Animal-based measures in slaughter and killing for disease control purposes

Antonio Velarde
Animal Welfare
Agrifood Research and Technology (IRTA)
Spain

Regional training seminar for OIE National Focal Points on Animal Welfare
18 – 20 June 2019
The Hague, The Netherlands

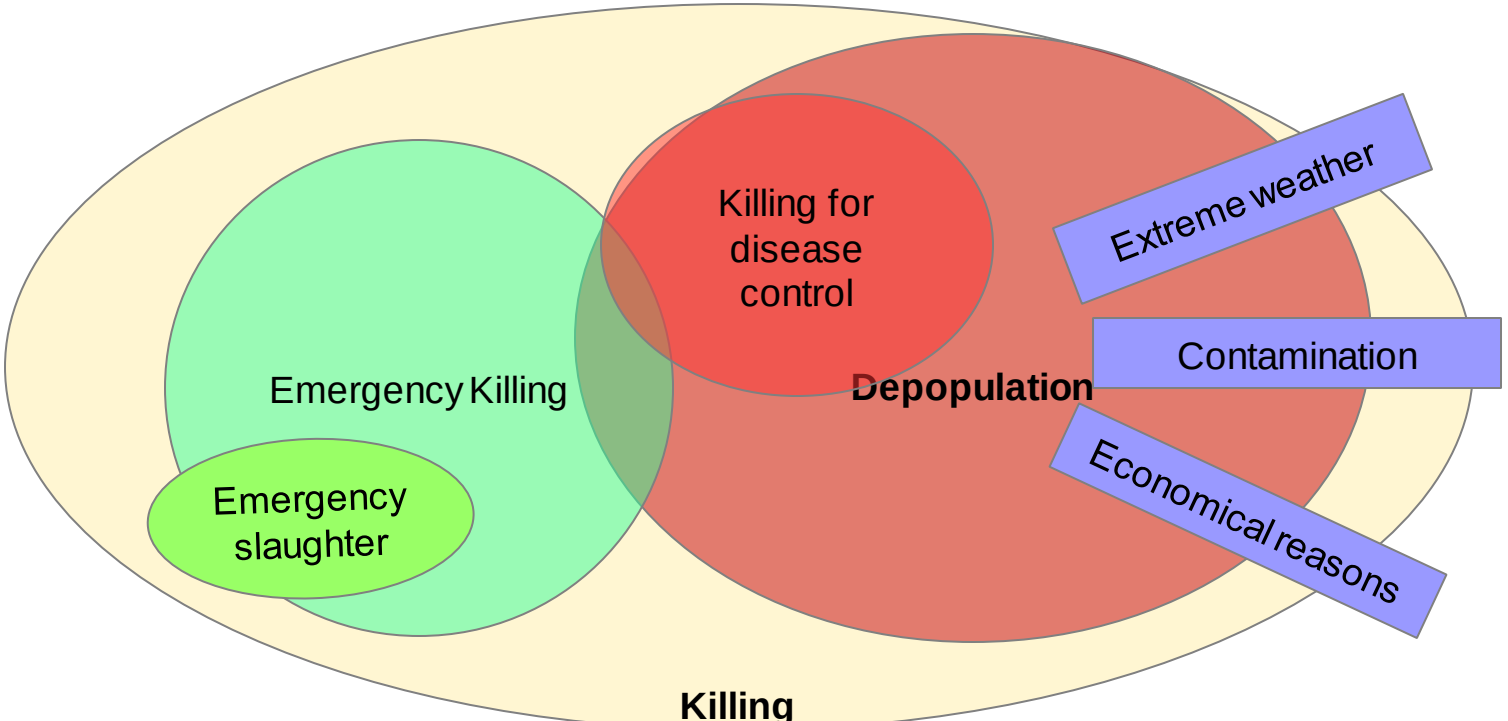
Outline

- Background
- Monitoring unconsciousness
- Electrical methods
- Mechanical methods
- Controlled atmosphere methods

Scope

Slaughter: the killing of animals intended for human consumption

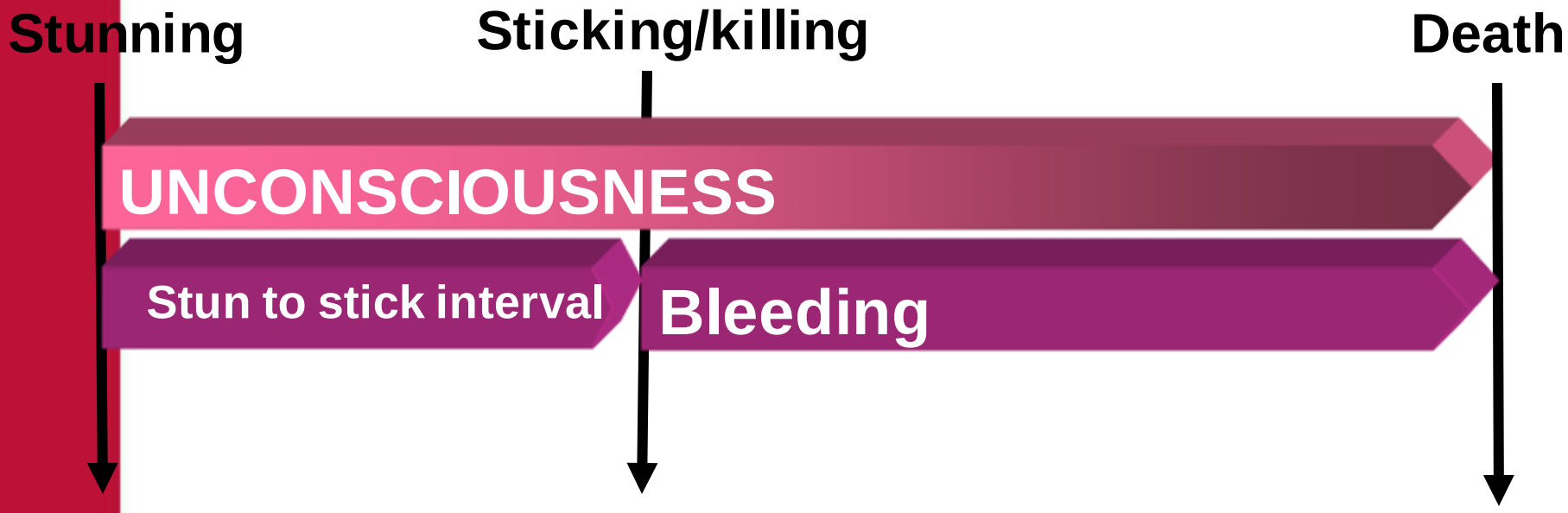
Depopulation: the process of killing animals for public health, animal health, animal welfare or environmental reasons under the supervision of the competent authority



IRTA

Stunning

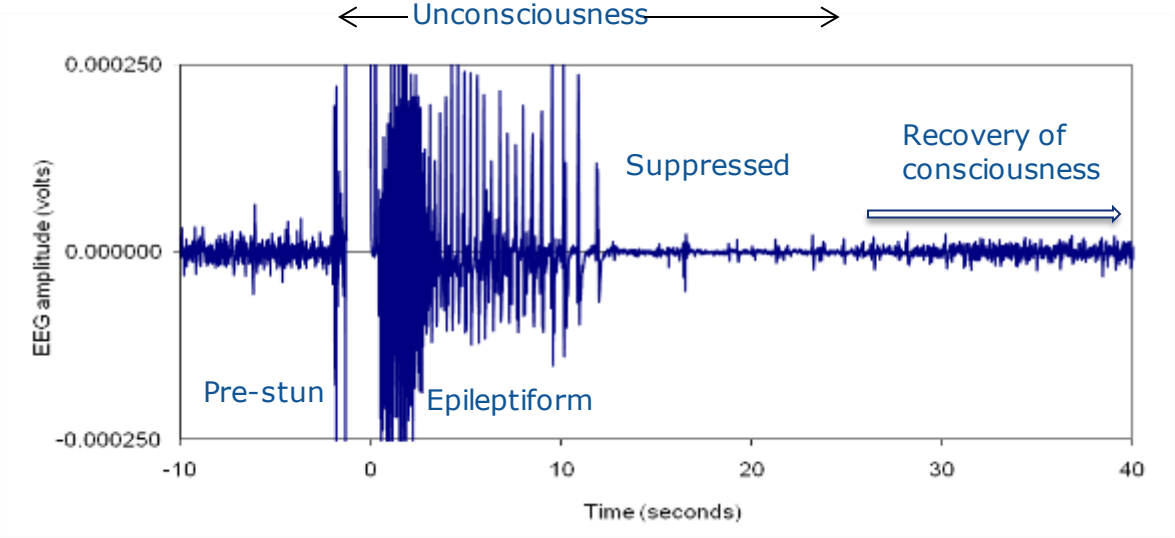
Any intentionally induced process which causes loss of consciousness and sensibility without pain, including any process resulting in instantaneous death.



Assessment of loss of consciousness

Unconsciousness: Inability to perceive external stimuli and control its voluntary mobility

- ✓ EEG
- ✓ Indicators for unconsciousness



IRTA

Source

EUWelNet
Coordinated European Animal Welfare Network

http://www.euwelnet.eu/euwelnet/53430/7/0/80

Animal-based measures

Toolbox of indicators for unconsciousness:

1. Behaviour of animals (e.g. collapse, loss of posture),
2. Physical signs (e.g. onset of seizures, cessation of breathing, fixed eye),
3. Presence or absence of response to external stimulus (e.g corneal reflex and response to pain stimulus).

Methodology

Stunning Shackling Sticking Bleeding Death

UNCONSCIOUSNESS

Stage 1

Stage 2

Stage 3

IRTA

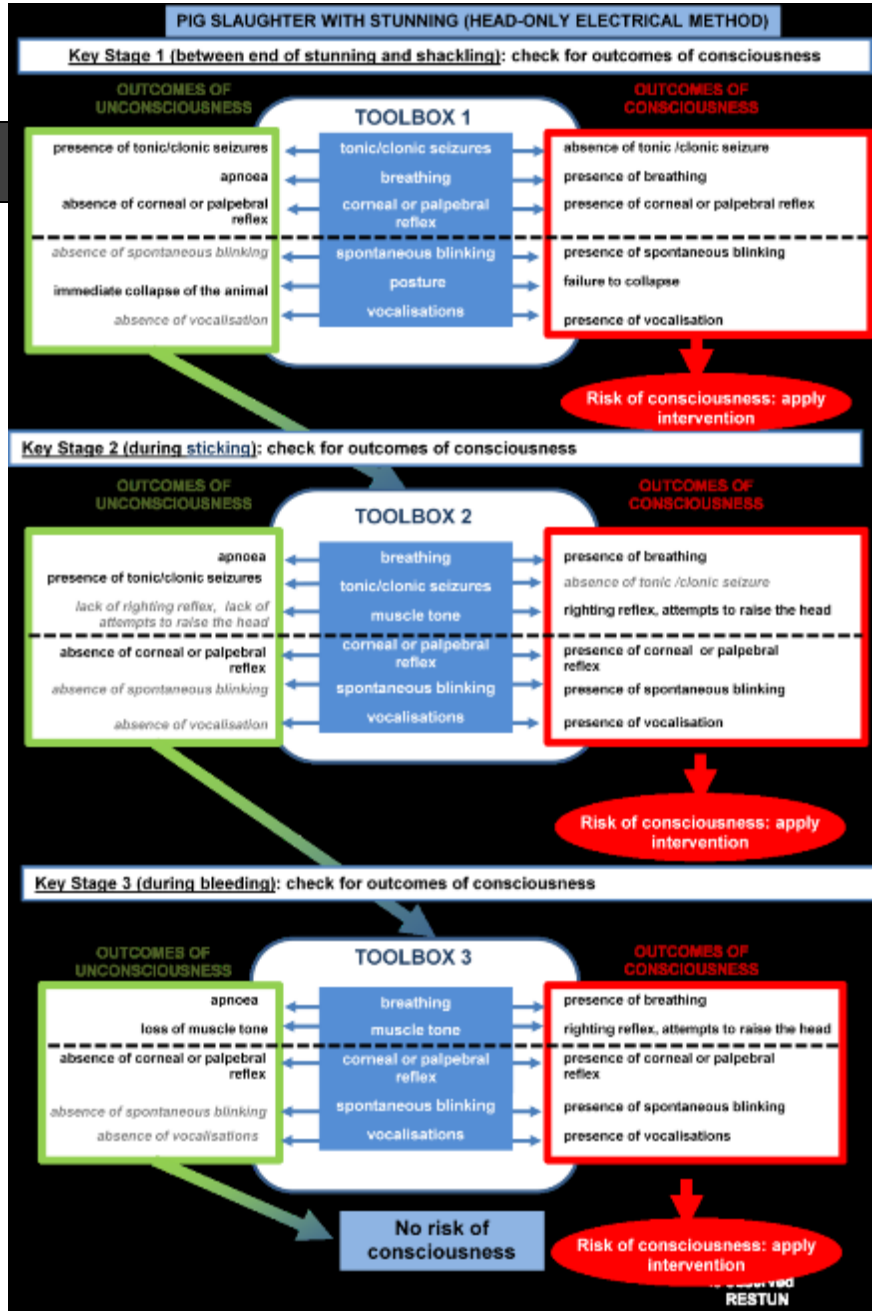
Toolbox

Key stage 1: between end of stunning and shackling

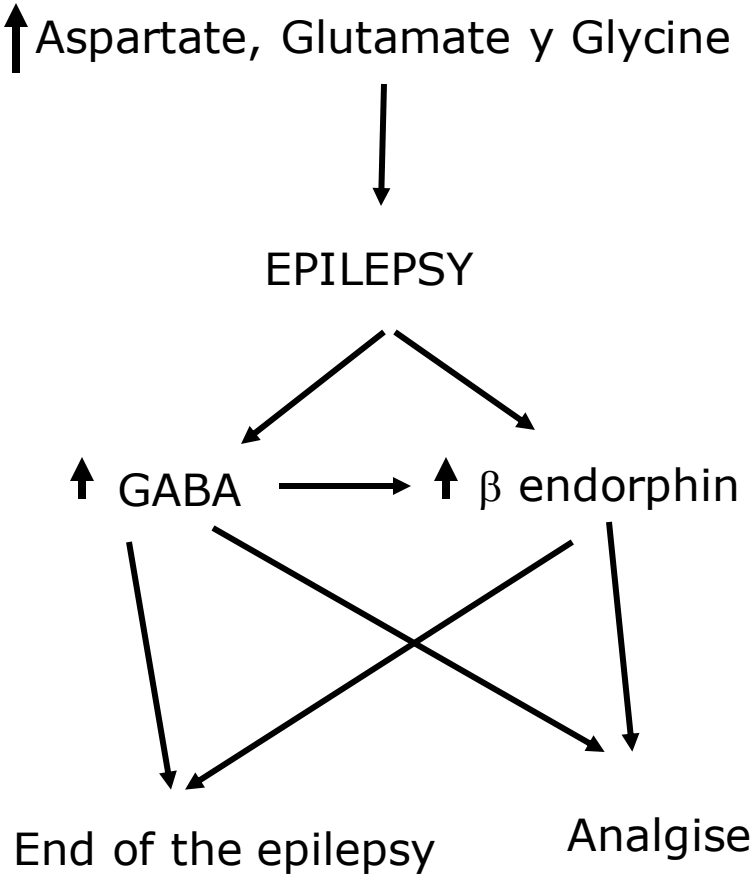
Key stage 2: during sticking

Key stage 3: during bleeding

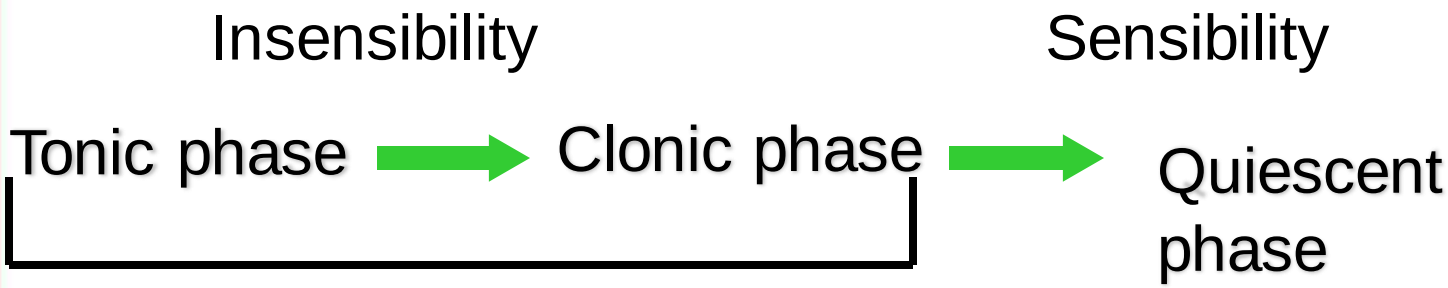
check for outcomes of consciousness



Electrical methods



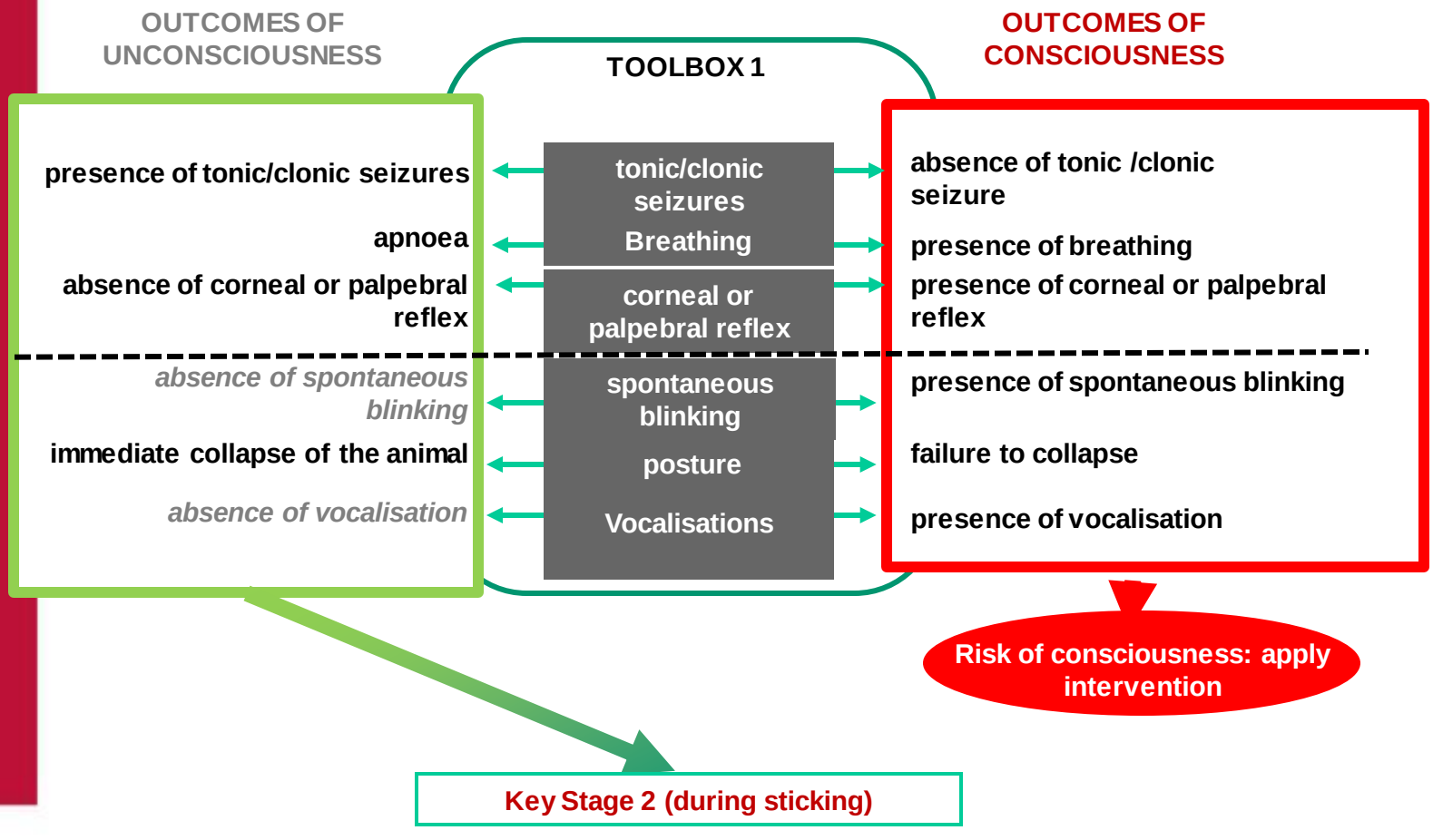
Electrical methods



- Immediate collapse
- Apnoea (absence of breathing)
- Loss of corneal reflex (not always reliable)
- Absence of response to a painful stimulus
- Absence of vocalization

Electrical methods

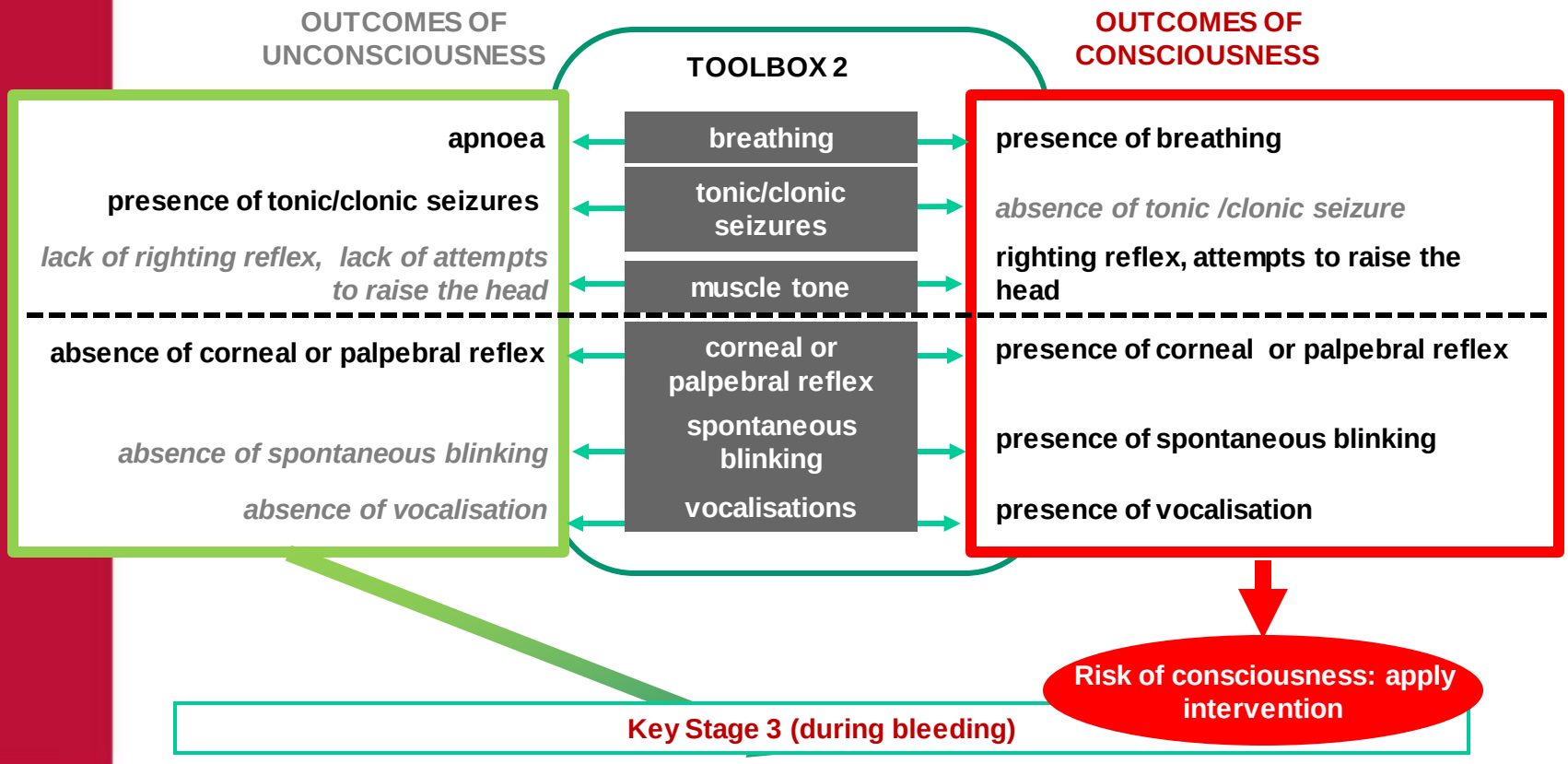
Key Stage 1 (between end of stunning and shackling



IRTA

Electrical methods

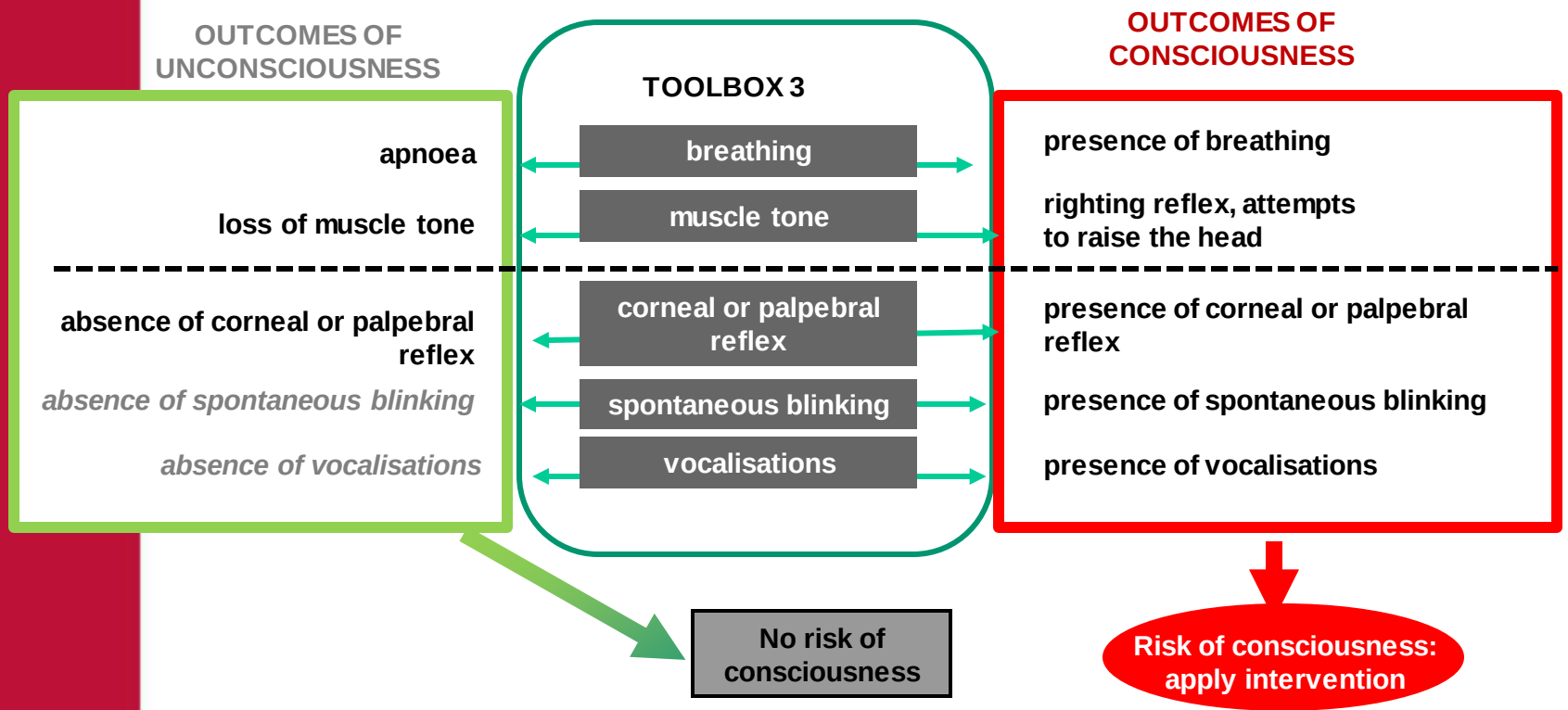
Key Stage 2 (during sticking)



IRTA

Electrical methods

Key Stage 3 (during bleeding)



IRTA

Current : 1,3 A
Frequency: 50Hz

Electrical stunning and cardiac fibrillation

WORLD ANIMAL PROTECTION

IRTA

Mechanical methods

Cerebral concussion

- Increase of intracerebral pressure
- Brain acceleration
- Rotational forces
- Brain haemorrhage

- ✓ Immediate loss of consciousness
- ✓ Long lasting unconsciousness (> 60 s) o irreversible

WORLD
ANIMAL
PROTECTION

IRTA

pithing

- Never stun until someone is ready to pith
- Stun to pithing time as short as possible

Free bullets

Animals difficult to be restrained

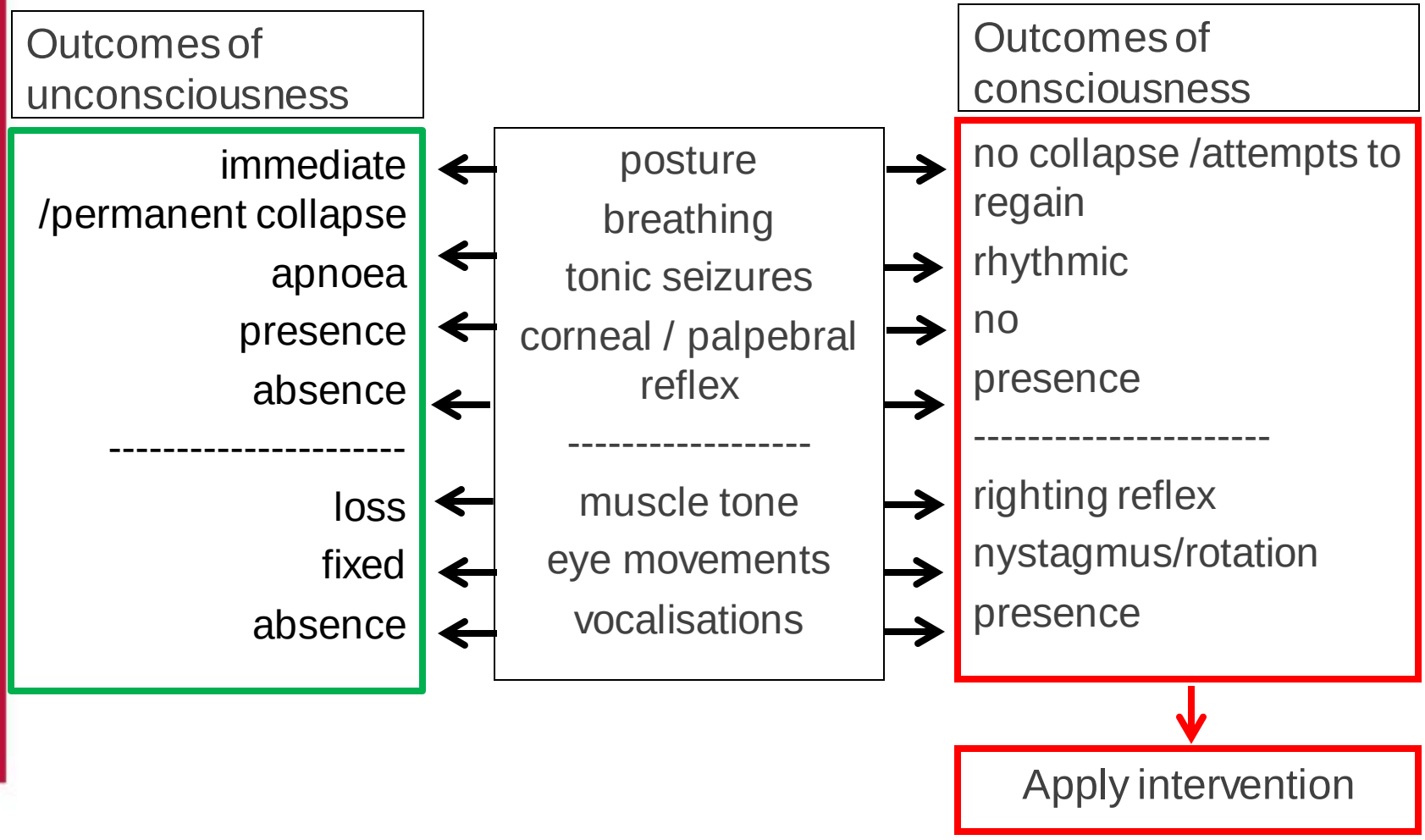
Distance:

- Humane killer: less than 5cm
- Shotgun: between 5 and 50 cm (no contact with the animal's head)
- Rifle (few meters)

IRTA

Mechanical methods

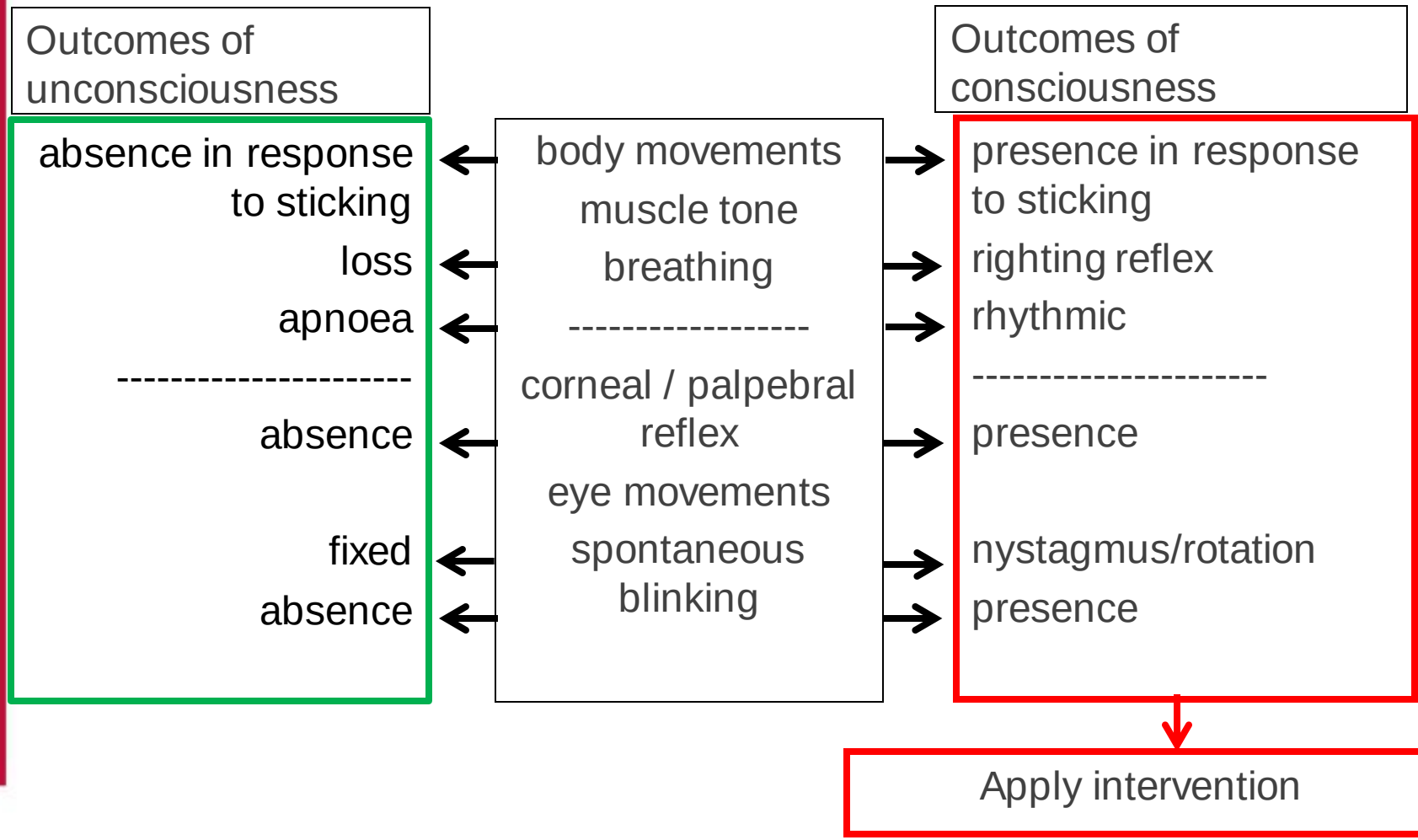
Key Stage 1 (between end of stunning and shackling



IRTA

Mechanical methods

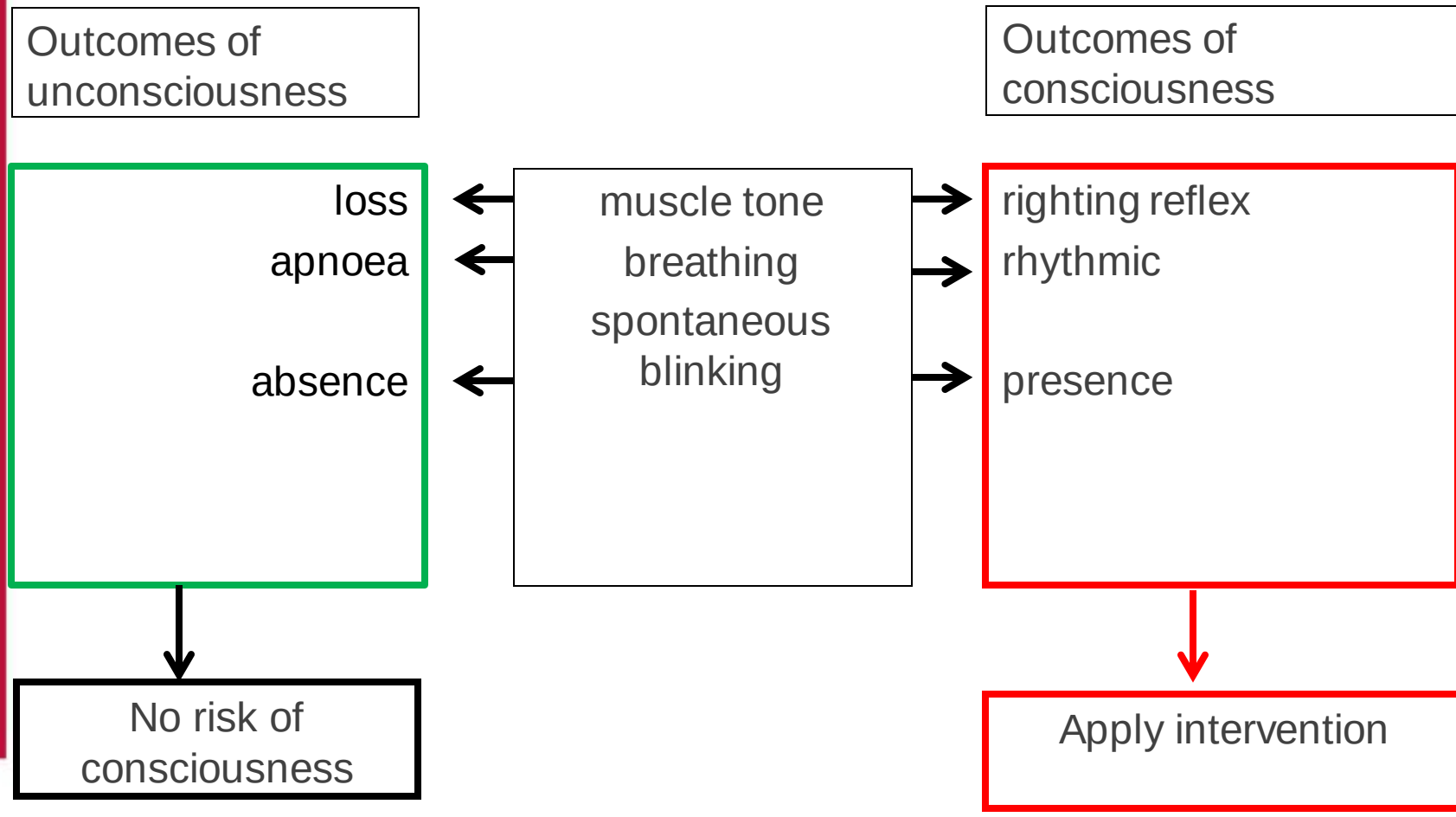
Key Stage 2 (during sticking)



IRTA

Mechanical methods

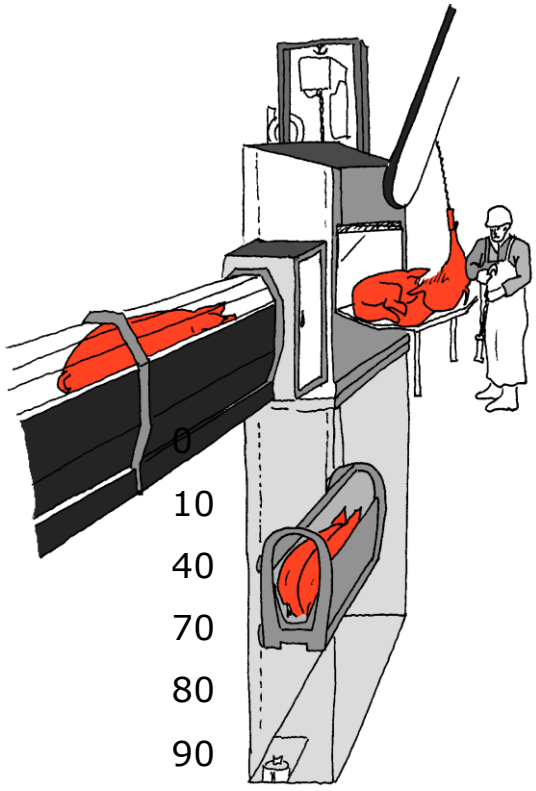
Key Stage 3 (during bleeding)



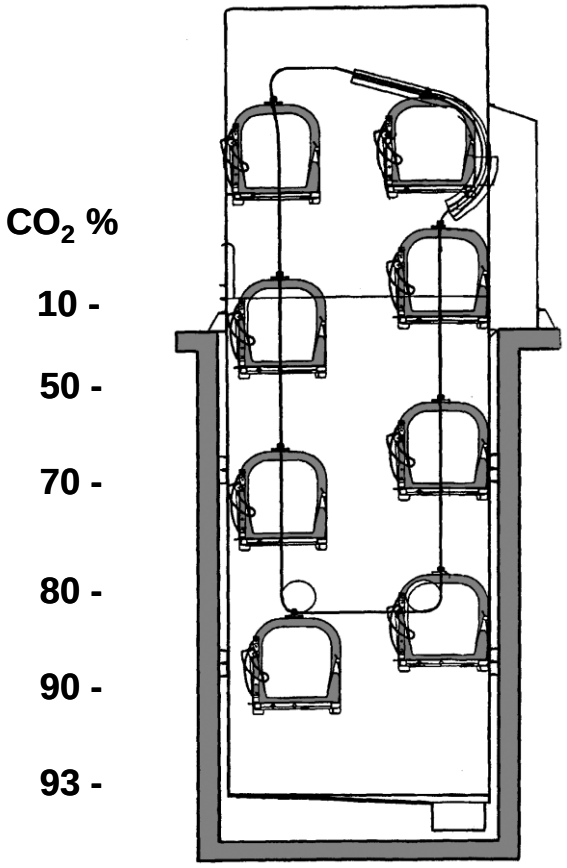
IRTA

Mechanical methods

Controlled atmosphere methods



Dip lift system



Paternoster system

IRTA

CO_2 at high concentration

- Hypercapnia and hypoxia
- Increase the amount of carbon dioxide in the blood
- Displace the O_2
- $CO_2 + H_2O \rightleftharpoons HCO_3^-$ y H^+
- Respiratory and metabolic acidosis
- Reduces the pH of cerebrospinal fluid (from 7.4 to 6.8)

Gas stunning in poultry

Gasses or gas mixtures

- CO_2
- CO_2 mixtures with Ar or N_2
- N_2
- Argon
- CO

Requirements

- Gasses should never create burns, excitement by freezing or lack of humidity.
- Animals remain in the gas concentration until they are dead.

Gas filled containers

Gas filled containers or culling bags are placed inside or out side the animal house.

- Easy to move
- Controllable killing method
- Easy to stop and adjust
- Applicable in many situations
- Intensive handling of live animals
- Large numbers of personnel
- Low capacity per set (operation speed)

IRTA

Whole house gassing

Carbon dioxide is injected from a tanker by one or more injection point into the shed were it distributes.

A level of at least **40% CO2** in the whole house is required.

- Not suitable for all housings
- Difficult to control
- Difficult to adjust during processing
- Temperature drop
- Minimal human contact with live birds
- High capacity

Gas filled foam

Foam is injected in a restricted area or into the shed covering the animals with a layer of foam filled with >99% of nitrogen.

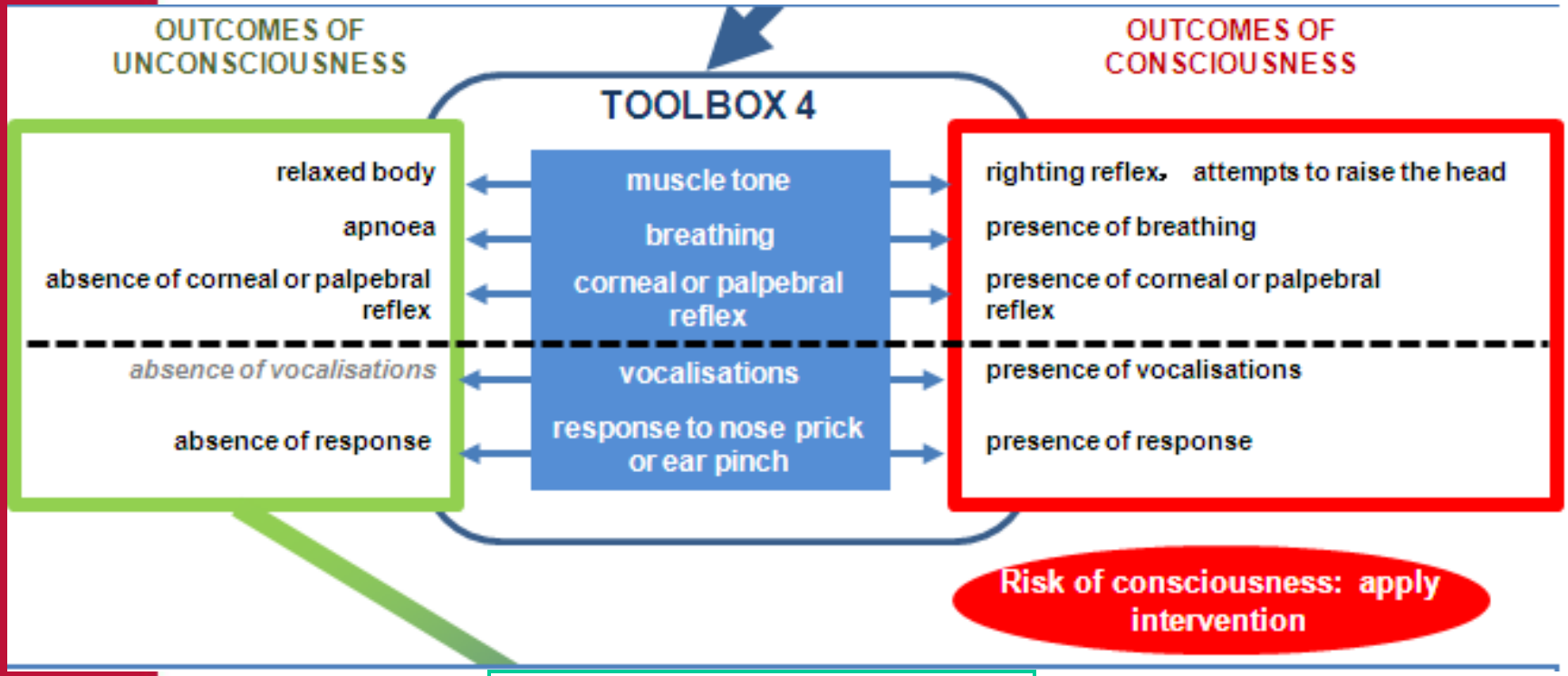
Animals die due to the lack of oxygen in the breathing air.

- Applicable in open housings
- No restriction of airways due to large bubbles
- New method, still under development

IRTA

CO_2 at high concentration

Key stage 1: between end of stunning and shackling

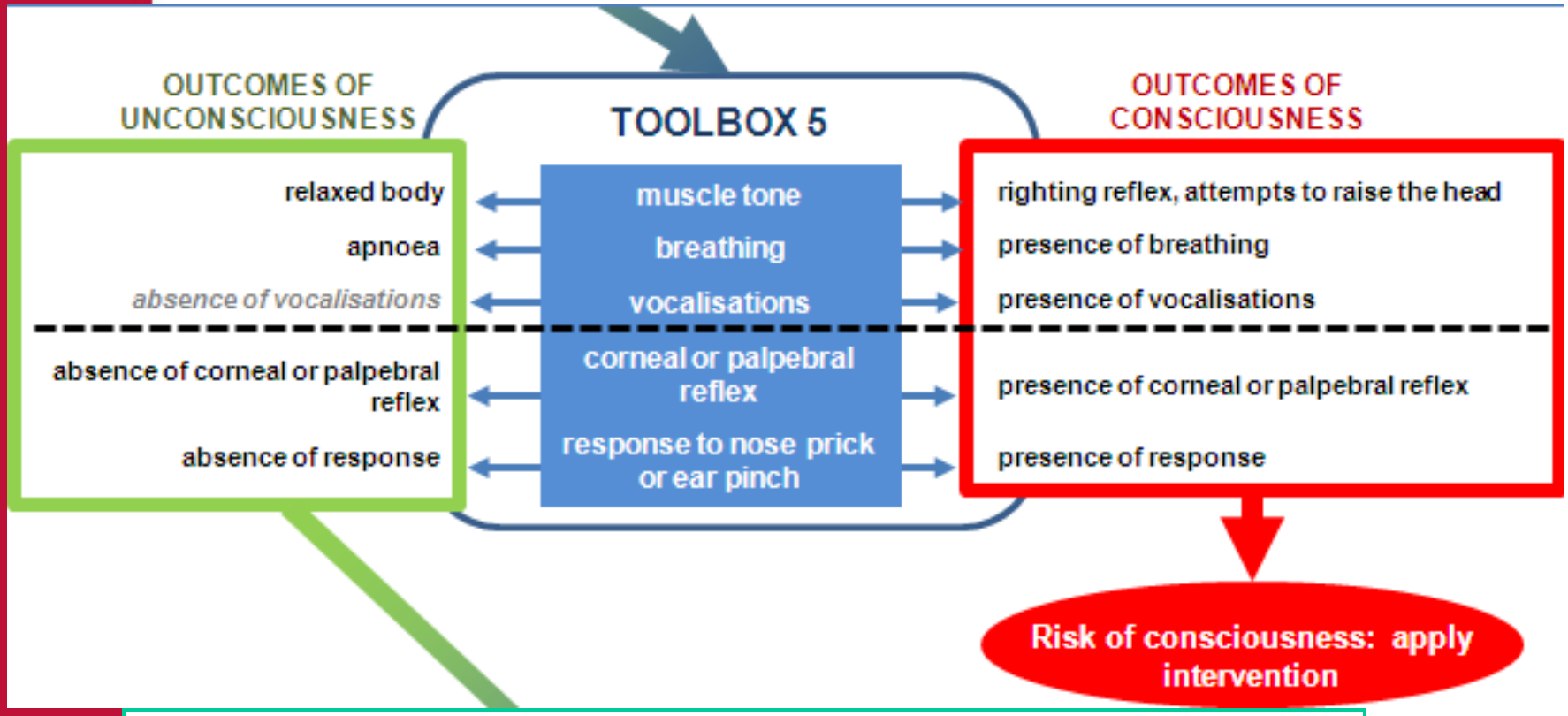


Key Stage 2 (during sticking)

IRTA

CO_2 at high concentration

Key stage 2: during sticking

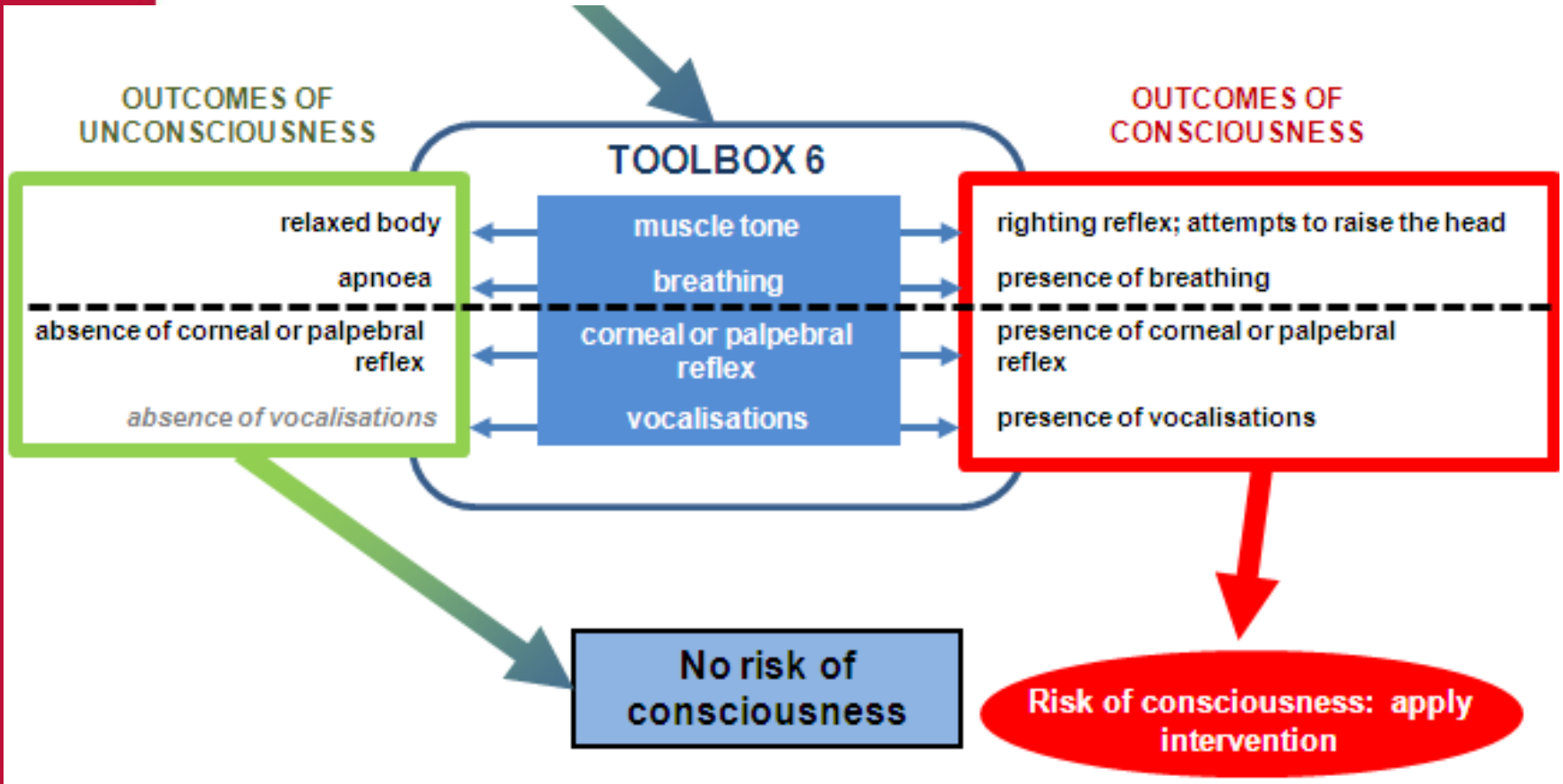


Key Stage 3 (during bleeding)

IRTA

CO_2 at high concentration

Key stage 3: during bleeding



IRTA

CO_2 at high concentration

IRTA

Thank you for your attention

Antonio.Velarde@irta.es