiffness. Other indications of pain include taking longer to lie down, eating less and avoiding social contact with littermates.

The range of signs of pain with other painful procedures are detailed in the reference[9].

Pain management does not remove all the pain. Also, it does not prevent complications or longer-term effects such as fear, pain sensitivity or negative production impacts such as temporary growth reduction and nursing disruption.

Classes of drugs available to prevent or treat pain in pigs are not always available or effective, especially for moderate to severe pain caused by castration. Avoiding painful procedures is clearly preferable. There is no convincing evidence that pain can be reduced to an acceptable level on a commercial scale with the drugs available for food producing animals worldwide. Providing only post-procedural pain relief contravenes scientific advice on pain management.

[6] Boar taint *detection was conducted by 34 testers in the Netherlands in 2012/2013, and average boar taint prevalence amongst 1.7 million boars on 1585 farms was equal to 3.31%, with 90% of the farms within the range of 1.5% to 5.8% boar taint prevalence. Boars on the way. 2013. Wageningen University.* http://edepot.wur.nl/293639 More on boar taint occurrence in the following report also.

Weighing up alternatives

Entire males grow more efficiently but are also more aggressive and sexually active. This leads to more fighting, mounting and injuries on farm and during transport or at the slaughterhouse. Surgically castrated males grow less efficiently. They use more feed and lay down more fat than entire or immunocastrated males, and this affects pork quality and profitability. [h]

The following are higher welfare alternatives to surgical castration (also known as physical castration) to reduce or prevent boar taint:

- Sale of entire males before puberty or boar taint risk, i.e. at lower slaughter weights. Good management can assist: in a German slaughterhouse receiving entire males, slaughter weight has been increased from 90-92 kg to 95 kg dead weight as a result of improvements in feeding schedules, genetics and pig management. Following these changes, the proportion of tainted carcasses decreased from 5-8% to 2-2.5%. Using meat with boar taint in cold, cured or preserved products has been found a viable option in some EU markets while Asian markets are certainly very sensitive to boar taint. Rapid, reliable carcass taint detection methods are used to prevent boar-tainted meat reaching the market while the human nose is still preferred in some markets. [7]
- Refinement of pig diets[i] [j] (dry, fibre, protein content) and feeding (long troughs), also improved pen hygiene and group management to reduce aggression, mounting and related injuries[k]. These approaches reduce boar taint levels predominantly via reduced skatole levels[l] in and from manure absorbed via skin, especially injured pig skin. Sex sorting for female only herds or maintaining litters also assists[m].
- Low taint breeds or genetic selection for reduced boar taint lines by a number of breeding companies. Ranking boars (for artificial insemination) on their genomic breeding values for low boar taint resulted in a reduction in boar taint prevalence of 40%[n]. Note: these approaches will not remove the unwanted behavioural aspects of entire males.
- Gene editing to block puberty[8]. Sperm sexing is also being researched[o].
- Immunocastration – essentially two vaccinations[9] to temporarily prevent testicular function and boar taint within two weeks after the second injection[p]. The scrotum is retained but testes are around 55% smaller[q].

To date, the most widely used and commercially viable alternative is immunocastration; through an anti-GnRF (Gonadotrophin Releasing Factor) vaccine. This vaccination effectively prevents testicular function and boar taint, reduces aggression, mounting, tail manipulation and skin lesions[r] while pigs grow similarly to entire males.

Vaccinated males can even grow faster[10]. Feed efficiency is improved overall, on average by 7% compared to surgically castrated males[s]. Castration-related infections are eliminated and mortality reduced[t] [u]. These benefits usually more than compensate for the cost of immunocastration. Sustainability benefits are associated with the reduction of feed required. The carbon footprint can be reportedly[11] reduced by up to 3.6% compared to production with surgically castrated males.

Meat quality can be better than surgically castrated males with higher percentage lean[v] and good water holding ability for storage and cooking, also superior to entire males in terms of intramuscular fat for tenderness[w]. Immunocastration is safe for animals and consumers, with no residues of concern. It is not a hormone. The vaccine is legally available in more than 60 countries with a zero-day withdrawal period[12].

[7] https://ec.europa.eu/food/sites/food/files/animals/docs/aw_prac_farm_pigs_cast-alt_establishing-best-practices.pdf

[8] Tad Sonstegard abstract from 2019 proceedings. Farm animal welfare and gene technology. RSPCA Australia animal welfare seminar.

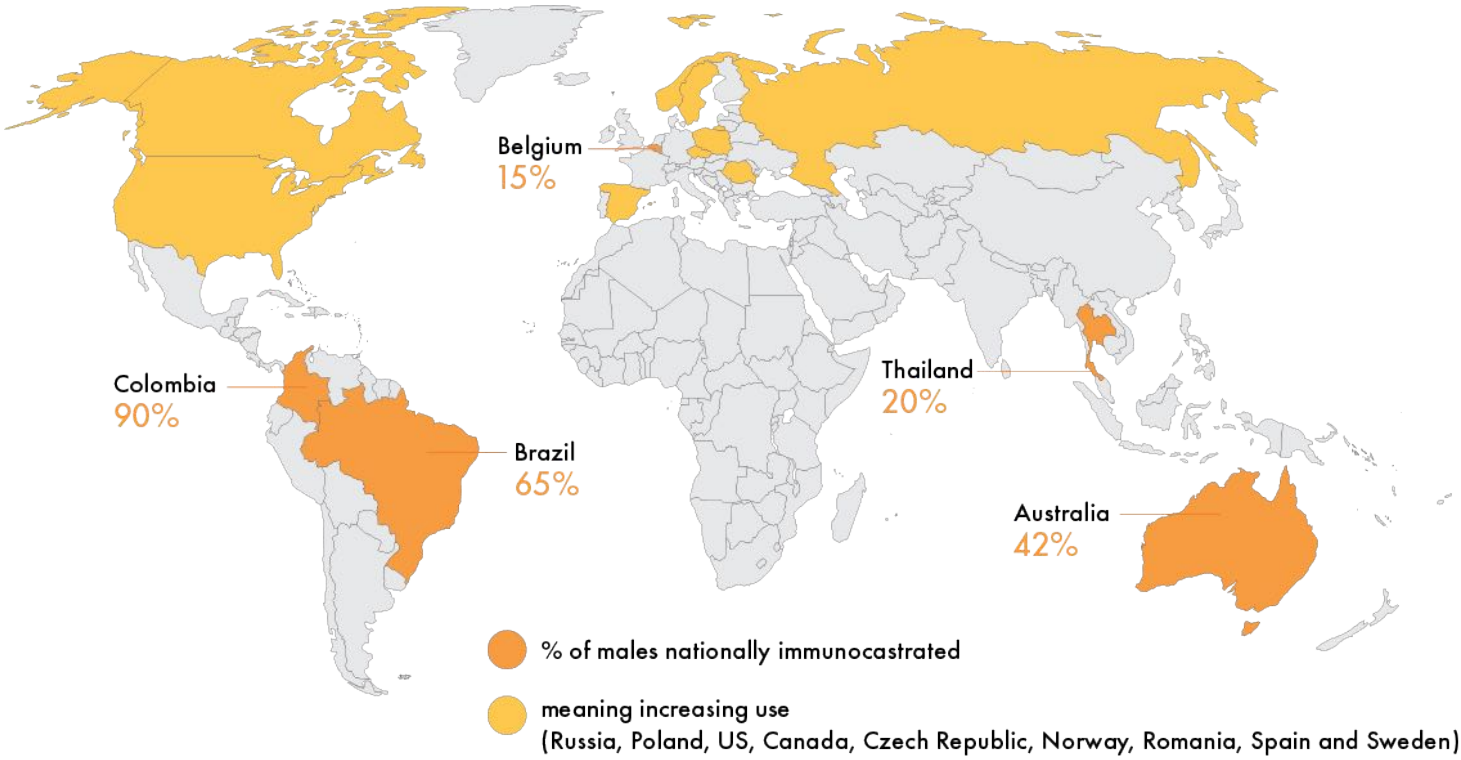
[9] Depending on the product and country: the first vaccination is around 3 weeks of age and then 4 weeks before slaughter (http://fs-1.5mpublishing.com/ceva/CevaValora.pdf) OR a first vaccination from 8-10 weeks then a second in 4 weeks or 4-10 weeks before slaughter (https://www.zoetisus.com/improvest/docs/key-messages-faq-brochure.pdf)

[10] An independent meta-analysis across the fattening period from first vaccination (at 8 weeks) to slaughter shows that immunocastrates can grow faster than entire and surgical castrates. Batorek N,Čandek-Potokar M,Bonneau M,VanMilgen J.Meta-analysis of the effect of immunocastration on production performance, reproductive organs and boar taint compounds in pigs. Animal. 2012;6:1330-1338. DOI: 10.1017/S1751731112000146

[11] https://www.zoetisus.com/products/pages/improvest_new/index.html#13

[12] https://www.zoetisus.com/improvest/docs/key-messages-faq-brochure.pdf Zoetis directly reports registration now in 65 countries.

Map of main immunocastration uptake



Case study – ALIAR S.A., Colombia

ALIAR S.A. is Colombia's largest pig producer. Production director Sergio Gomez outlines why and how they pioneered the use of immunocastration.

"Castration requires a lot of time, it generates high stress on animals; not only the castration itself, also because they need to be caught and handled. By using immunocastration, we have obtained good results with better pig conformation and higher lean gain. This means better production and a positive cost benefit, while generating a positive welfare impact for the animals."

He reports that immunocastration allowed the company to:

- eliminate the traumatic process for the piglet and phase out this painful procedure
- lower piglet mortality during lactation
- improve the welfare of workers by eliminating the routine process
- obtain good results with better weight gain during the whole production process.

The company also found that implementing immunocastration was relatively easy, with a well-organised process to vaccinate at the right time with the right equipment. They allocated staff for this task, including training for good pig handling and safety to prevent self-injection as vaccination occurs in the pens.

"Now, after 10 years of using immunocastration, we have one person at each farm responsible for vaccination. They have training and certification, plus we also have internal guidelines on how to do immunocastration and to identify if there is any problem with any animal before it goes to the meat plant. I think this is a very simple process if is performed according to the recommendations," says Mr Gomez.

"We have immunocastrated over two million pigs and probably only five pigs were reviewed (for revaccination prior to slaughter). So, my advice is that the producers should not be afraid of using this technology. Immunocastration has facilitated our work and has improved production parameters, bringing benefits to the company and of course providing better welfare for the animals.'

Nationally, more than 90% of male pigs in Colombia are immunocastrated. Key to success is the national technical team, involving stakeholders along the supply chain: the farmers, traders, processors and regulators so they understand and trust the technology.

Another major incentive for Colombian pig farmers is the reduction of feed needed. Consequently, immunocastration is a very attractive economic option for this market which demands a heavier, leaner carcass. Immunocastration is also accepted by Colombia's increasing export market.

Argentina and Mexico are also increasingly adopting immunocastration.

Photos: **(lt) ALIAR S.A. trained staff vaccinating pigs (credit: Zoetis, ALIAR S.A.). (Rt) IC pigs had an additional daily weight gain of 54g and finished with at least 2.8mm less backfat and 2.2% more lean[13]. Innosure is the Colombian registered name of the vaccination format by Zoetis (credit: Zoetis, Colombia)**

[13] Carcass analysis study across 50 companies and more than 200,000 carcasses in Colombia from similar facilities, management and feeding. The analysis concludes, with statistically significant findings and 95% confidence limits, that after adjusting the hot carcass weight, the back fat of an average carcass of an IC pig is between 2.8 and 3.4 mm below the back fat of an average carcass of a pig with surgical castration. Zoetis.

Sharing country and regional success and experience

Brazil

Brazil processes 150kg pigs and 65% of all males are immunocastrated, including most destined for export markets. A technical team conducts the vaccination, inspection and certification. They have reduced male pigs that miss vaccination to 0.2%. Once they are detected, they are given a follow-up vaccination on farm to ensure 100% compliance, with documented assurance for the slaughterhouse.

The two major vertically integrated producers in Brazil are in the top 10 producers globally. JBS and BRF Brazil do not practice surgical castration, choosing immunocastration to promote higher comfort and lower stress to piglets. BRF raises 4,750,000 pigs for meat annually. Edilson Caldas (corporate coordinator pig supply chain, BRF) states:

"BRF was a pioneer in this practice in Brazil and use immunocastration on all our male pigs, except a small proportion destined for parma ham. We adjusted our management and raised awareness among producers and employees. Immunocastration was relatively easy because it reduces the amount of work and brings technical benefits."

Australia

More than 42% of entire male pigs are immunocastrated in Australia. Farmers are reportedly motivated by the lean meat quality demands of consumers and the need to prevent unwanted behavioural impacts of entire males. Pigs are calmer, easier to handle for transport and slaughter and in large groups. Even in eco-shelters (see last section) they can be comprehensively vaccinated. Retailers, however, could clarify their stance on the use of this technology across their supply chains.

Thailand

An estimated 20% of male pigs nationally are immunocastrated.

North America

For similar reasons to Australia, the USA and Canada are increasingly adopting immunocastration, including some major vertically integrated companies.

Vaccination is outsourced, as in Brazil, and compliance reports are legally accepted in the USA. No additional inspection is required at participating slaughterhouses. American consumers like a bit more fat with their pork, so immunocastration, compared to entire males works well.

A 2013 study[14] estimated net financial gain for US pork producers is $5.32 per immunocastrated market hog, and the packer is expected to achieve a net gain of $5.04 per immunocastrated carcass.

[14] Buhr et al. Comprehensive Economic Analysis of Improvest ® Adoption by the US Pork Industry. 2013. This net producer gain includes $2/head feed saving, $6.71/head at for optimal weight and carcass premium, $1.61/head for a reduction in labour costs associated with physical castration and a reduction in mortality, and also takes into account the $5/head cost of implementing immunological castration (labour, drug costs).

Europe

Surgical castration is still the norm in most EU member states, performed mostly without pain management. A voluntary EU Declaration on alternatives to surgical castration of pigs by 2018 relied on industry to lead the way, but it has failed to generate a comprehensive outcome and only a few countries were committed towards phasing out surgical castration completely[x].

Currently, some European countries raise mostly entire pigs to a lower weight. A few have mandated, or industry has volunteered, pain management with surgical castration. Some await destination market leadership, associated with their trade in pigs raised for meat, to take decisive national action. Others have taken little action[y].

A large-scale consumer study[15] across France, Germany, Netherlands and Belgium in 2011 found that consumer awareness of boar taint was low. But when informed about techniques to prevent it, most preferred the adoption of immunocastration (to castration with pain relief). The study also noted: Norway (since 2002), Switzerland (since 2010) and the organic farming sector in the Netherlands (since July 2007) banned surgical castration without anaesthesia. Since 2014, domestic grocery stores in the Netherlands have also not stocked pork from surgically castrated pigs.

In 2013, the EU commissioned[16] an economic feasibility study comparing surgical castration with and without anaesthesia, immunocastration and production of entire males in an EU transition context. The research estimated that the better feed conversion can be valued at €7.11 per pig for entire males and €6.10 for vaccinated pigs. A clear net benefit was demonstrated with immunocastration compared to any variations of surgical castration. This benefit was maximised when a minimum of 95% of male pigs were not surgically castrated.

A 2015 survey of EU member states by the Federation of Veterinarians of Europe found that Belgium remains the largest EU adopter with around 18% of immunocastrated males while Czech Republic, Norway, Romania, Spain and Sweden reported an increased number of immunocastrated pigs during the last 3–5 years[z].

In 2019, the EU finalised a report[17] on best practices of entire or immunocastrated pigs, including processing and marketing, with a compelling portfolio of commercial examples from farm to the retail market. Good communication and best practice sharing, farm-to-slaughter assurance, data and cost-benefit sharing agreements meant a successful transition, with animal welfare, sustainability and health marketing benefits. 'Vaccination' was strongly preferred over 'immunocastration' by retailers and consumers in marketing communication.

The report concluded: "Evidence from these operators demonstrates that it is commercially feasible to transition from physical castration to raising entire males or vaccinating them against boar taint. While improving pigs' welfare significantly, these changes have also resulted in increased profitability for some businesses." Retailer case studies are reported:

[15] This 2010 large-scale quantitative study (n = 4031) does not support the reserved attitude of stakeholders who fear potential low market acceptance. The vaccine (immunocastration) method was actually preferred by the majority of consumers surveyed (69.6% of the participants) and it was perceived as equally effective in terms of avoiding boar taint; 43.8% of the consumers reported an intention to seek out pork from pigs where the vaccine had been used to control boar taint, whereas 33.7% reported an intention to avoid pork from pigs physically castrated with anaesthesia.
https://www.researchgate.net/publication/221968940_Consumer_response_to_the_possible_use_of_a_vaccine_method_to_control_boar_taint_v_physical_piglet_castration_with_anaesthesia_A_quantitative_study_in_four_European_countries

[16] EU Declaration https://ec.europa.eu/food/animals/welfare/practice/farm/pigs/castration_alternatives_en and final report commissioned study in 2013 https://ec.europa.eu/food/sites/food/files/animals/docs/aw_prac_farm_pigs_cast-alt_research_civic_pt1-synthesis_20131202.pdf

[17] https://ec.europa.eu/food/sites/food/files/animals/docs/aw_prac_farm_pigs_cast-alt_establishing-best-practices.pdf

Spotlight

European retailers and labels lead the way:

The largest Belgian supermarket chain Colruyt Group decided to sell only pork from vaccinated pigs from 2011 onwards. They initiated trials and research in 2010, engaging and communicating well with farmers. Supplying farmers were encouraged by the benefits of better welfare, feed efficiency, reduced manure and antibiotic use previously associated with surgical castration. The retailer uses 'vaccination' in all their communication with consumers amongst their messages of pig health, welfare and general sustainability[18] and receives very positive responses.

LIDL in Belgium only accept pork form pigs that have not been surgically castrated[aa]. They quietly made this transition swiftly in 2013 and without incentives, building on a number of farmers already providing taint free entire males. Farmers embraced the full transition, with benefits of avoiding castration, associated infections and reduced feed consumption. The supermarket did not market this change specifically except on LIDL Belgium website.

Following the retailer trend in Belgium, Carrefour Belgium announced[19] it would ban all pork from castrated pigs by end of 2013 and maintains this requirement[bb].

French pork cooperative COOPERL (formerly Cooper Arc Atlantique) announced plans to stop castration of piglets by March 2013[20]. They account for around 20% of France's pig production and provide entire male taint free pork to 13 million consumers a year. Their decision was motivated by animal welfare, increased feed efficiency (10%) and an opportunity to reduce antibiotics. The company detail their approach involving stakeholders along their integrated supply chain[21]. A case study also summarising the cost-benefit evaluation and their research investment and use of low-taint lines for entire males is included in the 2019 report.

In June 2018, Belgian retailer Delhaize launched its 'better for everyone' label, successfully marketing castration free pork. Their supply of non-castrated pork expanded and now all Delhaize pork sold is castration free. The retailer worked closely with farmers to improve breed use (variant of Piètrain) and on farm and slaughterhouse management with guidelines and a small financial incentive for use of a specific pig feed. Delhaize also guaranteed purchase volumes from farmers to secure their improved welfare supply. The slaughter weight of entire males remained at 110kg.

There are a range of welfare assurance schemes and labels in Europe (and beyond) that don't accept surgical castration. A group of 13–14 farms in Sweden have also formed their own label. The selling points are animal welfare, local produce, tasty and environmentally conscious credentials. They use immunocastration, have very low antibiotic use and the pigs have high health levels. The farmers meet twice yearly to share tips. Three of these farms are likely to be amongst the top 10 pig production performers of 2019.

Greater consumer education about alternatives to surgical castration is always useful. However, current barriers to wider use appear more associated with processors and perceived barriers to export than marketing to consumers. Avoiding surgical castration is a commercially viable way for producers and retailers to promote sustainability, by solving a pig welfare concern and reducing overall feed required and carbon emissions. It provides the opportunity to boost social responsibility, sustainability, reputation and retail advantage.

[18] https://www.colruytgroup.com/wps/portal/cg/en/home/stories/Welfare-pigs

[19] https://www.globalmeatnews.com/Article/2012/11/08/Carrefour-Belgium-imposes-stricter-animal-welfare-requirements

[20] https://www.globalmeatnews.com/Article/2012/09/11/French-cooperative-to-end-piglet-castration

[21] https://www.boarsontheway.com/best_practices/anne-lacoste/ last accessed 5 May 2019

Avoiding tail docking

Pigs need to explore and forage for many reasons. These include searching for food, bedding materials, a place to lie down, or to express curiosity about their living area. All pigs need to perform these behaviours from a very young age. When their behavioural needs are not met, there are negative consequences including tail biting. This abnormal pig behaviour is fundamentally a response to boredom, insufficient stimulation and frustration as pigs direct their oral behavioural needs to other pigs[cc].

As pig farming intensified, routine tail docking was originally advocated to reduce the risk of tail biting. However, regardless of methods used or age performed, all tail docking is painful for at least a week afterwards and in some pigs for up to a month. It also reduces piglet growth and immunity for at least a week after the operation. 100% of piglets are impacted.

Docking involves labour costs and time and does not eliminate tail biting. Some reports detail more than 50% of pigs have tail lesions at slaughter, despite 99% of these pigs being docked[dd].

Pig tails are important indicators of pig health and well-being. Consequently, tail docking hides poor welfare and management practices in intensive farming which also risk tail biting. Risks include: lack of manipulatable material and space, poor health, poor pen layout, inactivity or restlessness; heat stress; fully-slatted flooring; nutritional and water deficiencies; genetics; herd size; competition for feed, stressful mixing of unfamiliar pigs and dysfunctional social structure. These risks accumulate until the stress becomes too much and tail biting breaks out.

Tail biting is painful and costly. It leads to reduced feed intake, changes in group social behaviour and feeding, infections, increased antibiotic use and worker labour, carcass downgrading or condemnation. There is also a correlation between lung lesions and tail biting[ee ff gg], and lame pigs are at greater risk[hh ii] of becoming victims. In summary, tail biting risk is increased by management and housing practices that fail to meet the basic needs of pigs yet data suggests it can be managed to an acceptable level without docking by correcting the production system to better meet pigs' needs rather than changing the system totally. [ii]

Housing, management and environmental conditions, designed to meet the needs of pigs, prevent tail biting and the need for docking have wider health, welfare and production benefits. Cost-benefit modelling is being tested. Enrichment (eg. Manipulatable materials) is key to enable natural exploratory and chewing behaviour, along with other provisions to meet pig needs.

Reduced tail biting is found when chewable enrichment is used pre-weaning, and particularly during and after weaning. Regular pig monitoring and early detection of at-risk or biting individuals is also important. Intact tails can directly indicate good welfare and provide an indication also of pig health on farm, and value on the slaughter line. Intact tails are also in demand in some Asian markets.

The European Council Directive 2008/120/EC outlines minimum standards for the protection of pigs, which does not allow routine tail-docking. The directive requires farmers to provide their pigs with 'manipulatable material' such as straw, hay, silage, peat, or sawdust. Throughout the EU, compliance generally falls far short.

However, the UK government is auditing farms for intact tails and evidence that tail docking is used only as a last resort. It is also engaging the industry in solutions to address the root causes[22] of tail biting. Intact tail pigs do not necessarily cost more and there are benefits of increased feed conversion rates, and better health and production. With good enrichment, management and housing conditions, tail docking has been successfully avoided throughout several countries in Europe[23] - it is not a niche concept.

[22] http://www.pig-world.co.uk/news/tail-docking-must-be-a-last-resort-defra-sets-out-position.html

[23] A 2016 EC study visit Report 2016-8987 available in several EU languages: http://ec.europa.eu/food/audits-analysis/overview_reports/details.cfm?rep_id=101 Good practices identified at farm level in European states (Finland, Sweden which both have banned docking, Norway and Switzerland) who are successfully rearing pigs with intact tails include: good management of enrichment materials, feed, air quality and ventilation, stockmanship, competition between animals and health status. In addition to the above, farmers must also regularly observe pigs and rapidly identify the tail biter and thereby prevent outbreaks of tail biting when they first appear. In Sweden, enrichment materials represent 0.25% of costs in fattening farms (6kg of straw per finished pig) and in Switzerland, the expenditure on rolls of compressed wheat chaff was around 90 cent (€) per fattening pig.

Making the case – raising pigs with intact tails

Viggby Äs Lantbruk

Viggby Äs Lantbruk is a conventional Swedish farm of slightly above national average herd size. The farm avoids tail docking, teeth reduction and weans above a minimum of 28 days as required by Swedish law; as a result, antibiotic use if minimal. Viggby Äs Lantbruk weans piglets at an average weight of 10kg.

Piglets are moved into small group pens with solid and slatted areas and a straw-based system. For the first two weeks after weaning, piglets are bedded on sawdust. Farm workers find this is cleaner and easier to spot any diarrhoea. After that, they are given straw[24].

Co-owner Jeanette Elander says: "If they [workers] start to see tail biting, they immediately provide an extra round of straw to all pigs. They then give ropes and toys if it's still a problem. They find paper bags and ropes work the best as the pigs can rip them apart."

This farm is also part of a local group that sells waste products (in Viggby's case straw-based manure) to produce biogas that power all the buses and taxis in the local city. After the biogas processing procedure, material is returned to spread as fertiliser on their land. This is a cost neutral and welcome environmental initiative, with the added benefit of an enriched and lower odour fertiliser to spread on the land.

Photos credit: **Viggby Äs Lantbruk farm.**

Spotlight

The benefits of daily straw – how much is needed?

To be effective, enrichment needs to be safe, chewable, destructive and ideally edible. Straw and similar substrates are ideal. Providing straw at least once a day can reduce tail biting tenfold[kk]. As little as 100g/day/pig and 0.9sqm space per pig provides behavioural benefits and significant reduction in tail biting[ll]. In Sweden and Finland where tail docking is not permitted, farmers report using on average 30 to 50g of straw per pig and per day.

A survey revealed fewer injurious tail biting outbreaks on farms using larger amounts of straw. Increasing the straw amount up to 300 or 400g per pig and day had the following positive effects:

- reduced tail injuries and stomach ulcers
- increased growth rate
- increased the number of pigs, and time spent, engaging in straw-directed behaviour
- reduced the time spent in redirected behaviours towards other pigs.

These farms easily manage straw with partially-slatted floors and underfloor slurry systems.

These systems deal with small amounts of straw that fall down the slats using large pipes and regular flushing.

When straw is not available: chewable materials provided before (and after) weaning also reduce tail biting[mm]. For example, jute sacks, knotted rope and local edible plants replenished daily or fresh wood work well, placed in the activity area of pens. Some exploration feeding (on the ground) can also reduce tail biting and other fighting[nn].

[24] Swedish farms were widely surveyed about their straw use, manure handling and tail biting incidence. Amounts of straw used for weaners and finishers are visually reported. https://farewelldock.eu/straw-survey-sweden-3-conference-abstracts/

Heikkilä farm

This indoor farm in Finland produces 110,000 meat pigs indoors annually. They sell them at 30kg for finishing. In 2002, Finland banned tail docking. Originally, Finnish farms experienced 5–20% tail biting. Tail biting average rates in Finland are now less than 2.5% and this farm experiences less than 1%. Consequently, the company has significantly reduced their antibiotic use.

Mr Heikkilä is clear: "A happy pig does not bite tails. There are many things we do to make pigs happy in a preventative way."

With training, the staff know that a curly tail represents a happy and healthy pig and a flat or straight tail is an early indicator that something is wrong. An EC 2017 produced video [25] narrated by the farmer, walks people through the farm, showing the undocked pigs and their tail biting prevention strategy. In summary Mr Heikkilä advises:

- enrichment – straw based in racks, over a solid/slatted floor
- ensure the feed and straw is clean and safe – without mould or mycotoxins
- additional hanging rubber stick toys for weaners to chew works well
- a suitable, consistent or carefully introduced diet and enough space and drinkers – to limit any competition; this farm uses liquid feeds with plenty of trough space.
- good thermal comfort and ventilation indicated by air socks
- health and fitness of pigs – preventative disease approaches
- daily herd checks, observing the whole pig, especially the tail posture
- a shift in mentality.

Mr Heikkilä has proudly produced long tail pigs for more than 15 years. He encourages other farmers to join him. "Long tails on pigs are a good indicator that all is well with your pigs," he says.

Finnish farmers have collectively changed their perception of docking and their approach to preventing tail biting. They use basic welfare principles to provide holistic solutions to enable no docking. These ensure no hunger or thirst, comfortable places to rest and space to move, improving health, reducing stress and facilitating natural behaviour. This means enabling social contact and play (especially in younger animals).

Photo credit: **European Commission, 2017.**

[25] https://audiovisual.ec.europa.eu/en/video/I-147131

Søndergaard farm

Søndregaard produces pigs for sale for pork in the Coop (Denmark) supermarket chain via Danish Crown under their Bornholmergrisen label. In May 2018, the label changed to a new concept, with greater pig welfare provision, including zero sow confinement, more space and no tail docking. They get around 70 DKK (or 20%) extra per pig sold at 30kg, which are then finished elsewhere. This premium offsets the additional requirements and demand outweighs supply. They also wean at a minimum of 28 days.

As part of the label concept, the pigs have 30% more space which they offset with earlier sale of some pigs. The farmer said: "This is perfect, as the extra space means less pressure, less sickness. Consequently, the farm has seen a gradual decline in antibiotic use."

Workers spend an extra 1.5 hours during weaning taking care of the long tail pigs, ensuring they have straw, chains and rope enrichment. The flooring in the pens is half solid, half slatted. A corner partition is added to piglet pens, so the straw is available to manipulate and does not go straight down the slats. Regularly checking the pig behaviour also takes a bit more time.

The farmer also mentioned that the long-tailed pigs do need a bit more food to prevent tail biting. "They [the workers] give them sugar beet pellets in the afternoon (coinciding with the afternoon peak in natural foraging activity), and to recently weaned growing pigs as the pellets help with behavioural issues and gut health and helps to reduce diarrhoea." They liquid feed all pigs at once, and there is enough trough space to avoid competition.

Photo below: **chewable enrichment (e.g. straw) before weaning also reduces risk of tail biting. Credit: Søndergaard farm.**

Photo right: **weaners using jute rope. Credit: Søndergaard farm.**

Dutch conventional farms

A group of conventional producers are successfully rearing pigs responding to demand from retailer Coop (in Sweden) for long tails and minimal antibiotic use. It was a multilateral initiative[26]. The pork is successfully marketed as 'longtails'.

The initial incentive to farmers was a premium of €20 for each pig reaching the slaughterhouse with an intact tail. All pigs are photographed and screened for a non-docked, intact tail at the slaughter line. The incentive was offered to cover the extra enrichment and management costs during rearing and finishing phases, and to cover the risk of emergency slaughter in tail biting outbreaks.

Three years later, the reduced premium is €10 per pig, and the group rears 2,000 slaughter weight long tail pigs per week. All supplying farms are in the lowest antibiotic use category for the Netherlands; the green zone (which is 0–5 antibiotic treatment days maximum per pig per year).

For this report, three producers in this group described their management and methods for rearing of long tail pigs after weaning at a minimum of 24-28 days.

Their farms are conventional for the Netherlands. The housing is standard with part solid / slatted flooring (40 to 50% slats). Pigs are raised in pens of 10–30 pigs, depending on the farm and pen size, with space of 0.30 m^2 per piglet up to 28kg and 0.8m^2 per pig to finisher weight. These are EU minimum space requirements. Pigs with more space, pen complexity and substrate enrichment would do even better and enjoy more natural behaviour. The farm also ensures good ventilation, monitors health and other potential causes of tail biting.

Protection from pain

The piglets on these farms start their lives with minimal invasive procedures. Tails are not docked, and piglet teeth are not reduced. Male piglets are not castrated (as some are sold for breeding). The piglets only receive an ear tag for identification, are vaccinated and receive an iron injection, when they are between three and 10 days old. This means the stressful procedures in their early lives are minimised. Some farms also use needleless technology to avoid pain and damage to the muscle.

The enrichment provided is simple and standard for the Netherlands. It includes manipulatable hanging items, such as chewable tubes or balls, jute sacks – replaced when destroyed – plus some lucerne straw. Enrichment is provided from the time of weaning; additional manipulatable material is provided if there is any hint of tail biting.

Photo: **Long tail finisher pigs and basic enrichment at Finsterwolde farm. Credit: Netherlands.**

Johnny Hogenkamp of Hogenkamp-fokvarkens, breeds and sells young pigs or raises them to slaughter. Even before joining the Long Tails project, his farm already supplied good enrichment to the pigs with hessian sacks that hang above the solid floor (one sack per 30 pigs) renewed when destroyed. The piglets also receive lucerne (alfalfa) straw (about a handful a day) and are calm. When there is an occasional incident of tail biting, extra sacks and a basket with lucerne straw is provided in the pen. He provides the following tips:

"Do not just start with long tails, carefully think it through...When we agreed to participate in the project we started with leaving the tails on the piglets of four litters (about 50 piglets per week), then moved to 20 litters. When that was successful, we scaled up to 100% pigs with tails and by then, had secured the sales channel for these pigs.

"When you work with long tails, you cannot use automatic pilot, you have to observe the animal...leaving the tails on the piglets has not led to higher investment costs, but it has increased labour. There is now a full-time person that monitors the piglets when they are first born until 28kg. Weaners are checked at least six times a day."

Minimal antibiotic use

The farm does not use any antibiotics in the finishing phase (unless treating individual pigs which are then removed from the main supply) and only small amounts in the piglet rearing phase (until ten weeks old).

Mr Hogenkamp says: "The awareness of the need to reduce antibiotics on these farms has led to big reductions, mainly because people do not automatically use them anymore. Their use had become routine practice, without thinking about it."

Cars Huisman is a finisher farmer who receives 1150 piglets per week from Johnny's breeding farm. They arrive at seven weeks old at his farm in Finsterwolde and weigh about 15 to 20 kg.

"When the farm first joined the Long Tails project in 2016, we started with small groups of pigs with tails to be able to adjust their management. I used a similar enrichment regime and also took care with feeding, raising males and females separately to optimise feeding and minimise competition."

All farmers in this group mix their own feed. They particularly focus on the quality by cleaning grain to ensure absence of mycotoxins, dust and sand. One farm, when starting to rear long tail pigs, removed the whey originally in the feed. Another uses a fermented lactobacillus culture in the pig feed to improve digestibility. The farms provide wet or dry feed for pigs, ensuring enough trough space to minimise feeding competition. Ideally, they also prefer to place drinkers in separate locations to prevent drinker guarding by the pigs.

Martin Van de Peut, of Van de Peut High Health Pig Breeding, is also part of the group and is convinced that one of the key factors to successfully rear pigs with tails is good quality feed.

Grain undergoes a few steps before it is used in feed (e.g. cleaned with air blowers, then left to 'die'; rested, for a month minimum, under climate-controlled conditions). All these steps ensure that the grain is optimally digestible for the pigs and they are content with this format. He recommends "every producer checks their pig feed, and have it analysed (at least two times a year), for quality control."

[26] The initiative for this project was from Weidemark Fleischwaren, a German slaughterhouse, Norvida a Swedish meat trader in cooperation with Schuttert pig trader and Hijdeporc Welfare consultants from Holland.

Table 1: Production figures from Martin Van de Peut, Jonny Hogenkamps and Cars Huisman's farms below:

Variable	Martin Van de Peut's farm	Notes	Jonny Hogenkamp's farm	Notes	Cars Huisman's farm	Notes
Weight	8.5/9.5kg	Weight at weaning	26/27kg	Weight at 11 weeks		
Post-weaning mortality	1-2%		2-5%		2.5%	Finishing stage
Daily growth	640/650 g/d	(piglets till 30kg). High, as this business selects pigs on daily growth (for breeding)	320 g/d	Average growth from birth till 25kg		
Daily growth	1150/1250 g/d	(finisher pigs) High, as this business selects pigs on daily growth (for breeding)	800/850 g/d		850 g/d	From 25kg to slaughter
Feed conversion	1.85kg	(the amount of feed that is used for a 1kg growth)	2.35 kg		2.47kg	
Slaughter (live) weight	124kg		120kg		122kg	

Increasing enrichment and avoiding tail docking in Thailand

Betagro is a Thai vertically integrated food producing company, and among the top 20 global pig producers. They produce up to 2.4 million pigs for consumption annually, including exports to Japan and Hong Kong.

Betagro phased out tail docking in 2016, while introducing enrichment for growing and finishing pigs. Betagro's responsible antibiotic use policy further demands improved growing pig management. They use enrichment as an important tool to reduce stress, improve immunity and reduce fighting, biting, disease and antibiotic need. They also provide a space allowance of 1.2m^2 per pig nursery to finishing.

Dr Jessada Muenpakdee, one of Betagro's managers of their Quality Assurance and animal health department, observes long tail pigs with enriched pens. "Pigs are happier, I see their long tails wagging. They show more natural behaviour, rooting in the sawdust, manipulating the enrichment and not manipulating other pigs. The contract farmers' feedback was that it is really good to reduce aggression, fighting, tail biting - I have also learnt to take more time for behavioural observation of pigs."

Some contract farmers were already trying some basic toys around higher stress times, such as mixing and puberty, and were keen to do more. Farmers and staff were encouraged to innovate and use local sustainable resources with key properties for enrichment; safe, chewable and ideally edible. They noticed when non-edible enrichment is initially introduced, "pigs use it a lot, then get bored". This highlights the importance of rotating such enrichment and supplementing with edible enrichment.

Mr Jarut Choknumtrakul, farm owner of Chokenatrakool farm said: "Initially it was difficult to get banana leaf in quantity, but now we grow it. We also use horse tamarind wood which we were already growing on the farm (for hanging enrichment)."

A worker also said they noticed pig behaviour and benefits such as: "Reduced fighting, reduced tail biting, less stepping on other pigs. I saw the benefit to pigs with the enrichment, attracting pigs so they have something to do, playing and enjoying themselves."

These workers anecdotally report: "Fifty percent less fighting and minimal tail biting. So, with enrichment we know we can send more pigs to slaughter."

Photo: **Betagro long tail weaners rooting in the sawdust and using enrichment. Credit: Betrago.**

On another contract farm, workers have seen similar effects of enrichment on behaviour.

Zom Yu May from Keindtiporn farm noted: "Pigs play with enrichment, then they are not stressed. Sawdust is used as the material for piglets to be warm and it also reduces fighting when mixed together" [after weaning].

Kriengsak Pansuk also observed less tail biting. He noted it is also important to ensure good house temperature, ventilation and training young pigs to make best use of the pen area.

In 2017, Betagro worked with staff and farmers to develop a recommended list of enrichment materials including sawdust, straw, hanging chewable plastic bottles and grasses. They found that placement in the activity area of the pen, and regular top up or replacement, was important.

By the end of 2018, Betagro had ensured that 2.3 million finisher pigs (at high risk times as a start) and 260,000 pigs with long tails had enrichment. This was made possible by the company's pig welfare trained staff supporting company or contract farms to extend enrichment use.

"We use monthly meetings and videos to demonstrate the benefits to the (contract) farmers, pigs and production (from trials on company farms). We communicate with management – that it is easier with fewer sick pigs or pigs with tail biting to treat, less use of antibiotics, and less time for these activities needed.'

Photo: **Betagro long tail finishers rooting in sawdust provided. Credit: Betrago.**

Avoiding teeth reduction

Tooth reduction (clipping or grinding) involves stressful handling and pain for every piglet, regardless of age. Pain leads to high pitched squeals, isolation and disruption of suckling, which causes poorer growth rates and altered immune status.

Though once preferred to reduce risk of teeth splitting and infection, teeth grinding usually takes longer, increasing the handling time and stress response of piglets. A scientific review concludes that the perceived benefits of teeth reduction do not outweigh the costs from risks of injury and infection from the procedure itself [oo pp qq]. Litters requiring teeth reduction due to poor sow colostrum and/or milk production, mastitis or competition for udder access are unlikely to perform well, regardless of the procedure.

Photo: This young piglet is having its teeth clipped on a farm in Brazil. Photo credit: World Animal Protrection

Focus on… ALIAR S.A.

ALIAR S.A, the largest pig producer in Colombia, decided to phase out teeth clipping more than 10 years ago. Sergio Gomez, director of production explains: "We introduced the phase out as we were reviewing how to make production more efficient and avoid painful procedures. By avoiding teeth clipping, we found the farrowing house staff had more time to be more focused on the most important areas of husbandry, such as sow body condition, water availability, improving lactating sow´s feeding and piglet care during the first three days of life."
From ALIAR S.A. experience: "If producers are facing problems with piglet fights or sow nipple damage, the first thing that a producer needs to guarantee is greater comfort for the sow and piglets. Also, to be more focused on cleaning, and disinfection," says Mr Gomez.
Underlying problems can be serious and may include the following:

- large or excessive litter size – associated with a trend in genetics
- poor colostrum and milk let down and quantity – also associated with farrowing crates, farrowing exhaustion and stress, reduced feed or water intake or underlying causes
- Sow infection, fever, pain and reduced milk output due to Post-Partum Dysgalactia Syndrome (PPDS)). This is a general term used to describe reduced milk production (mastitis-metritis-agalactia). PPDS can also be a prelude to weak piglets, susceptible to infection and diarrhoea compounding their risks of survival and later weaning.

Teeth reduction is not needed if sow comfort is ensured. This involves promptly resolving issues of inadequate milk let down and production, and mastitis. It also involves ensuring that litter sizes are not too big and that piglets are not overly competitive in their feeding. Producers in Europe[27] are routinely avoiding teeth reduction by preventing the underlying issues mentioned above, associated with some pigs.

Photo right: **In birthing cages (farrowing crates), mother pigs cannot reach their piglets so they cannot properly care for them.**

ALIAR S.A. implemented the phase out step by step.

Mr Gomez says: "First we consulted all the personnel involved as the major concern was about worker safety (risk of bites from protective sows), but we did not find any problem. Another concern was about damage of sow nipples, and we did not register any problem with that either. Piglet fighting was a final concern, but we did not have any problems or dead animals due to fights.
"After addressing any concerns, we stopped teeth clipping and nothing happened... pigs continued to grow normally, and we basically eliminated a process that took us a lot of time. We decided to then scale up the phase out as teeth clipping was considered an unnecessary procedure."
He stated the only real challenge they faced was: "When the company is used to get good productive results, sometimes (it) is hard to introduce any change, however if the teams can evaluate and concentrate on those activities that have highest impact on productivity, rather than on unnecessary procedures, they will see the positive changes."

Learning from change – JBS, BRF and Betagro

JBS Brazil is a large vertically integrated producer. Pork supplied for their Seara label comes from pigs that do not have their teeth reduced. This is the first stage in the company's transition to avoid this painful procedure.
BRF, Brazil's largest pig producer, does not conduct teeth reduction throughout their supply chain. Mr Caldas, the company's coordinator of supply chain explains: "The company prioritised training and encouraged producers and employees to check and address the root causes when sow mammary glands were hurt. Dedicated adjustment of management, training and awareness of producers and employees made the transition possible."

BRF's practical tips are included in Table 2 and a practical checklist is also available.
Inspired by BRF's success, Thailand's Betagro is also phasing out teeth reduction. In 2018, the company avoided clipping the teeth of 365,000 piglets and is working to extend this.
All producers highlighted in this section of the report have avoided an unwanted task, time and effort. They have reduced unnecessary disruption to piglets and sows and improved their standards of animal care to help prevent problems during lactation.

[27] The EU Directive on the protection of pig's states: "Neither tail-docking nor reduction of corner teeth must be carried out routinely but only where there is evidence that injuries to sows' teats or to other pigs' ears or tails have occurred. Before carrying out these procedures, other measures shall be taken to prevent tail-biting and other vices, taking into account environment and stocking densities. For this reason, inadequate environmental conditions or management systems must be changed."

Avoiding ear notching

Even routine identification procedures can be very painful. Scientific evidence shows that pain-related behaviours are higher in ear notched than tagged piglets. Notching elicits the most high-pitch squeals and elevations in stress blood chemistry[rr]. As with the above mentioned painful procedures, piglets are more likely to isolate themselves and be inactive. This reduces their feeding and potentially disrupts social and maternal bonding. The age the procedure is performed makes little difference.

BRF has abolished ear notching from their production system and all animal identification is now done by a refined ear tattoo process.

"Acquiring tattoo equipment of up to eight digits allowed decreasing tattoos from two ears to a single one and reduced either the workforce or the number of digits in tattoos to identify the farm," *says André* Filipe Dal Mago – pig sanitarian, Concórdia/SC, BRF.

Other alternatives exist such as tail tags or ideally electronic identification systems. These offer a range of additional advantages on farm and at slaughter[ss tt], such as feeding regulation (especially for group sows) to electronic traceability.

Electronic ear tags are already used by some companies, while injectable intraabdominal transponders are researched. Application suggests some general pain responses to the latter, but less than measured from ear notching or tagging.

The use of needleless technology, for example in the case of piglet iron vaccinations, provides good advances and avoids injection related infections or abscesses generally. It is being increasingly taken up in Europe and being considered by leading producers in Brazil and Thailand.

Photo below: **Credit: BRF.**

Photo: **Sows during birthing and nursing, are out of cages, free to move and bond with their piglets with plenty of space, and straw.**

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Later weaning – the benefits

Weaning in a natural setting is a gradual process usually completed by the time piglets are up to 17 weeks old. It is a significant transition for the piglet. In intensive farming conditions, early weaning involves physical, physiological, environmental and social stress. This contributes to intestinal and immune system dysfunction, that can result in reduced pig health, growth, and feed intake[uu vv] as well as increased antibiotic use.

Weaning piglets younger than three weeks old is detrimental to their welfare. This is indicated by increased abnormal behaviour (e.g. belly nosing; mimicking the deprived piglet searching for the sow's udder), decreased feed intake and growth[ww xx].

Low weaning weight increases piglet mortality. It also delays sow reproductive recovery – the time it takes for sows to rebreed again, particularly when combined with length of time it takes sows to give birth to larger litters. It is now well established there is no production benefit to early weaning, because of the welfare and production costs involved in dealing with early weaned piglets and their mothers.

The EU Directive requires a minimum of 28 days weaning. However, in practice it allows for lower averages which have welfare and production consequences. A 28-day minimum was established and regulated by a few countries. This is because earlier weaning significantly affects pig immunity, disease and how the pigs cope beyond weaning.

Weaning later has a direct impact on reducing routine antibiotic use to prevent or treat post-weaning diarrhoea. Increasing the weaning age also reduces shedding of key foodborne bacteria such as Salmonella and E Coli, that can pose human health risks[yy].

Weaning at 28 days also benefits piglet survival and production. It enables 1–1.5 extra piglets weaned per sow per year. Sows also return to breeding more quickly and the piglets have increased growth rates and resilience to later disease.

A minimum of 28 days weaning represents a 'good' level of welfare in World Animal Protection's Global Pig Welfare Framework. Our acceptable minimum weaning age of 25 days is based on scientific and commercial understanding, as practiced by some major producers aiming to improve welfare on a large scale. Achieving target weights for weaning, commensurate with a minimum of 25 or 28 days may also be more practical.

Sweden: linking later weaning, improved performance and reduced antibiotic use

Sweden became the first country to ban the use of antibiotics as growth promotants in 1986. It also introduced a requirement for veterinary prescriptions for preventive or therapeutic use. To mitigate negative impacts and address underlying issues, farming practices were adapted and some regulated. Sweden now regulates for free farrowing and a minimum of 28 days weaning; bedding is required, and tail docking is not permitted. Regulating for later weaning[28] resulted in many benefits including far lower antibiotic use in weaned piglets.

Viggby Äs Lantbruk farm

Piglets are weaned at five weeks on average (national median). However, piglets are weaned earlier at a minimum of 28 days if individual sows are struggling, for example with poor body condition.

At weaning, the farm keeps piglets in their litter groups as much as possible, only around 25% are mixed after weaning. Stress caused by mixing on top of weaning, along with a poor environment and lack of space decreases immunity, increases sickness and antibiotic use. Moving piglets in batches and all at the same time (all-in-all-out), and later weaning, have been fundamental to creating heavier, more robust piglets at weaning. This is part of why the Swedish system can keep antibiotic use low.

Medicinal zinc oxide use for weaning is to be banned by the EU in June 2022. This farm is ahead of the curve and stopped using it in 2016: piglets are weaned without zinc oxide and without antibiotics.

"Good management is critical in the first two weeks post weaning. Piglets need warmth, good conditions to prevent a negative energy balance, cold stress, and diarrhoea," says Co-owner Jeanette Elander.

The company achieves an average growth rate (680-700g per day on average from birth to slaughter) exceeding that of the Netherlands with similar genetics.

One of the main reasons for the high growth rate is good weaning weights. Sows in free farrowing systems are more comfortable and produce more milk, enabling weaning from five weeks. This results in a robust pig at weaning and good growth in the nursery section.

Not using zinc oxide during weaning is also an advantage as it disturbs the gut microbiome when administered and again when taken away, meaning piglets take time to adjust. Instead the farm manages changing feed without drugs. They also have long troughs in the farrowing pens, so piglets can learn to eat with their mothers, and become used to vegetable protein from a young age.

Viggby Äs Lantbruk farm finds the ideal balance for sow and piglets is weaning at 30-32 days. Weaning sooner, at 28 days on average, is more challenging and needs a milk-based diet and earlier introduction of feed. With a clear focus on weight than age, good-sized piglets can be weaned at a minimum of 28 days to take the pressure off the sow. Occasionally, if a sow dies when her piglets are three weeks old, farm staff immediately see abnormal behaviours such as belly nosing and tail biting associated with early weaning.

The farm vet stresses that "increased weaning age is central to eliminating antibiotic use at this time and reducing use later in a pig's life." Sweden's low antibiotic use is a distinct contrast with high antibiotic use in Spain - a country that weans piglets earlier.

Comparative findings and cumulative effects of higher welfare

Combinations of good welfare measures achieve good results. Viggby Äs Lantbruk and Søndregaard farms also use free farrowing systems. Søndregaard farms report: "The sows are better milkers, they eat more, have better body conditions and are fitter. This is important when weaning later, since in the last week, piglets grow very fast and the sows needs to keep her body condition to enable re-breeding."

Many other companies that wean at 28 days or later also have loose farrowing of sows. This combination is also well established in outdoor bred or combination farms.

[28] Regulating certain aspects of welfare is known to assist in reducing some types of use of antibiotics. A study comparing weaning practices and antibiotic use in Sweden, Belgium, France and Germany found that median antibiotic use in weaner piglets was over 100 times lower in Sweden than in the other three countries.[1] In Sweden, the median weaning age was 35 days, whereas in the other three countries it was between 22 and 25 days. In most EU countries, piglets can be weaned as early as 21 days. Council Directive 2008/120/EC mentions an official weaning age of 28 days but allows weaning at 21 days when certain minimal requirements are met. In contrast, in Sweden weaning is not legally permitted before 28 days.

Transitioning at scale in Brazil

JBS Brazil is transitioning to later weaning. Where weaning occurs at 25 days or later, they output heavier piglets, as weaning occurs when piglets are more prepared to eat solid feed, which leads to greater gains over the next phases, with reduced losses due to mortality and need for veterinary interventions. This is particularly important to their Seara label which has committed to annually decrease the use of antibiotics in its supply chain.

At BRF their policy is to not use antibiotics preventively nor as growth promoters. Mr Caldas, corporate coordinator pig supply chain, explains.

"Again as a pioneer in Brazil, BRF already have approximately 40% of our production weaned at an average 25 days. We are aware that weaning age is of utmost importance for the future performance of animals and we prioritise this transition within our strategy. By increasing the age at weaning, BRF sees the benefits of better adaptation to the nursery, growing and finishing periods. Benefits such as better daily weight gain, feed conversion and health result. "

Mr Dal Mago, pig sanitarian Concórdia, BRF, also speaks of the transition.

"There is an adaptation period as in any other process that is new. Raising the weaning age from 21 to 25 days reduces the habit of piglets suckling on other piglets after weaning, and this also reduces cannibalism. We believe that later weaning and the elimination of painful procedures improve animal welfare, as well as establishing an ethical and moral commitment within the production chain, which is one of our principles of action. "

BRF adds that it believes that environmental enrichment, coupled with other management strategies, hygiene and facilities, is an excellent tool to enable animal welfare precepts. Currently, about 90% of BRF's farms use some form of enrichment - either part-time or in specific bays. "Animal welfare improves the work environment, the human-animal relationship and, consequently, productivity and our business," adds Mr. Caldas.

Photo: **Sows in free farrowing systems produce more milk which also supports later weaning and more robust piglets. Photo credit: World Animal Protection / Thomas Alexander**

Higher welfare housing enabling natural behaviour

Ecoshelters in Australia – Hoopbarns in the US

Western Plains

Judy and Tim Croagh operate Western Plains farm near the wheat and barley belt of Victoria, Australia, marketing and innovating ways to produce higher welfare pork. They produce 1,400 conventional Large White / Landrace/Duroc pigs per week, and demand exceeds supply. They produce entire males, avoid teeth clipping and will return to not docking this year. Piglets are outdoor bred but weaned at 28 days at an average of 7.7kg on entering the ecoshelters. They achieve robust, well growing piglets post weaning, minimal post weaning mortality (1.7%) and minimal antibiotic use.

Judy Croagh explains her motivations: "Animal welfare is part of holistic business. I want to be proud of our ethics policy. And, if the animals are happy they produce well (same as people!).'"

Western Plains sells to distributors in two states, and to companies for charcuterie or directly to restaurants and cafes, that value their sustainably-farmed pork. A long-standing customer chef at Streat Cafe in Melbourne said: "I like the product for its taste, consistency and ethics."

The farm also exports pork to Singapore: "We enjoy a global outlook and export interest is clear from China wanting a high welfare and quality product," says Judy.

Tim innovated a yarding system that sorted same sex weaners into groups of 200 to 400 per deep-bedded shelter. The bedding is topped up twice weekly. A minimum of 1m^2 space is provided plus a feeding and drinking area. The straw is on a concrete base to prevent pigs digging out.

They use an all-in-all-out process and achieve above average growth rates (ADG 680–730g/day) and excellent carcass consistency. They're also considering immunocastration in the future, to optimise returns and lean carcasses.

Judy notes the benefits: "The pigs enjoy good movement and social behaviour and it's simply easier to grow them out. We have no problem with quality control."

Their pigs are provided with additional straw bales at the start of weaning (like Niman Ranch farm photo below) to eat and play with, and they retreat behind them to diffuse any fighting. In winter the weaners are sometimes completely burrowed under the straw, while summer has its own challenges. Enough drinkers and feeders are essential to avoid competition and heat stress, plus ventilation. Side curtains can also be raised and lowered. Additional hosing may be needed during temperatures of more than 35C. Also key to the farm's success has been careful training of staff about pig behaviour. Staff must hold at least a minimum certificate in pig husbandry.

Photo: **Ecoshelters are now a well-established, cost-effective housing system. They are used to raise around 36%[29] of grower/finisher herds in Australia and are used by some major producers. However, in the late 1990s, the Croaghs pioneered raising weaners to finishers, entirely in ecoshelters. Photo credit: Western Plains.**

[29] Communicated by Australian Pork Limited (February 2019).

Niman Ranch supply farms

Similar deep-bedded systems, called hoopbarns are growing in popularity in the US. Niman Ranch label farms use these systems for pigs raised for meat. The label is expected to supply 280,000 pigs in 2019, partly to Chipotle Restaurants, Panera and other chains. The Niman Ranch brand is supplied by 650 private farms including one owned by Almanzo Strahm.

Not only does Almanzo prefer the higher welfare system but he says, "It is more profitable with greater return on my initial capital investment than a conventional barn". The farm doesn't teeth clip or tail dock and weans at a minimum of four weeks for the brand. Around 150 weaners are kept in a barn of 30 x 72 feet, plus outdoor veranda space.

Like Almanzo, most Niman farmers start with hoop barns, rather than by converting conventional farms. They say they are attracted by the good returns from a higher welfare system, in addition to a more pleasant environment for both farmer and pigs. Farmers highlight that the improvements to their working life and wellbeing are significant, from a higher welfare system.

Even before supplying the Niman Ranch brand, Keith Frederick had never cut tails or teeth in his production. He says; "It's easier on the pig. It's hard on them to do that stuff to them, especially when they're that little. And I don't think you need to. It's important in prevention though to keep pigs occupied, give them something to do. Once in a while you'll get a tail biter and we'll get him out in a pen by himself. As for clipping the teeth; I've never seen a reason. Never thought it was necessary."

Another supply farmer fully agrees. Steve Howe uses a range of materials for enrichment to occupy his pigs; "They are constantly occupied, they can use their natural behaviour, root, explore, nest; things that a pig would do naturally if they could. Keeping them occupied and content so they don't pick on one another and get irritated. That is the biggest key. It also helps prevents health and hierarchy problems, biting things like that. You're managing their environment, it is a whole pig health issue. When the pigs are happy and content they are not going to have any problems with tails or teeth. We use bedding; lots of different kinds, corn stalk, alfalfa bales, grass, straw, wheat straw, dirt. Sometimes we just bring dirt in, in piles to let them play, which is good in summer when it's hot as bedding will be a few degrees warmer."

Mr Howe finds managing the seasonal use of different bedding important. Warmer bedding is used for winter and increased monitoring for tail biting conducted in the warmer months. He's constantly refining, learning and making his system more cost-efficient and intuitively knows; "There is a benefit of having the tails, that is to tell what mood the pigs are in."

Photo: **credit: Howe farm.**

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European housing innovations

Some major equipment companies are developing wean-to-finish complete deep straw bedded housing systems they call the 'Xaletto' principle[30]. Launched in 2018, this combination of feed, pig house design, equipment, straw and climate are integrated and monitoring automated.

Trialling farmers report a predictable system for growing out piglets already with good growth rates and low mortality to 30kg. It also leaves a by-product that can be completely composted to useful manure. An indoor contained version is also trialling the wean-to-finish principle and is similar to the ecoshelter/hoopbarn example above. The systems also include natural light and automated-treated straw dispensers and straw digesters. Various sensors maintain a consistent bedding temperature.

Other British and European farms have previously innovated similar straw distributor systems, but this whole system development may signal an equipment supply direction towards more deep-bedded systems. The investment cost for placing 2,000 finishing pigs is also less than a conventional straw bedded system.

Balcony systems

Balcony (or plateau) systems were first introduced 20 years ago in the Netherlands, but recently have grown in favour in Europe, particularly in the Netherlands and Scandinavia. Recent guidance by Red Tractor, the UK industry-based certification scheme, has also been issued for such systems.

Guidance exists already for some schemes in the Netherlands and requires 0.8m^2 for up to 110kg and 1m^2 up to finishing pig weight. This is slighter more space than the EU minimum and has several advantages. This cost-effective innovation has 25-40% more space than a conventional pen. The system has a ramp-to-balcony structure with a comfortable resting area and greater pen complexity and enrichment.

Farmers find it takes a bit longer to check pigs and clean but using this system, in addition to other provisions, enables them a Beter Leven Star Quality mark, which attracts a market premium. Costs (2018[31], ex VAT) to install the system in the Netherlands were approximately €100 to 150m^2 for finishers and €70-90m^2 for weaners.

In conjunction with the Sterksel Swine Innovation Centre (Wageningen University), use and impacts of the balcony area were assessed. Researchers found 95% of pigs using the balcony. There were no negative impacts on health or performance, including feed conversion, lameness and meat quality. Pigs quickly learned how to use the balcony and evade bullies. They were able to interact more socially and with the enrichment and rest better. It appears the additional space and system prevents head butting and tail biting, though this is yet to be fully assessed. Researchers are also looking at straw and other types of enrichment with the system.

Ventilation needs careful consideration as more pigs and increased biomass will affect the optimal rate of air turnover. However, some farmers think this system should simply be used to provide more space per pig. Some slatted flooring of the balcony allows good airflow and adjustments are very feasible to ensure good ventilation and prevention of respiratory problems. Additional considerations will be important in tropical or very hot climates. All manure falls through the balcony and is collected underneath and directed to the under-flooring slurry system. However, some modifications with a slightly sloped balcony floor directs the waste to the back of the pen to avoid hygiene issues and dirty pigs.

These innovative housing systems may become increasingly relevant as the EU continues to review space requirements for pigs or further enforces the avoidance of routine tail docking. Elsewhere, they may simply be more cost effective and enable a more sustainable, higher welfare form of production and pork products, where later weaning is feasible and painful procedures can be avoided.

Photos: **Balcony examples in the Netherlands. Photo credit: Pig Progress 2017, Pig World 2018**

[30] https://www.pigprogress.net/Home/General/2018/12/Warm-bed-of-straw-beneficial-for-grower-pigs-365926E/

[31] http://www.pig-world.co.uk/features/could-balcony-systems-be-the-answer-to-our-housing-problems.html

Conclusion: Acknowledging the global momentum for change

The global movement towards higher welfare pig production is clear. Ending painful procedures and early weaning is a must for companies to remain in step with consumer sentiment and meet growing consumer demand. It's also a key approach to reducing antibiotic use and reducing the risk of bacterial resistance to highly valued antibiotics for animals and people.

Pigs raised for meat are often in barren environments without enrichment, piglets are subjected to painful procedures in the first week of their lives, and weaning is premature.

Leading producers should consider whether these practices align with consumer values, and what steps they can take to improve pig welfare as well as reduce their antibiotic use.

World Animal Protection encourages pig producers to publicly commit to a timeframe for phasing out painful procedures and early weaning across operations. We also encourage them to develop a transparent and comprehensive approach to addressing all aspects of the Global Pig Welfare Framework.

Table 2: key features of raising higher welfare pigs for meat

Key features	More detail	Animal welfare benefits	Production / economic benefits
Avoiding surgical castration (and boar taint)	Immunocastration – available in over 60 countries. Generally, 2 injections with operator safe injector, pre-slaughter assurance. Entire males • Reliable taint detection • Nutritional / hygiene measures (partial) • Lower sale weight • Genetics (research)	Avoiding fighting, mounting and related injuries. Avoiding pain, fear, growth check of all piglets.	Improved growth and carcass. Depending on alternatives: reliable avoidance of boar taint, equivalent or better productivity and economics. Reduced fighting, mounting, injuries, lameness, energy losses and antibiotic use on farm. Worker satisfaction, reduced procedure labour. Marketing options for higher welfare pork.
Avoiding tail docking	Preventative mind set. Good daily pig observational skills address underlying issues. Minimal mixing. Enrichment – bedding, exploratory feeding, effective point source (see criteria below) – extra at very early tail signs. Housing other – good ventilation, hygiene, space (e.g. 0.9 to 1m^2 per pig), thermal control. Solid or partial solid flooring. Health – preventative, clean, palatable feed, no toxins.	Avoiding biting and related injuries, treatment. Avoid unnecessary pain, fear, growth check to all piglets, neuromas with some. Allows full pig communication. Easy worker / slaughter observation and welfare indicator with tails.	Reduced tail biting (and other skin) injuries and outbreaks – reduced energy wastage, stress, infections and antibiotic use. Improved growth performance. Worker satisfaction and general skills improve, addressing underlying issues for other benefits. Avoids carcass downgrade or condemnation, cost.
Avoiding teeth reduction	Good sow thermal comfort, health, feeding, checks, water. Well developed, shiny, smooth udder not hot or painful. Good pen hygiene. Piglet to teat ratio matched - not excessive litter sizes, check piglet health and thermal conditions. Avoid unnecessary piglet shuffling. Early creep feed, observations, accept up to 5% minor facial lesions.	Avoids an unnecessary painful procedure, possible infection and other complications. Avoids feeding and social disruption.	Better piglet feeding and sow monitoring. Worker satisfaction. Assists rapid litter stability and reduces suckling disturbance. Reduces the risk of injuries and associated antibiotic use or other treatment costs or culling.
Avoiding ear notching	Tail tags, RFID ear tags, tattoos, electronic intraperitoneal ID in research.		Modern ID systems, worker satisfaction, electronic feeding / monitoring/tracing.
Later weaning	Min 25 or 28 days. Min 28 days best for sustainable benefits, reduced use of antibiotics and risk of foodborne disease.	More robust, resilient piglets, improved immunity, growth and weight at weaning. Reduced disease.	Improves immunity, reduces disease risks and substantial use of antibiotics. Better sow return to reproduction. Reduced risk of food borne disease and antibiotic use and resistance.
Effective enrichment	Enrichment should be safe, chewable/destructible and ideally edible. A minimum of 50 to 400g fibrous enrichment per pig per day is recommended. Enrichment should be located in the activity area and regularly used with daily access. Some exploration feeding also good.	Enrichment is important to satisfy exploration and chewing behaviours and relieve boredom, prevent tail biting. Edible enrichment provides gut fill alleviating some hunger and prevents gastric ulcers. Straw bedding or racks is optimal.	Reduces chronic stress and tail / other biting behaviours which are energy/feed costly. Reduces feed competition and improves growth rates. Avoids gastric ulceration.

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Some key resources

EU fact sheets and UK pig industry 'webhat' to assist early signs and prevention of tail biting http://farewelldock.eu https://webhat.ahdb.org.uk/

EC fact sheets, case studies and videos demonstrate farming without docking and how to start: https://ec.europa.eu/food/animals/welfare/practice/farm/pigs/tail-docking_en

SchwIP is a software tool (used already in Germany and Austria) available for vets to train and assess risk of tail biting, and combine preventative planning on farm.

For further information:

Global Pig Framework, technical resources on enrichment, avoiding teeth reduction or any references are available from World Animal Protection.

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