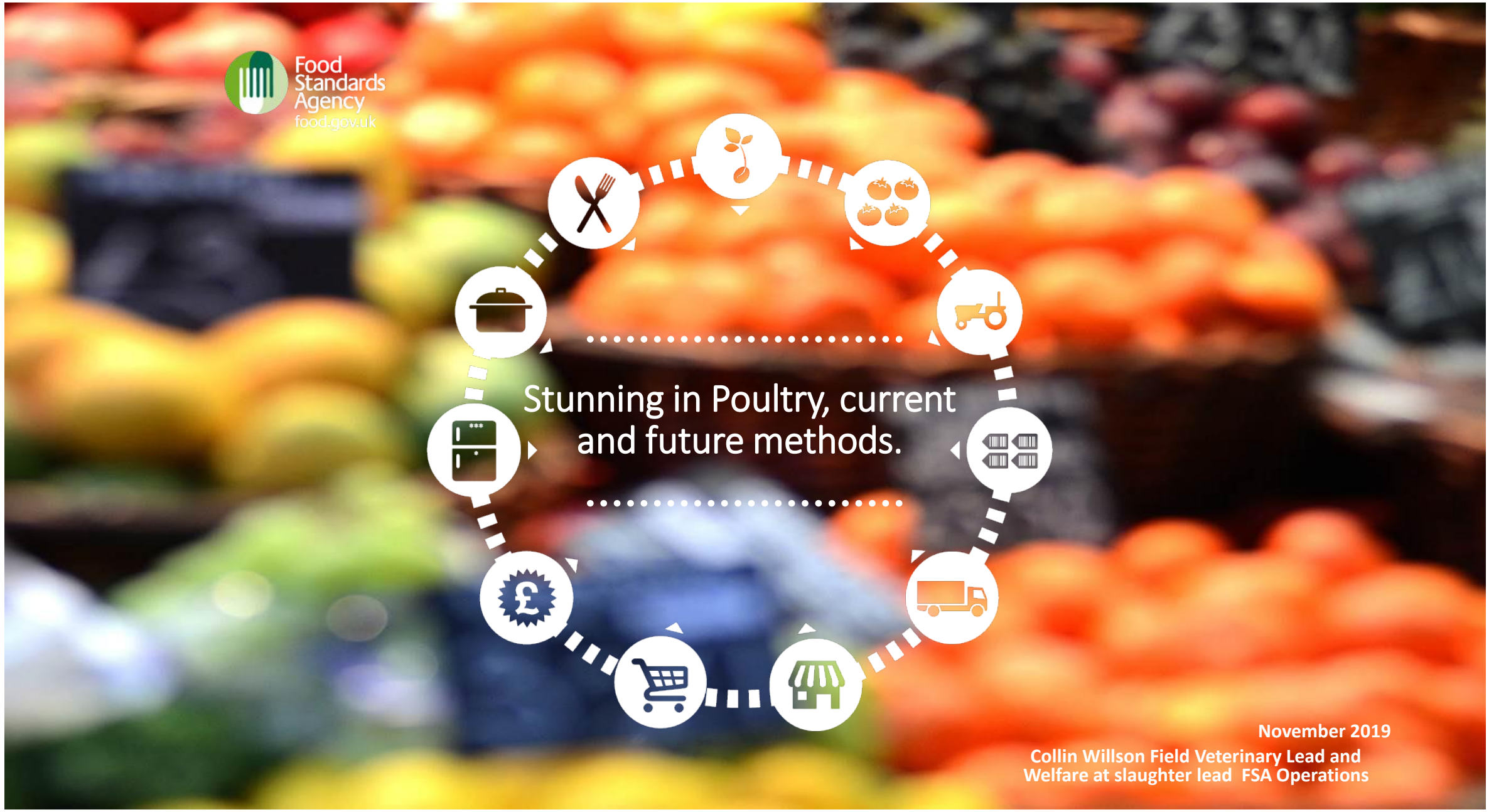
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Stunning in Poultry, current and future methods.
November 2019
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Legislation on stunning.

On 1st January 2013 EC1099/2009 came into force and introduced new legislation on welfare at slaughter across all EU Countries.

The UK carried over provisions from WASK 1995 in Domestic Legislation.

WATOK (England) and (Wales) and similar legislation in Scotland and N Ireland were introduced over a period of time.

For poultry there are two major references in WATOK.

Gas stunning all birds must be killed, WATOK Schedule 1 Regulation 30

WATOK (England) does not have a requirement to comply with Annex 1 requirements for religious slaughter. All the others do.

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Legislation on stunning.

LAPS has been added to Annex I but with a weight restriction of 4Kg.

Manual cervical dislocation has a limit of 70 animals per person per day and can only be used on poultry up to 3Kg liveweight. Mechanical cervical dislocation can be used up to 5Kg liveweight with no number limit.

EC 1099/2009 Annex II also has some additional requirements that will come into effect from 8th December 2019.

The recording of stunning parameters is proving a particular problem.

There are also a number of requirements for waterbath stunners including a provision to access the waterbath in the event of a breakdown.

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Legislation on stunning.

I have copied the tables from EC 1099/2009 Annex 1 for information and highlighted the methods not approved for slaughter.

The tables clearly set out all the key parameters and situations in which each method can be used. Definitions used are in Article 2.

Killing" means any intentionally induced process which causes the death of an animal.

Slaughtering" means the killing of animals intended for human consumption.

It is also worth noting that EC1099/2009 introduced new wording to describe stunning, simple stunning is recoverable and stunning is non recoverable.

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Mechanical Methods.

No	Name	Description	Conditions of use	Key parameters	Specific requirements for certain methods - Chapter II of this Annex
1	Penetrative captive bolt device	Severe and irreversible damage of the brain provoked by the shock and the penetration of a captive bolt. Simple stunning.	All species. Slaughter, depopulation and other situations	Position and direction of the shot. Appropriate velocity, exit length and diameter of bolt according to animal size and species. Maximum stun to stick/kill interval(s).	**Not applicable.**
2	Non-penetrative captive bolt device	Severe damage of the brain by the shock of a captive bolt without penetration. Simple stunning.	Ruminants, poultry, rabbits and hares. Slaughter only for ruminants Slaughter, depopulation and other situations for poultry, rabbits and hares.	Position and direction of the shot. Appropriate velocity, diameter and shape of bolt according to animal size and species. Strength of the cartridge used Maximum stun to stick/kill interval(s).	**Point 1 Ruminants up to 10Kg only.**
3	Firearm with free projectile	Severe and irreversible damage of the brain provoked by the shock and the penetration of one or more projectiles.	All species. Slaughter, depopulation and other situations	Position of the shot. Power and calibre of the cartridge. Type of projectile	**Not applicable.**
4	Maceration	Immediate crushing of the entire animal.	Chicks up to 72 hours and egg embryos. All situations other than slaughter	Maximum size of the batch to be introduced. Distance between the blades and speed of rotation Measure to prevent overloading.	**Point 2.**
5	Cervical dislocation	Manual or mechanical stretching and twist of the neck provoking cerebral ischemia.	Poultry up to 5 kg live weight. Slaughter, depopulation and other situations	Not applicable.	**Point 3.** Can only be used as a back up method in a slaughterhouse.
6	Percussive blow to the head	Firm and accurate blow to the head provoking severe damage to the brain.	Piglets, lambs, kids, rabbits, hares, fur animals and poultry up to 5 kg live weight. Slaughter, depopulation and other situations	Force and location of the blow	Point 3. Can only be used as a back up method in a slaughterhouse.

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Electrical Methods.

No	Name	Description	Conditions of use	Key parameters	Specific requirements of Chapter II of this Annex
1	Head-only electrical stunning	Exposure of the brain to a current generating a generalised epileptic form on the Electro-Encephalogram (EEG). Simple stunning.	All species. Slaughter, depopulation and other situations	Minimum current (A or mA). Minimum voltage (V). Maximum frequency (Hz). Minimum time of exposure. Maximum stun-to-stick/kill interval(s). Frequency of calibration of the equipment. Optimisation of the current flow. Prevention of electrical shocks before stunning. Position and contact surface area of electrodes.	**Point 4.**
2	Head-to-Body electrical stunning	Exposure of the body to a current generating at the same time a generalised epileptic form on the EEG and the fibrillation or the stopping of the heart. Simple stunning in case of slaughter.	All species Slaughter, depopulation and other situations	Minimum current (A or mA). Minimum voltage (V). Maximum frequency (Hz). Minimum time of exposure. Frequency of calibration of the equipment. Optimisation of the current flow. Prevention of electrical shocks before stunning. Position and contact surface area of electrodes. Maximum stun to stick interval in case of simple stunning(s).	**Point 5.**
3	Electrical waterbath	Exposure of the entire body to a current generating a generalised epileptic form on the EEG and possibly the fibrillation or the stopping of the heart through a waterbath. Simple stunning except where frequency is equal to or less than 50 Hz.	Poultry. Slaughter, depopulation and other situations	Minimum current (A or mA). Minimum voltage (V). Maximum frequency (Hz). Frequency of calibration of the equipment. Prevention of electrical shocks before stunning. Minimising pain at shackling. Optimisation of current flow. Maximum shackle duration before the waterbath. Minimum time of exposure for each animal. Immersion of the birds up to the base of the wings. Maximum stun-to-stick/kill interval for frequency over 50 Hz (s)	Point 6.

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Gas Methods 1.

No	Name	Description	Conditions of use	Key parameters	Specific requirements of Chapter II of this Annex
1	Carbon dioxide at high concentration	Direct or progressive exposure of conscious animals to a gas mixture containing more than 40 % carbon dioxide. The method may be used in pits, tunnels, containers or building previously sealed. Simple stunning in case of slaughter of pigs.	Pigs, mustelids, chinchillas, poultry except ducks and geese. Slaughter only for pigs. Other situations than slaughter for poultry mustelids, chinchillas, pigs.	Carbon dioxide concentration. Duration of exposure. Maximum stun-to-stick interval in case of simple stunning […]. Quality of the gas. Temperature of the gas.	**Point 7.** **Point 8.**
2	Carbon dioxide in two phases	Successive exposure of conscious animals to a gas mixture containing up to 40 % of carbon dioxide, followed when animals have lost consciousness, by a higher concentration of carbon dioxide.	Poultry Slaughter, depopulation and other situations	Carbon dioxide concentration. Duration of exposure. Quality of the gas. Temperature of the gas.	**Not applicable**
3	Carbon dioxide associated with inert gases	Direct or progressive exposure of conscious animals to a gas mixture containing up to 40 % of carbon dioxide associated with inert gases leading to anoxia. The method may be used in pits, bags, tunnels, containers or in buildings previously sealed. Simple stunning for pigs if the duration of exposure to at least 30 % of carbon dioxide is of less than 7 minutes. Simple stunning for poultry if the overall duration of exposure to at least 30 % of carbon dioxide is of less than 3 minutes.	Pigs and poultry. Slaughter, depopulation and other situations.	Carbon dioxide concentration. Duration of exposure. Maximum stun-to-stick/kill interval in case of simple stunning. Quality of the gas. Temperature of the gas. Oxygen concentration.	Point 8

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Gas Methods 2.

No	Name	Description	Conditions of use	Key parameters	Specific requirements of Chapter II of this Annex
4	Inert gases	Direct or progressive exposure of conscious animals to a inert gas mixture such as Argon or Nitrogen leading to anoxia. The method may be used in pits, bags, tunnels, containers or in buildings previously sealed. Simple stunning in case of the slaughter of pigs. Simple stunning for poultry if the duration of exposure to anoxia is of less than 3 minutes.	Pigs and poultry. Slaughter, depopulation and other situations.	Oxygen concentration. Duration of exposure. Quality of the gas. Maximum stun-to-stick/ kill interval in case of simple stunning. Temperature of the gas.	**Point 8.**
5	Carbon monoxide (pure source)	Exposure of conscious animals to a gas mixture containing more than 4 % of carbon monoxide.	Fur animals, poultry and piglets. Other situations than slaughter.	Quality of the gas. Carbon monoxide concentration. Duration of exposure. Temperature of the gas.	**Points 9.1, 9.2 and 9.3.**
6	Carbon monoxide associated with other gases	Exposure of conscious animals to a gas mixture containing more than 1 % of carbon monoxide associated with other toxic gases.	Fur animals, poultry and piglets. Other situations than slaughter.	Carbon monoxide concentration. Duration of exposure. Temperature of the gas. Filtration of the gas produced from engine.	**Point 9.**
7	Low atmospheric pressure stunning	Exposure of conscious animals to gradual decompression with reduction in available oxygen to less than 5 %.	Broiler chickens up to 4 kg live weight. Slaughter, depopulation and other situations.	Rate of decompression. Duration of exposure. Ambient temperature and humidity.	Points 10.1 to 10.5’

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Why is a method of slaughter chosen

Poultry premises tend to be high throughput fast lines and as such any method used has to be able to cope with this.

The large retail groups have driven welfare improvements across the industry with a move to Controlled Atmosphere Stunning (CAS).

This allows high volume slaughter of poultry with minimal handling at the slaughterhouse. In the UK this must kill the birds but in the rest of Europe it is classed as a simple stun.

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Why is a method of slaughter chosen

Small premises with slower lines still tend to use a live hang shackle line and waterbath stunners.

The EFSA view is that waterbath stunners should be phased out. If this were to happen then alternative methods will need to be considered.

For a low speed line a team of slaughtermen using individual head only stunning could potentially supply a line using cones to restrain the birds and then moving them to the shackles once unconscious.

There have been several manufacturers who have developed a head only stun shackle line, Dutch Vision being the most recent.

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Slaughter by religious rites.

EC1099/2009 Article 4, 4 permits slaughter without prior stunning by religious rites only in an approved slaughterhouse.

WATOK Schedule 3 includes additional requirements including that the neck cut must sever both carotid arteries by continuous movement of a hand held knife.

The use of an automatic neck cutter is not permitted where there is no prior stunning.

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Slaughter by religious rites.

A large number of premises produce Halal product using a waterbath stunner, usually operating at higher frequencies to ensure there is no cardiac fibrillation.

In England only WATOK does not require that the stun parameters in EC1099/2009 Annex I are adhered to so permitting very high frequencies which most researchers consider immobilise rather than stun the birds.

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Slaughter by religious rites.

Around 10% of poultry are killed by a Halal method without prior stunning. Poultry stunned by a method not approved in Annex I are included in the non stun data but account for a small percentage of the total.

A smaller quantity of birds are killed by the Shechita method, all without prior stunning. Around 1% of turkey slaughter is by the Shechita method.

Halal stunned broilers account for 13% and spent hens 6% of total production.

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Future improvements to stunning.

To avoid shackling ideally birds will be slaughtered in the transport crates and so any system avoiding a shackle line should be able to handle individual crates or modules.

In my opinion there is scope to adapt CAS systems to a low volume approach using inert gases and / or CO2.

Similarly Low Atmospheric Pressure Stunning (LAPS) could potentially be adapted for lower throughputs.

The major question is that of cost and industry take up.

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Future improvements to stunning.

There a number of issues that should be considered in the longer term when considering systems for stunning poultry.

Any system should be no worse than, and ideally better than existing systems for welfare. Shackling of live birds should not be required.

Handling of live birds should be minimised as far as possible.

Systems that are accepted by the Halal monitoring bodies should be developed to help acceptance for Halal production.

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Future improvements to stunning.

The head only stunning systems that have been developed still rely on hanging birds onto a shackle line. Such systems are however acceptable to some Halal monitoring bodies.

Any hang on time would need to be minimised if we are to continue to accept such systems.

The use of individual cones and head only stunning may be an alternative to live shackling and as the bird is not suspended by the legs, more acceptable from a welfare perspective.

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Future improvements to stunning.

“Improvements to head-only stunning of turkeys” Carlos Rebelo (RVC) Carlos and team have developed a device for turkeys with an improved contact surface area, using an increased current – up to 1.2 A which produces an effective stun duration of 15 – 37 seconds.

There was a presentation on this work at the recent Humane Slaughter Association meeting and the data presented supported this as an improved method.

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Future improvements to stunning.

Cervical dislocation using Nex.

https://www.livetecsystems.co.uk/nex/

Defra consider this to be a mechanical device when used for cervical dislocation of poultry so birds up to 5Kg liveweight can be killed using this method.

The limit of 70 birds per day will not apply to the use of a mechanical method but consideration must be given to numbers that can be accurately and consistently killed.

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Future improvements to stunning.

“Regulations for seasonal poultry slaughter in the UK”

“whatever the outcome of EU exit, EU legislation will be rolled over into domestic legislation.

The practice of mouth stun/stick is favoured by certain high-end retailers.

WATOK Schedule 2 applies outside approved slaughterhouses (and so in seasonal on farm slaughter units) and requires that the cut severs both carotid arteries or the vessels from which they arise.

A mouth stick will not achieve this.

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Future improvements to stunning.

Currently in the UK Halal monitoring bodies will not accept CAS systems because of the legislative requirement to kill the birds. CAS systems could be used as “simple stun” so potentially allowing recovery of the birds.

As they would remain technically alive such an approach may be accepted by the Halal monitoring bodies. I understand that elsewhere in Europe this is the case.

Currently there is a group looking at the New Zealand approach to Halal slaughter in sheep to demonstrate that a stunned animal remains alive.

This may have potential for poultry slaughter.

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FSA Board Paper September 2019.

• Broiler chicken was by far the most commonly slaughtered species. Out of the 18 million broiler chickens slaughtered, approximately 70% were gas stunned and 10% were slaughtered using non-stun methods, almost all of which were non-stun Halal including Halal water-bath not using the parameters in Annex I.

• Over 800,000 spent hens were slaughtered and 92% of these were stunned with CO2 or with other gas mixtures.

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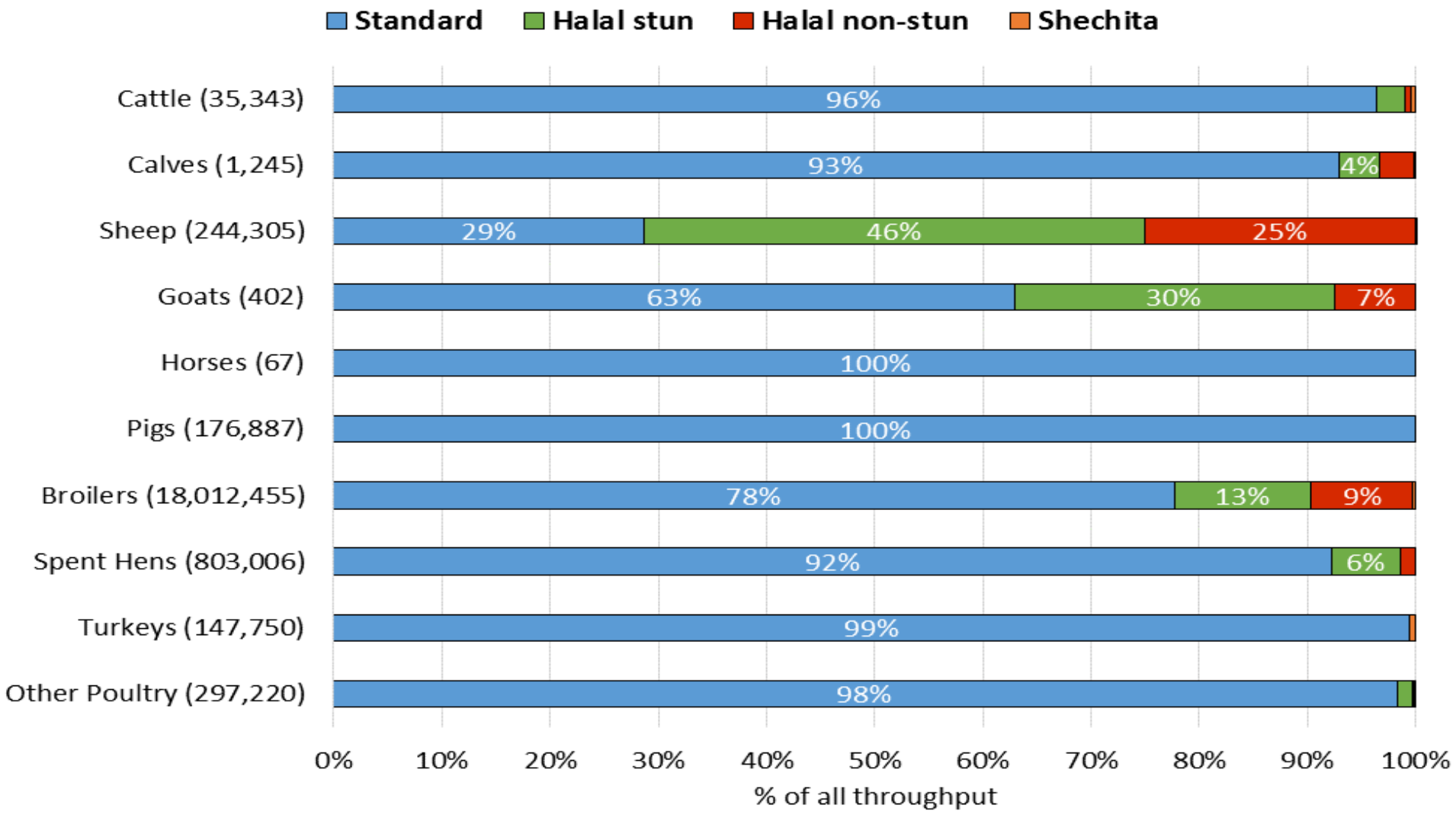
FSA Board Paper September 2019.



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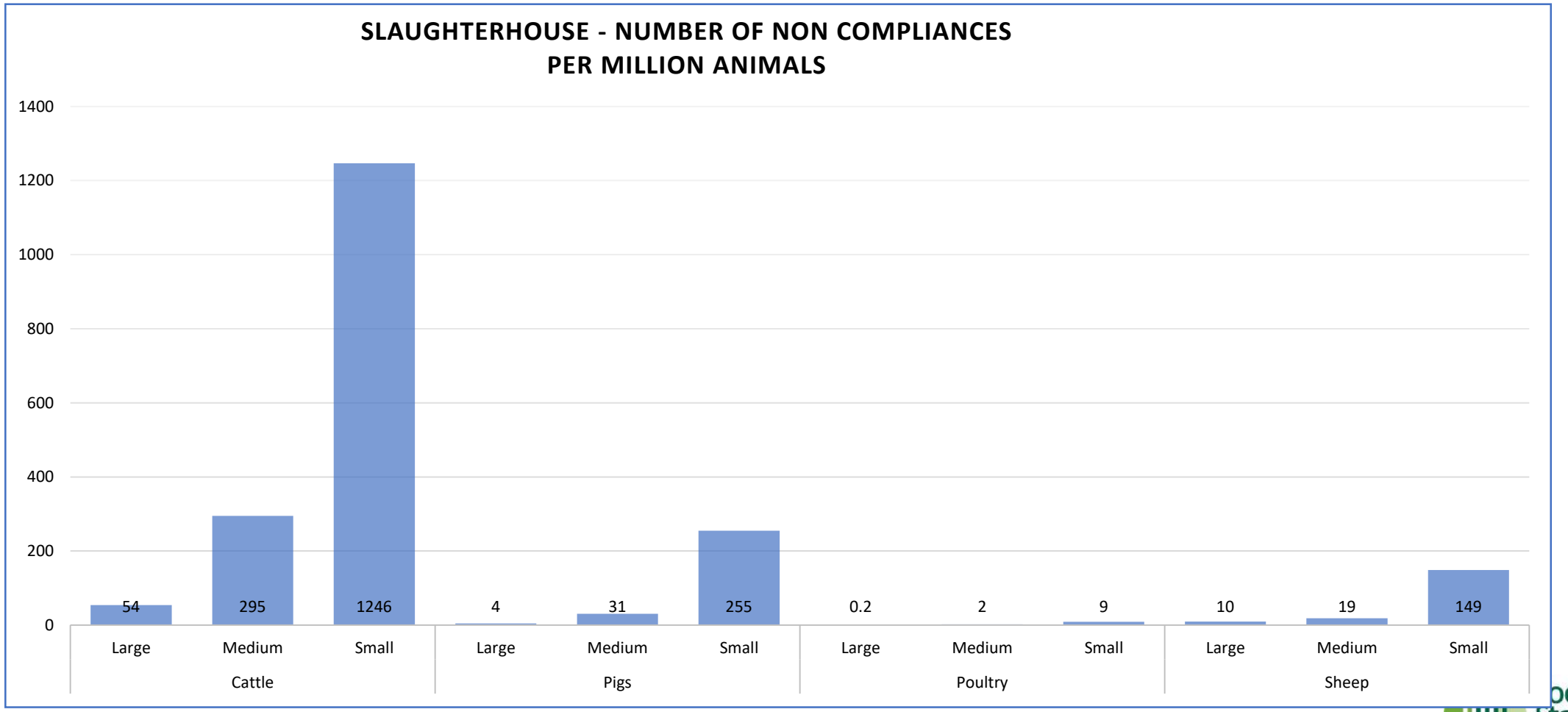

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The End.
Questions now please.
Thank you for listening.