

Is Electrical Stunning Ethical?

**R. Jeff Buhr
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Atlanta, GA**

Presentation Area of Focus

- transport
- unloading
- shackling

- **stunning**
 - **neck cutting**
 - **bleeding**
- < 2
min

- electrical stimulation
- scalding

Stunning

Stunning and bleeding need to be considered as two integral steps in a **single process** as opposed to independent operations

Stunning

Why electrically stun poultry?

1. Facilitates automated bleeding systems
2. **Animal welfare concerns**
3. Minimizes carcass damage (not stunned)
4. Human welfare - manual bleeding

Stunning

False reasons to electrically stun

1. Relaxation of feathers - **False**
2. Increases bleed-out blood loss - **False**
3. Accelerates onset of rigor - **False**

Stunning

- General concepts -

- Renders the animal unconscious
 - Reduces unconscious muscular activity
 - Malleable for automation
- Recoverable - “stunning”
- Unrecoverable - “killing = electrocution”

Stunning

- General concepts -

- Disrupts brain function -X- cerebral cortex
 - Loss of consciousness
 - Loss of ability to perceive pain
- Recoverable - temporary short circuit
- Unrecoverable - permanent damage

Stunning

- Ethical criteria -

- Rapid onset = “instantaneous” ~ 1 second
- Stun Duration = sufficient that animal does not regain consciousness prior to death
- Zero occurrence of under stunned birds

Stages of Anesthesia

- Conscious / Unconscious -

1. Analgesia - Pain relief, disorientation
2. Unconscious, Insensible, Senseless
 - Lose of sensory perception = “Pain”
 - Muscle reflexes present

Stages of Anesthesia

- Unconscious > Death -

3. Surgical Anesthesia (3 planes)

1. Light - Muscle relaxation, PR+ CR+

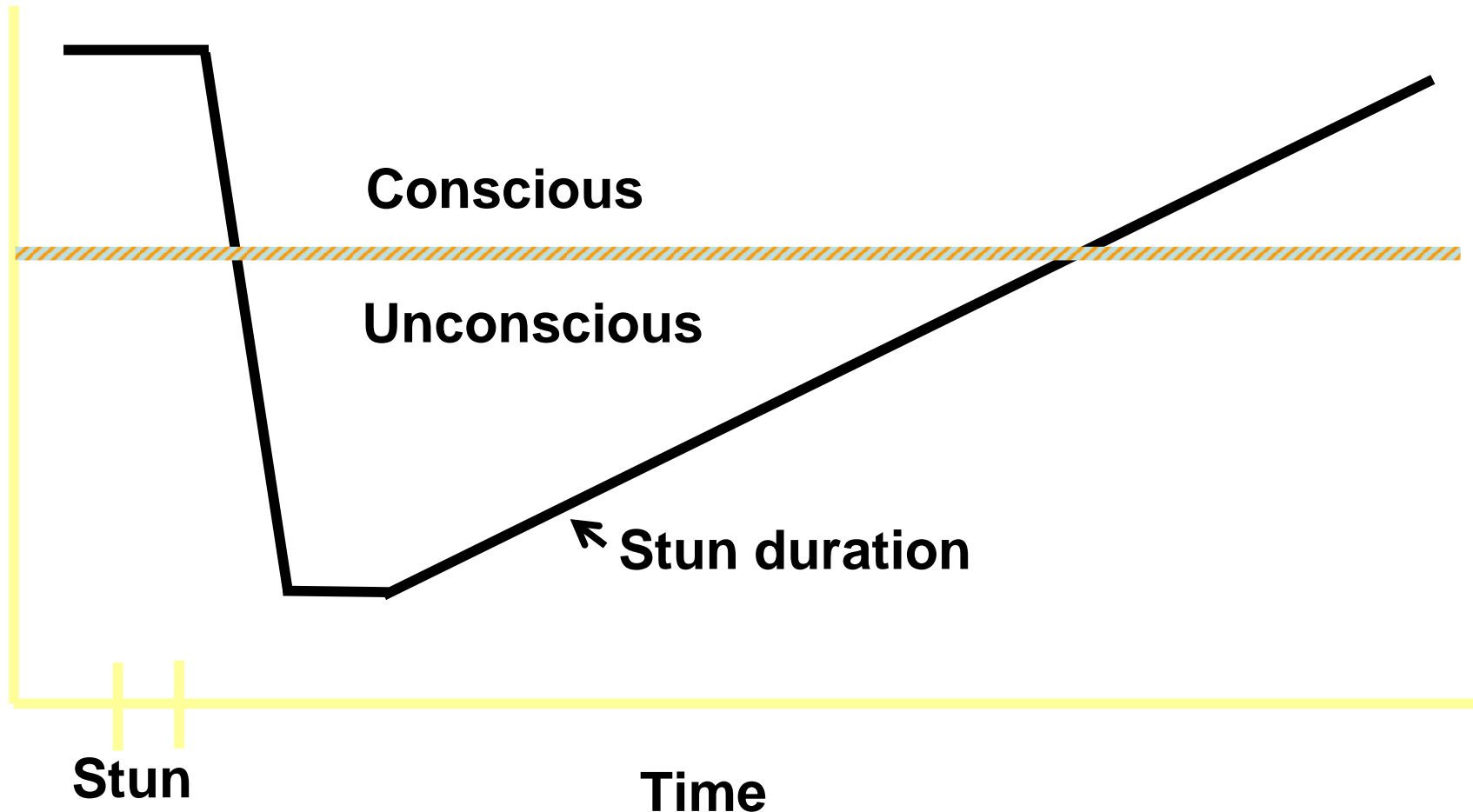
2. Medium - Sluggish reflexes, PR- CR+

3. Deep - Diminished reflexes / Respiration

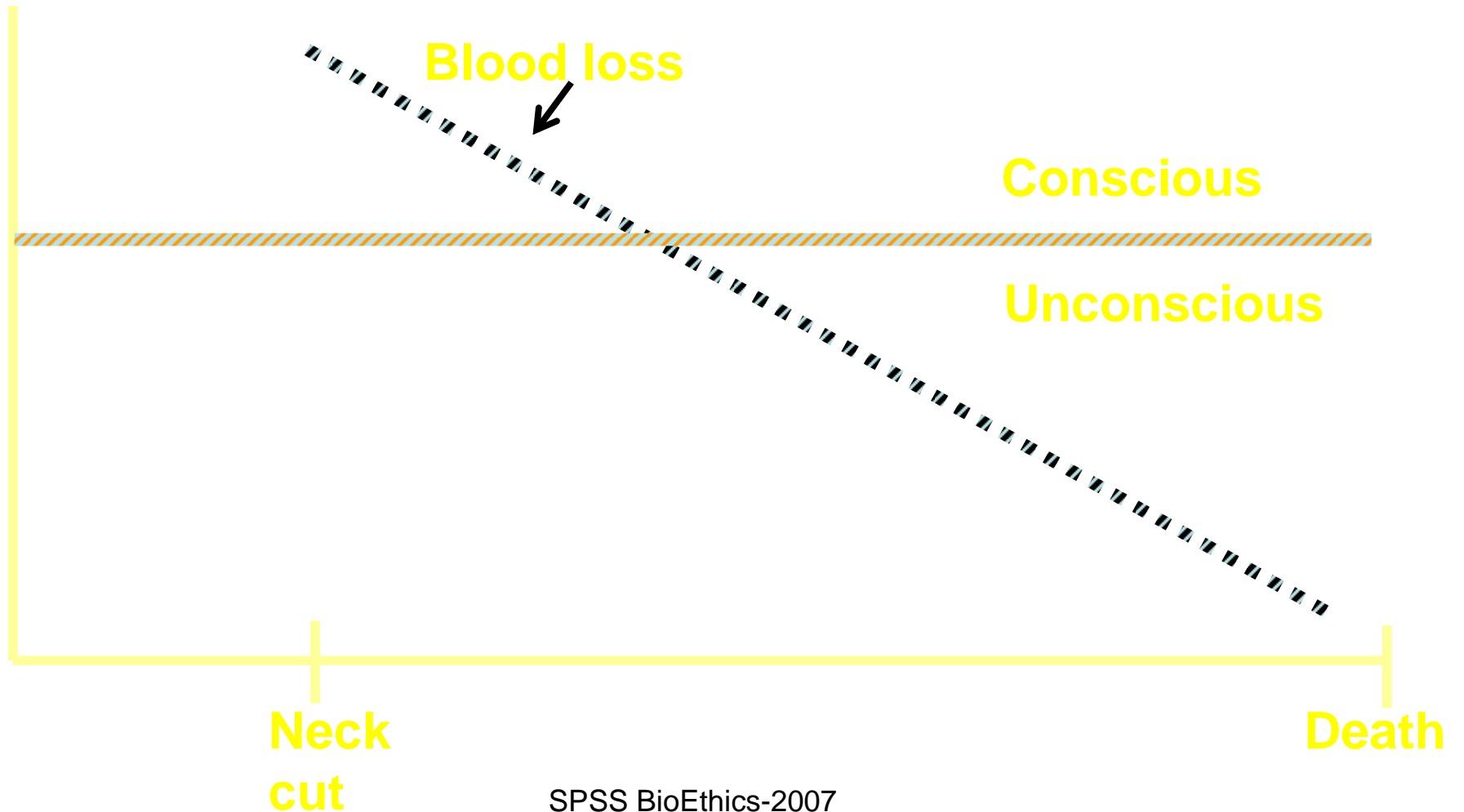
4. Medullary Paralysis, Overdose

- All reflexes absent, No Respiration

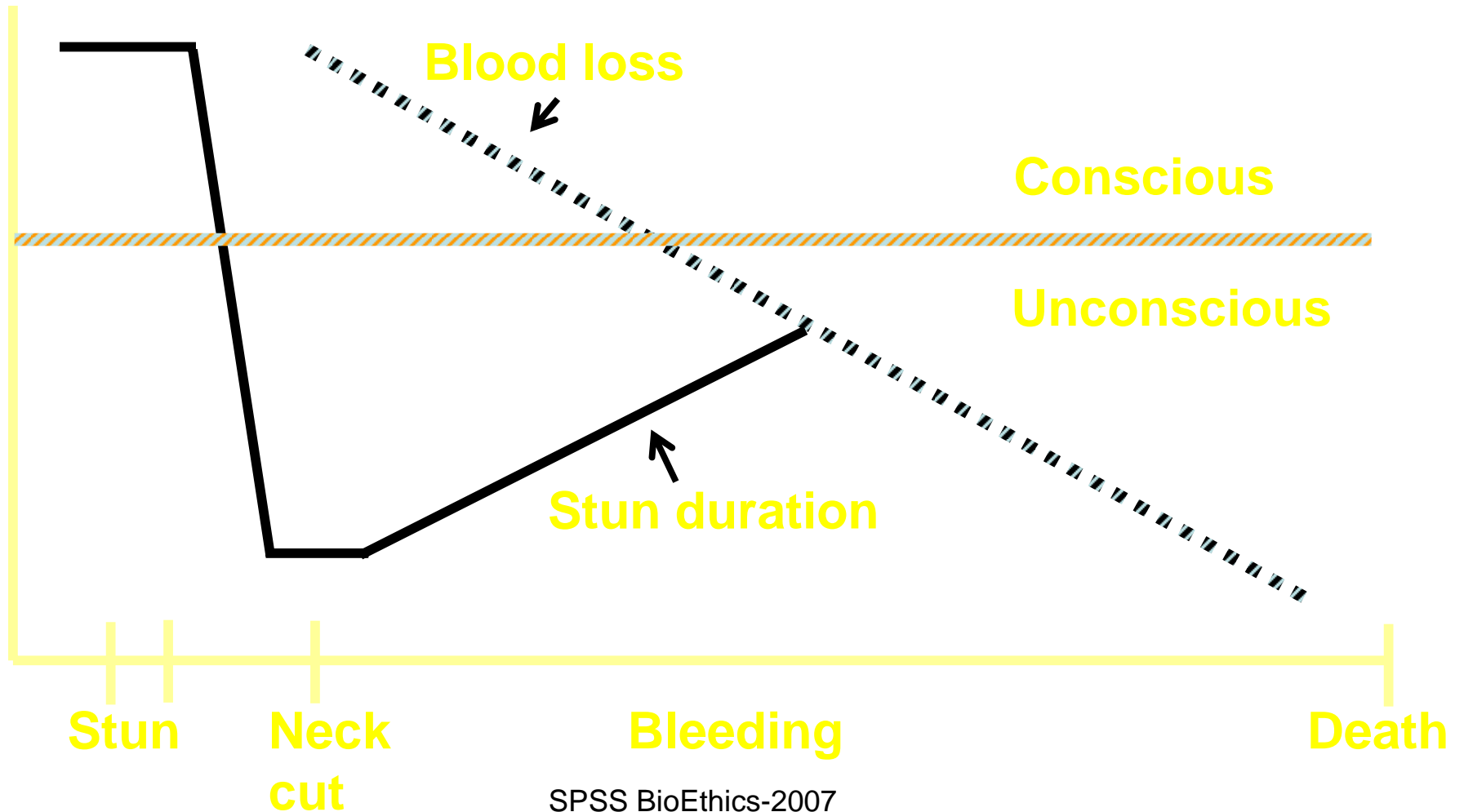
Electrical Stunning and Recovery



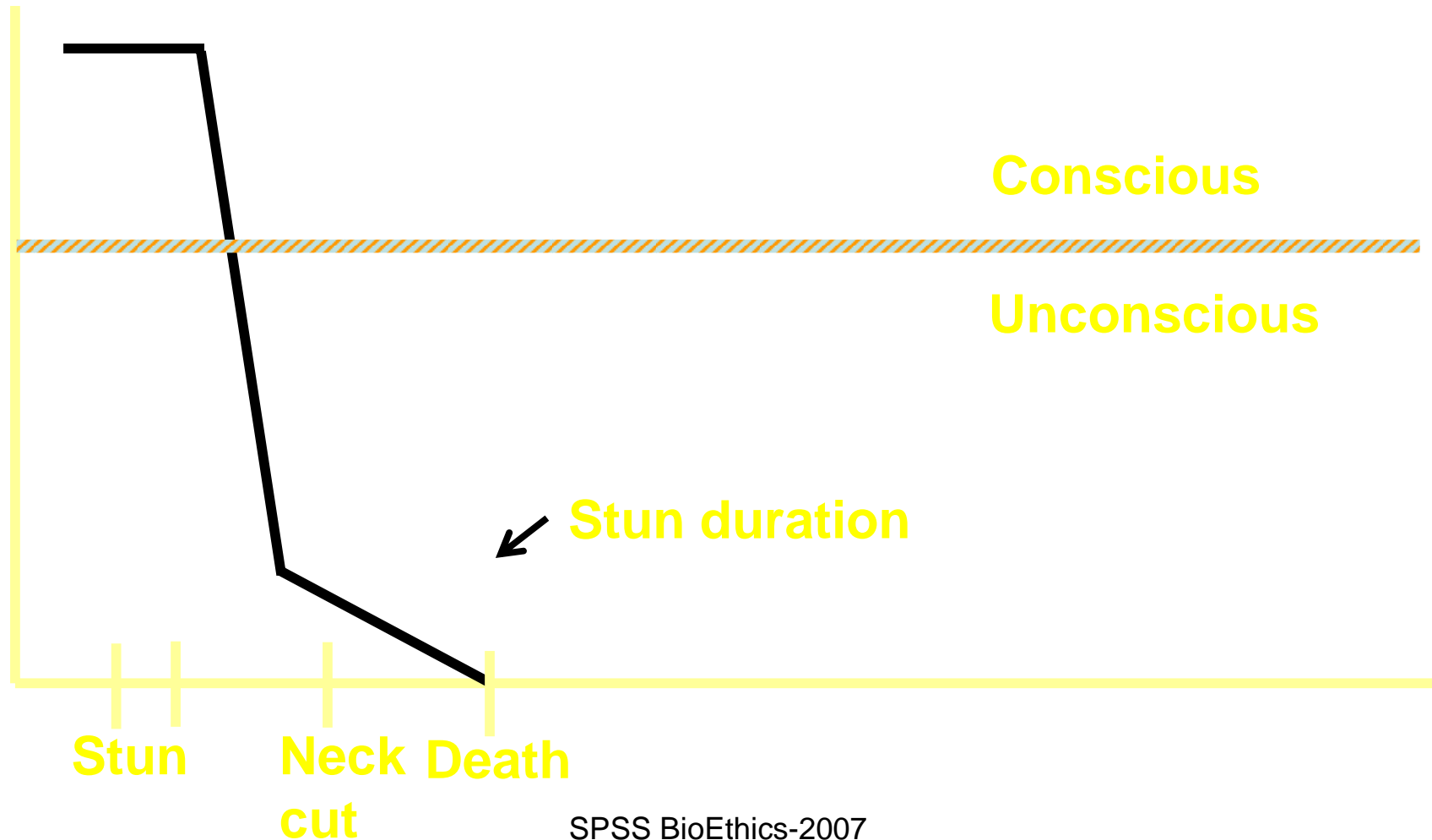
Blood Loss and Consciousness



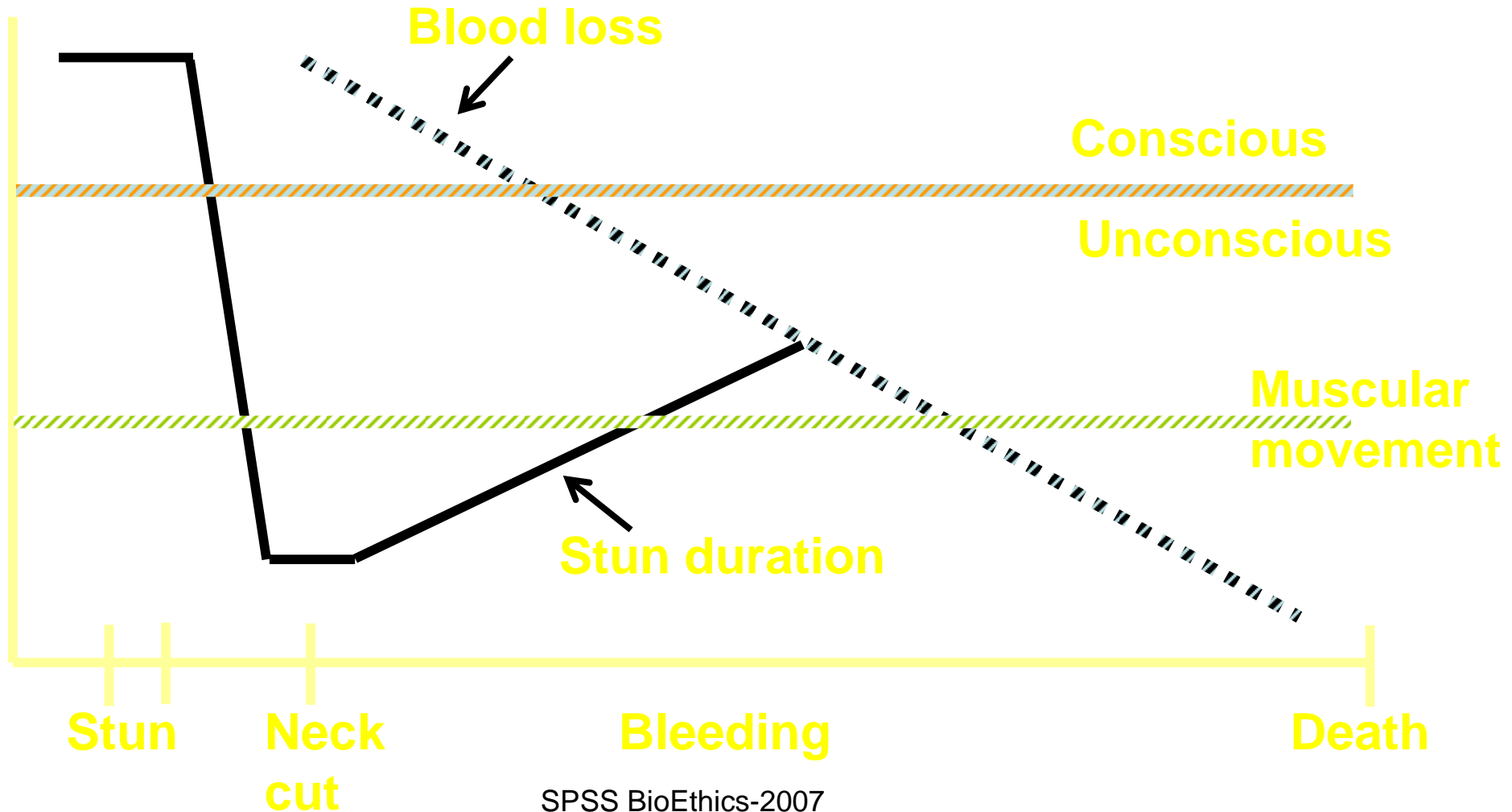
Proper stunning and bleeding



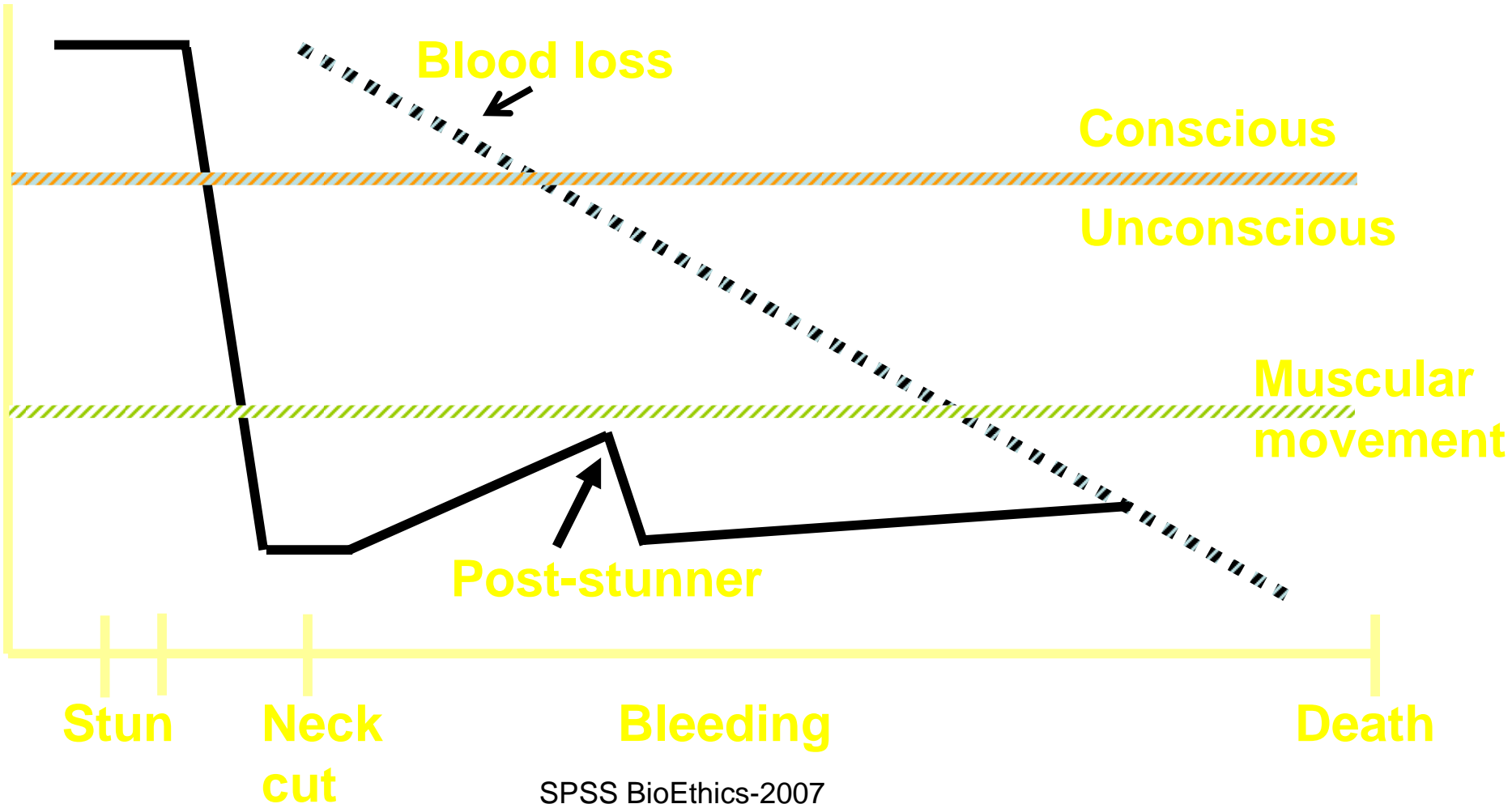
Stun-to-Kill



Muscular / respiratory movements



Muscular / respiratory movements





Alive

Dead



Alive

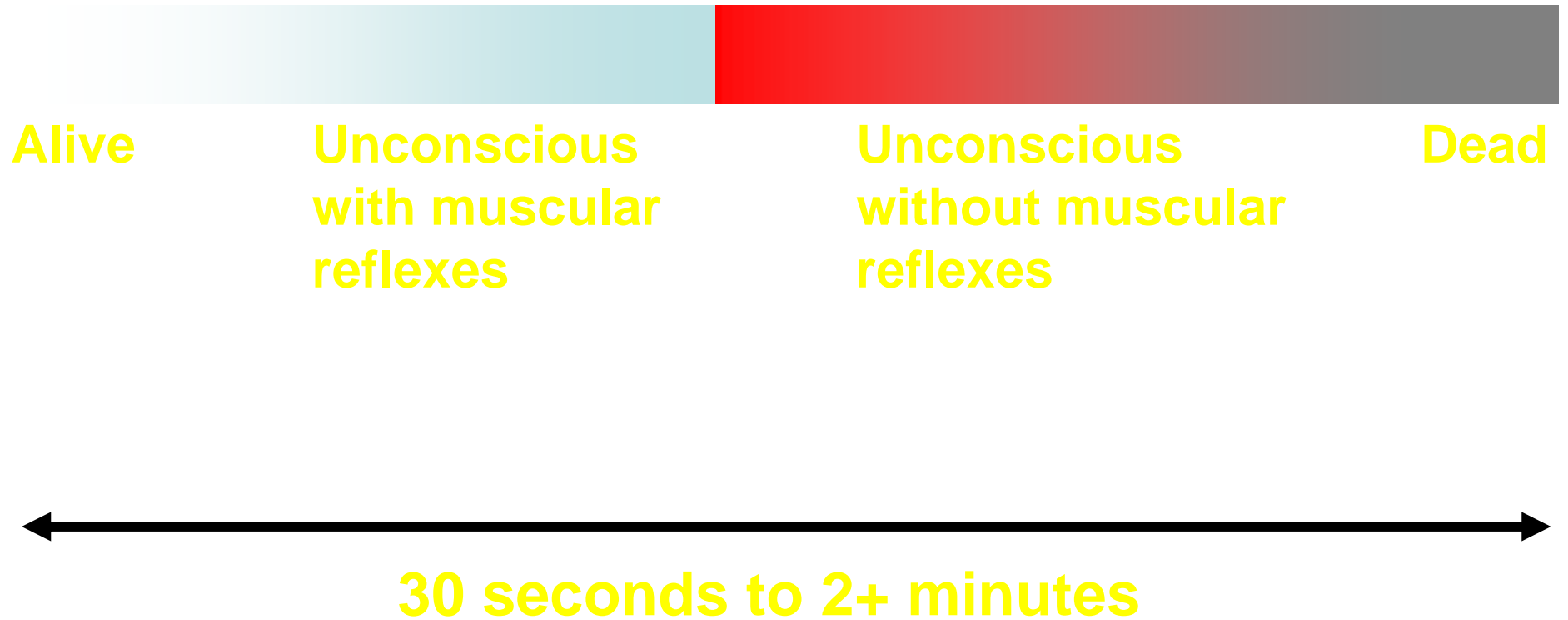
**Unconscious
but able to
self-resuscitate
(stunned)**

**Unconscious
and unable to
self-resuscitate ->
respiratory failure
(electrocution)**

Dead

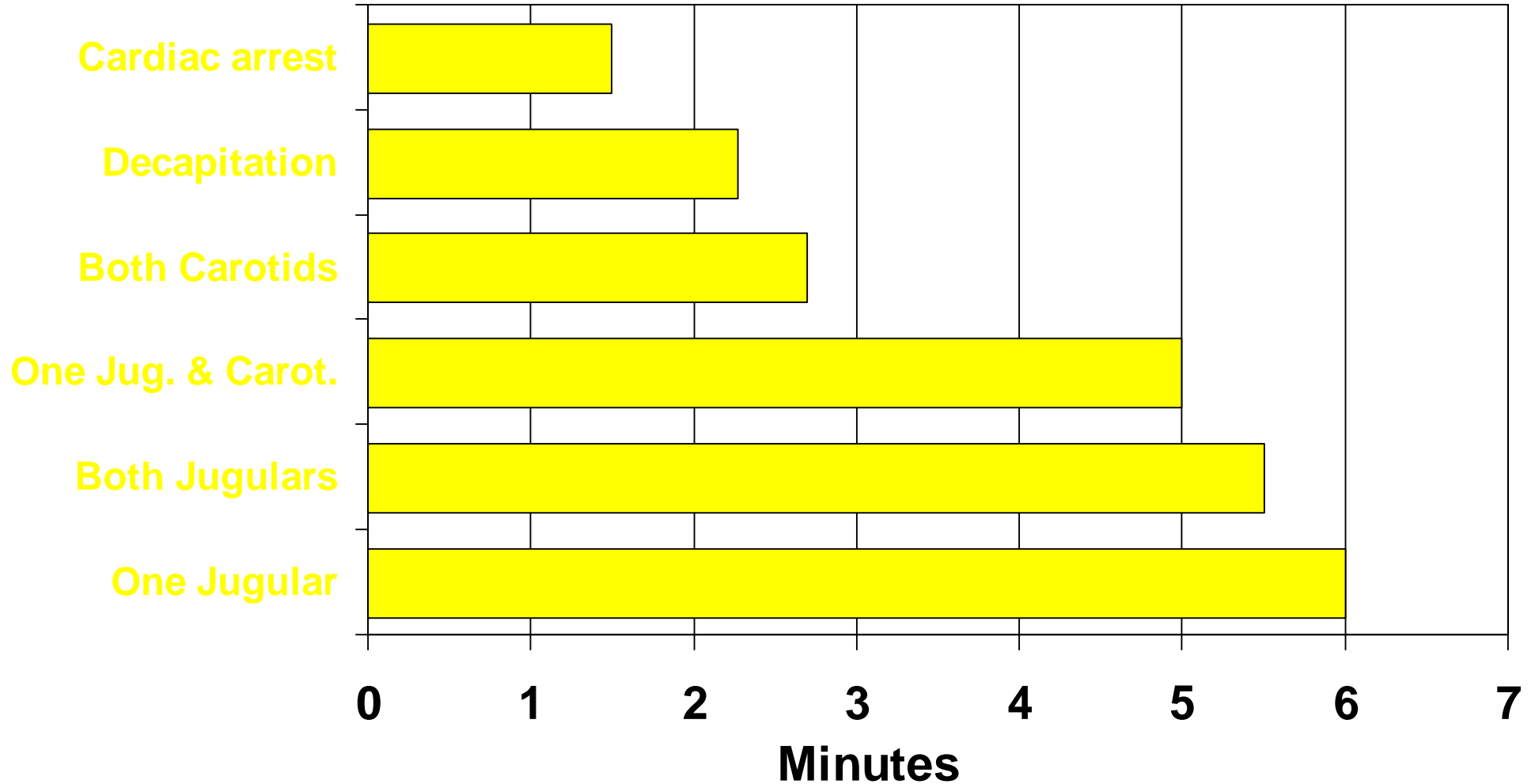


30 seconds to 2+ minutes



Method of Slaughter

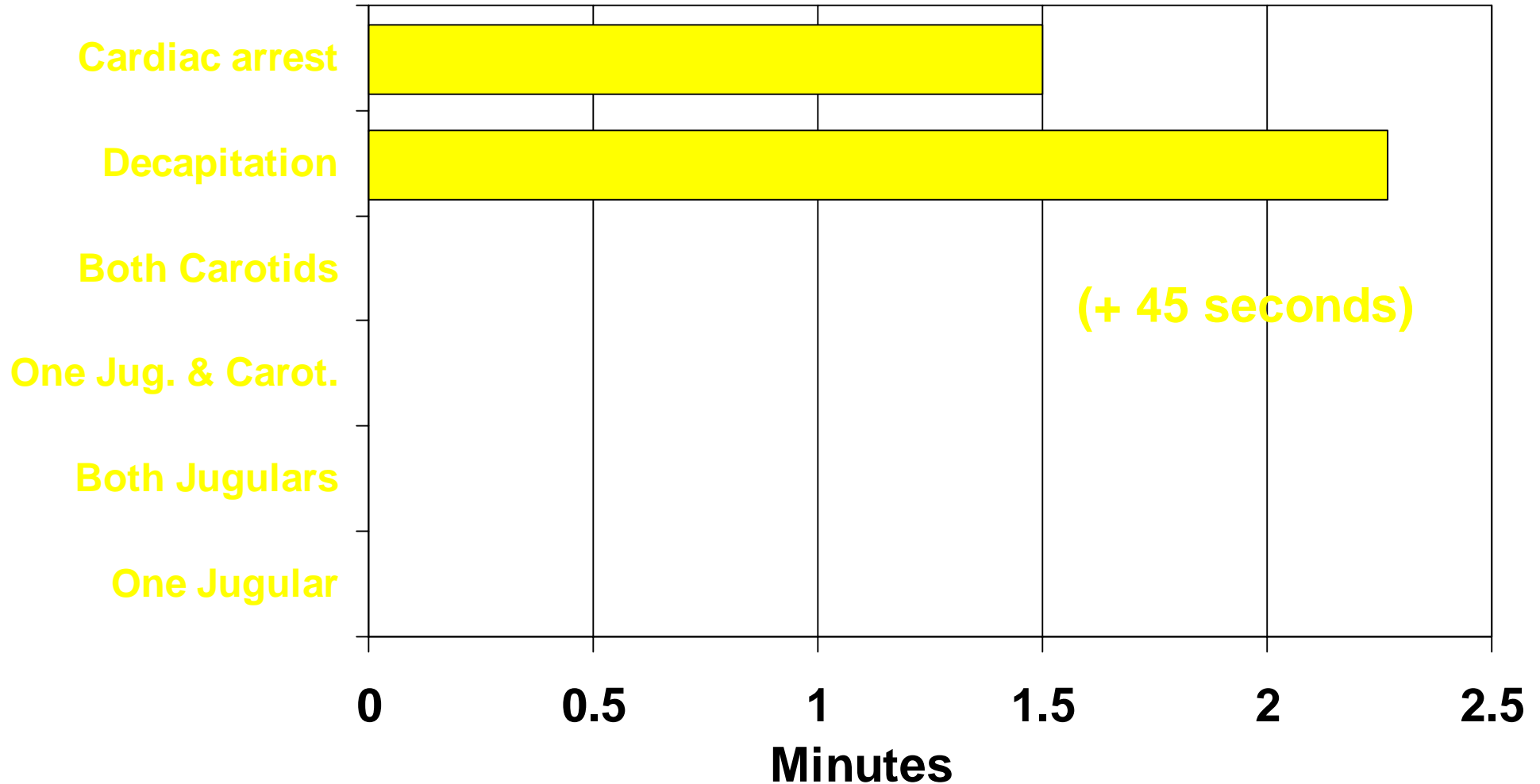
Time to Brain Functional Failure



(From Gregory and Wotton, 1986)

Method of Slaughter

Time to Brain Functional Failure



(From Gregory and Wotton, 1986)

Possible Explanations

Why not same time to brain death?

1. Three second delay during stun
2. Post stun recording delay
3. Stun induced lower stage of anesthesia

Problems with Electrical Stunning

- Welfare Issues -

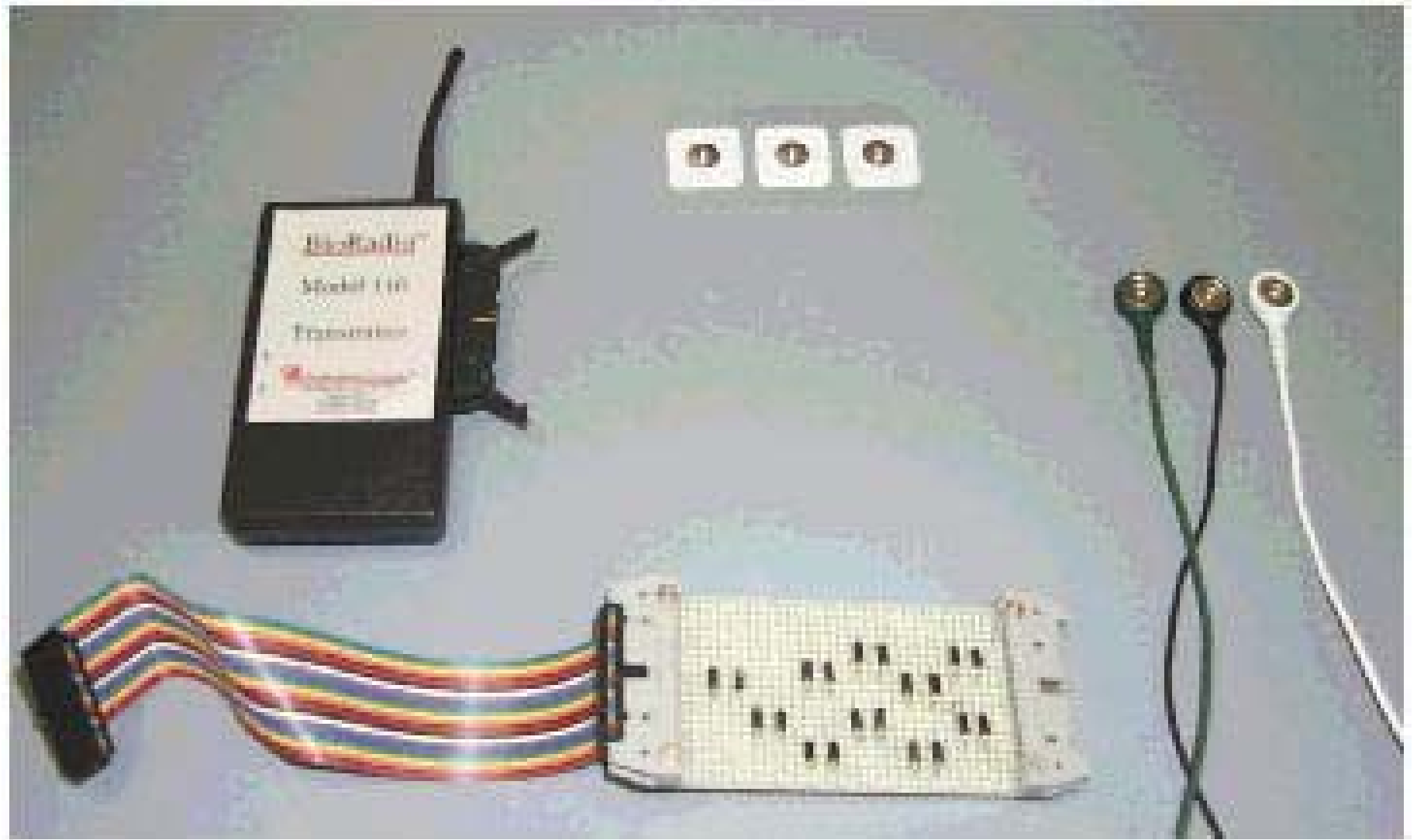
1. Failure to adequately and consistently stun each bird
2. Insufficient stun duration such that the bird regains consciousness

Gregory, 1989

EEG Pre- and Post-Stun

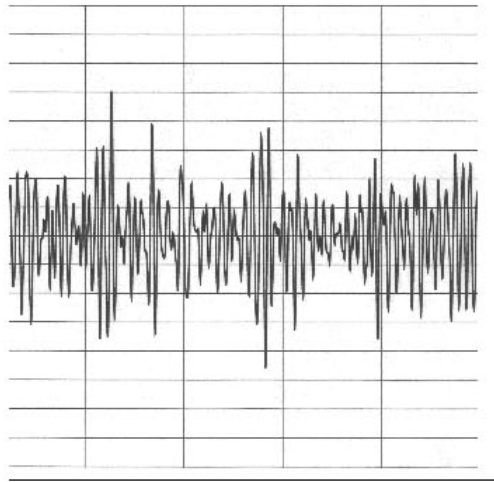
- Recent developments -

1. Cutaneous snap-on electrodes
 - Requires no surgery or anesthesia
2. Monitor Pre-stun and Post-stun
3. Able to quantify time to death

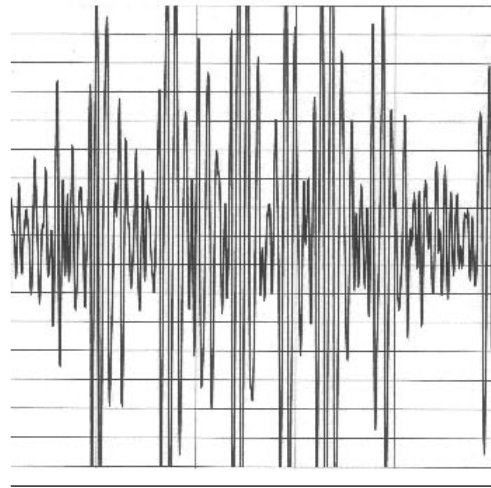


SPSS BioEthics-2007

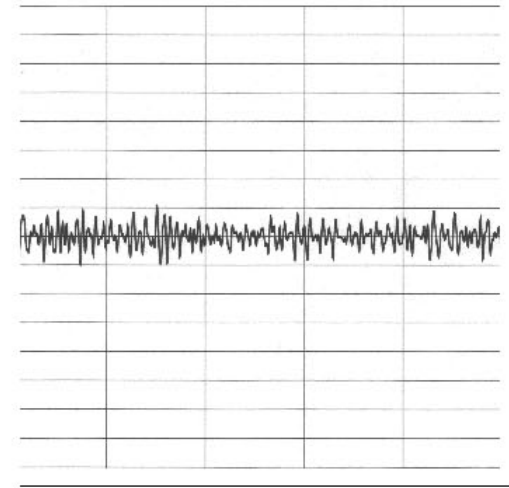
EEG Characteristic wave forms



10 sec
Pre-stun

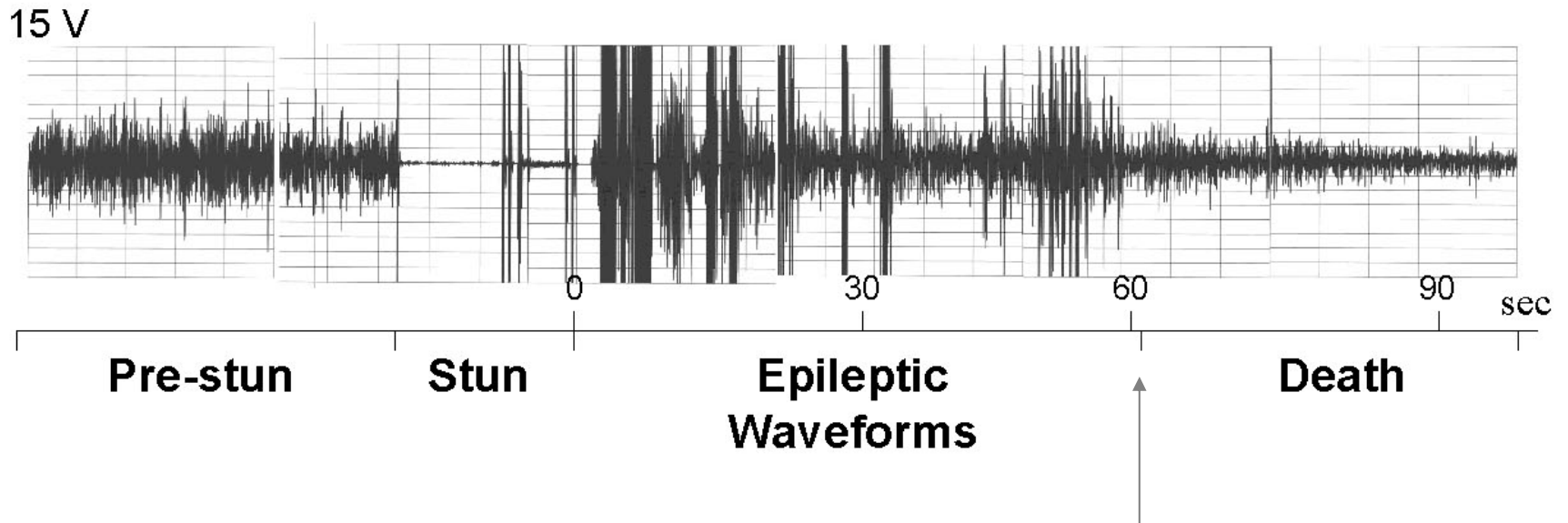


10 sec
**Epileptic
Waveforms**

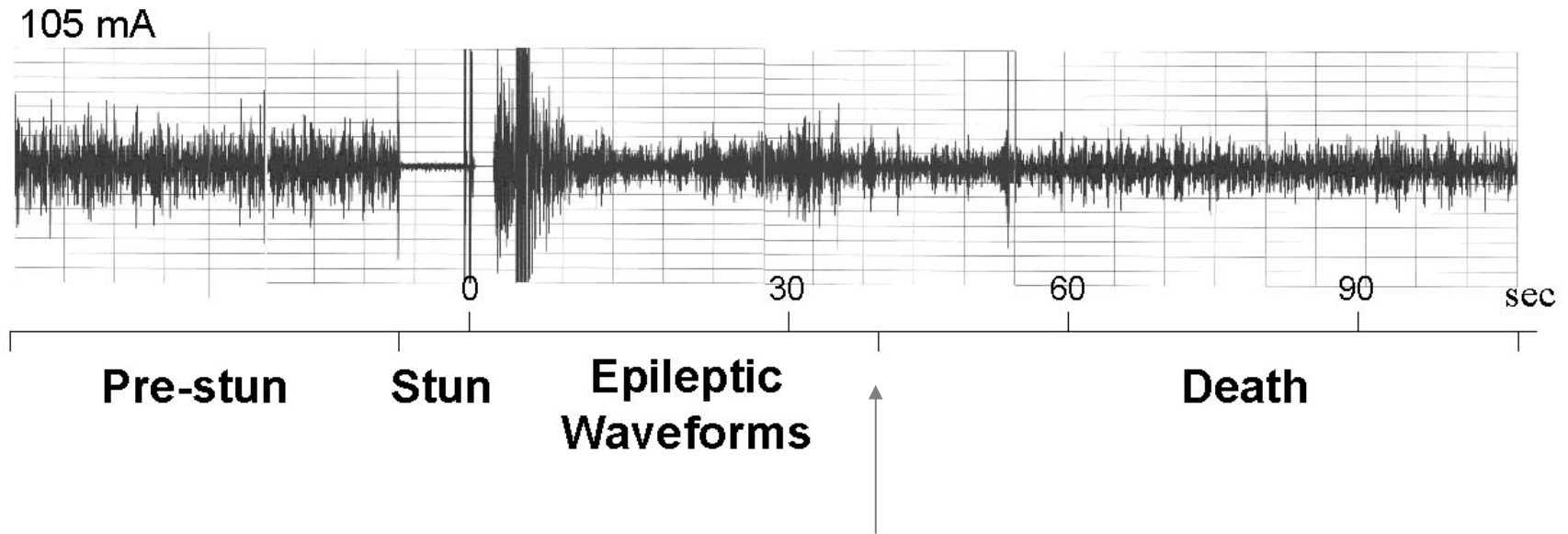


10 sec
Death

Broiler EEG 15 V stun



Broiler EEG 120 V stun



Stunning + Decapitation

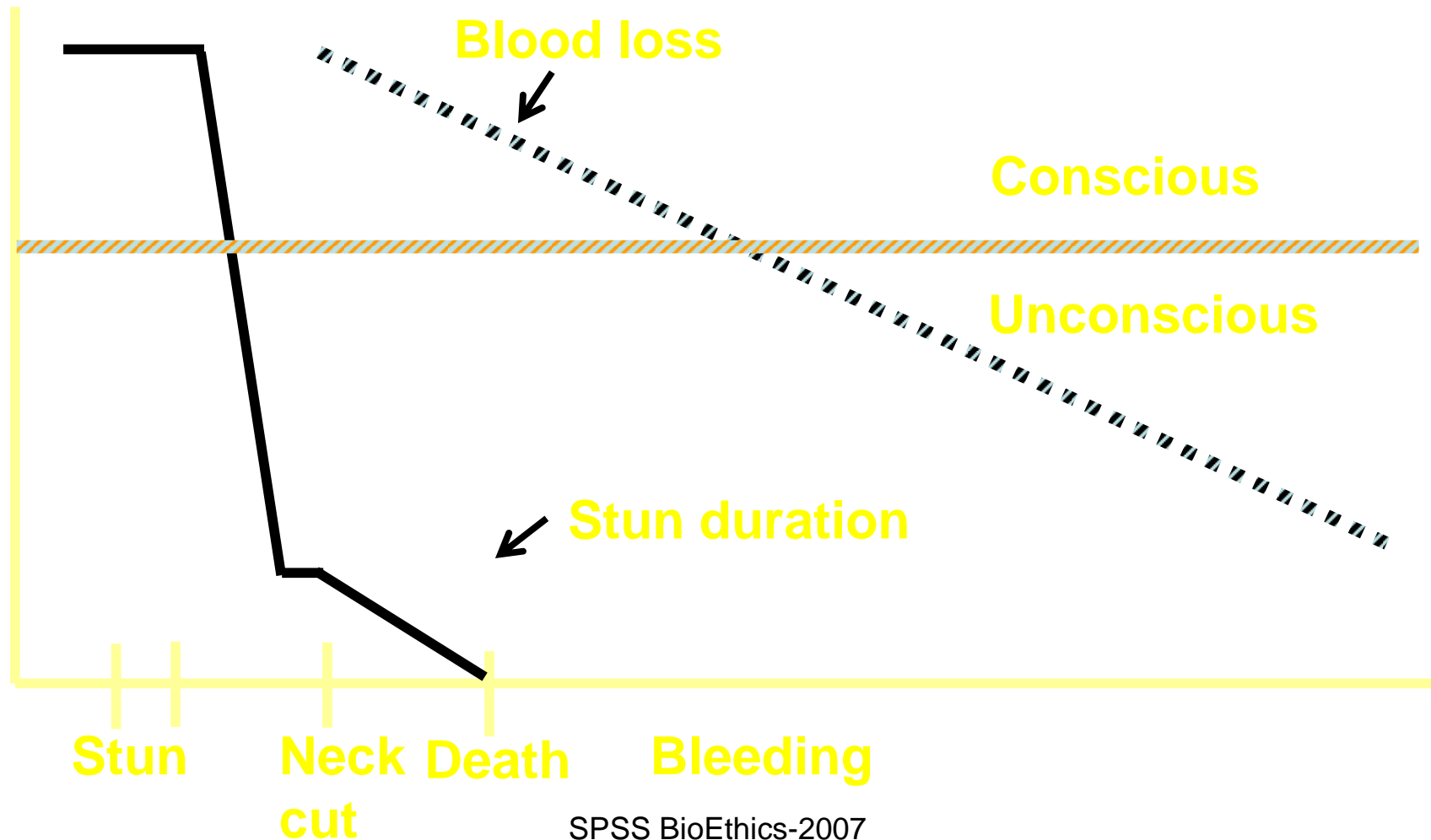
1. Stun - Electric / Gas / Concussion
2. Immediate decapitation at bleeding

Stunning + Decapitation

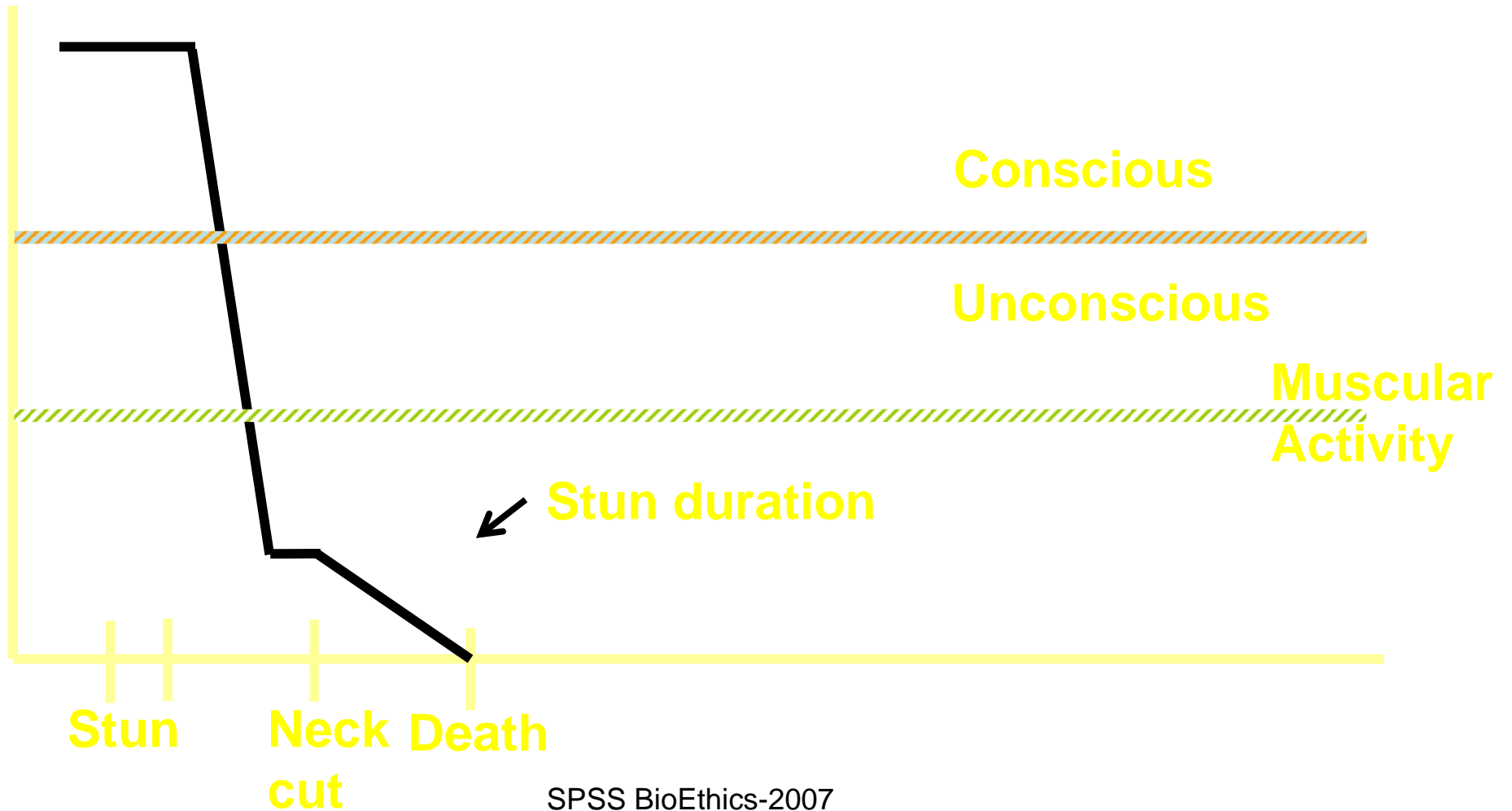
- Advantages -

- Instantaneous death
- Not possible to regain consciousness
- No muscular / respiratory movements
- Obvious if a bird is missed
- No cadavers

Stun-Decapitation / Kill



Stun-Decapitation / Kill



Stunning - Decapitation

- Impact -

Decapitation has No detectable impact on:

- Bleed-out blood loss
- Post-stun muscular movements (less)
- Defeathering
- Carcass quality (fewer broken bones)
- Meat quality (pH, color, yield, shear)

(McNeal, Fletcher, Buhr 2003)

Stunning - Decapitation - Impact -

Decapitation has No detectable impact on:

- Respiratory tract bacteria levels

Pre or Post immersion scalding in a
commercial processing plant

(Buhr et al., 2005)

Stages of Anesthesia

- Unconscious > Death -

3. Surgical Anesthesia (3 planes)
 1. Light - Muscle relaxation
 2. Medium - Sluggish reflexes
 3. Deep - Diminished reflexes

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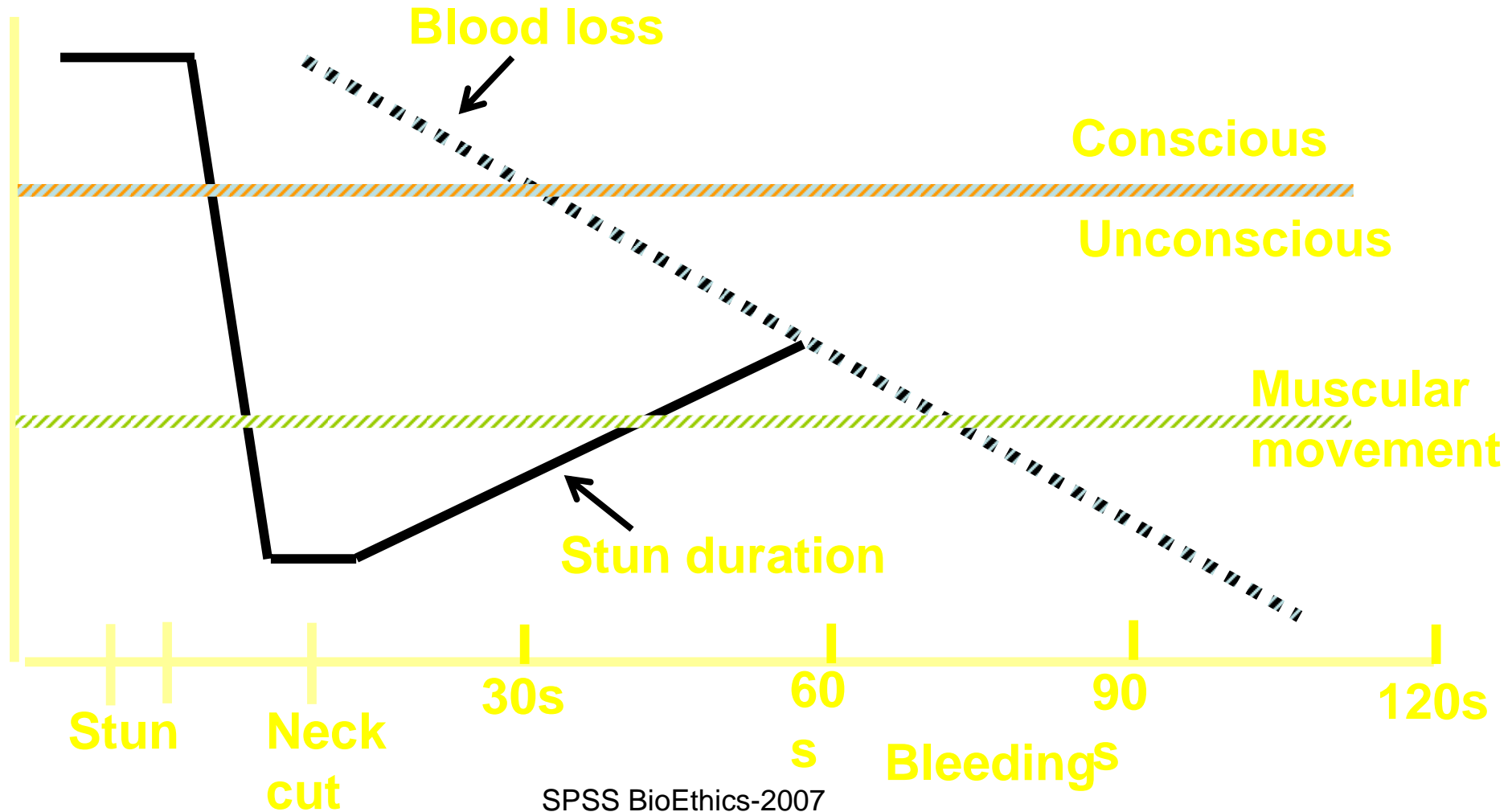
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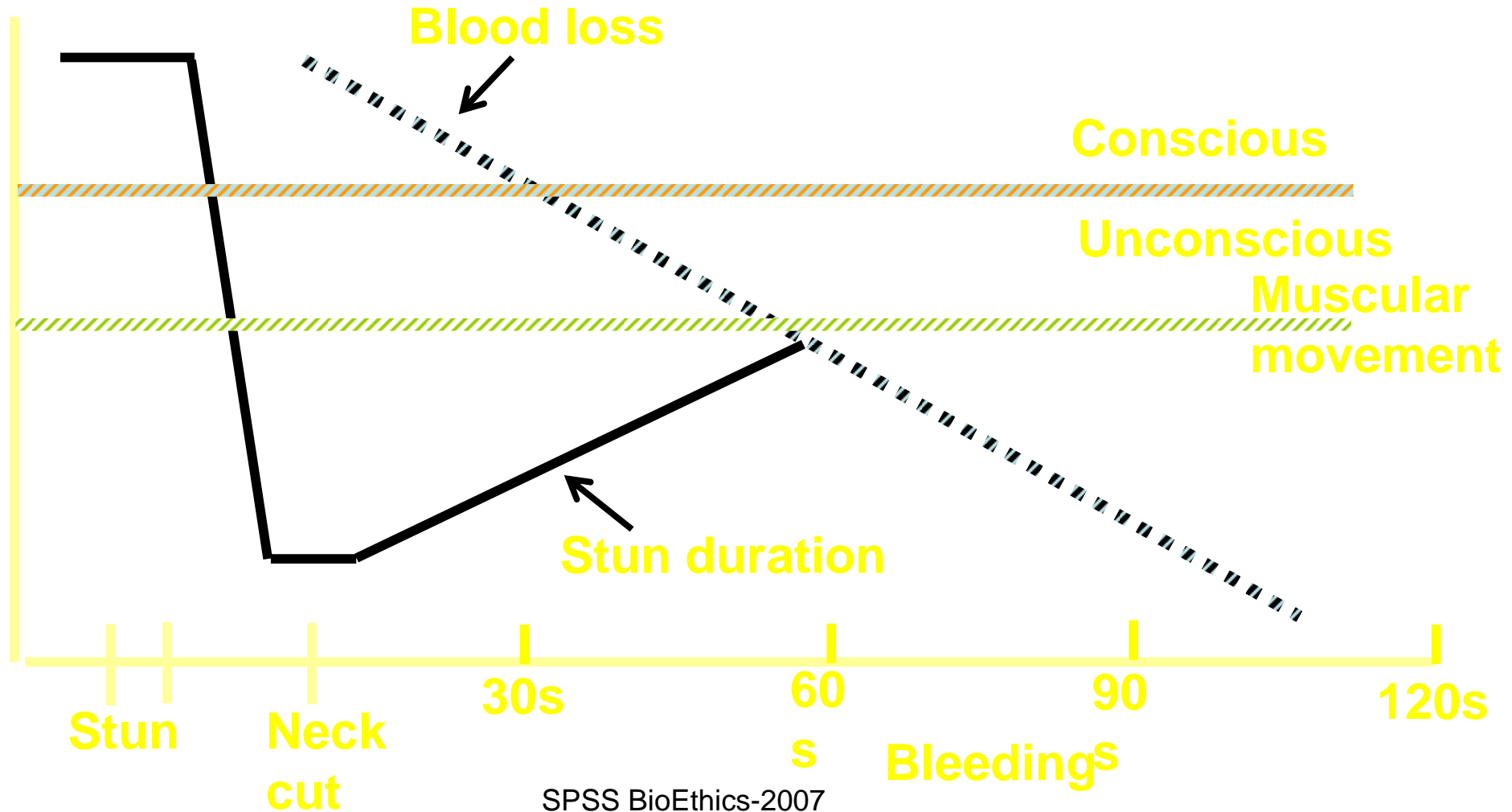


Spinal
cord
severing

Muscular / respiratory movements



Muscular / respiratory movements



Stunning

- Unconsciousness -

Apparently the application of post-stunning spinal cord severing during bleeding can be used to confirm unconsciousness by the absence of a subsequent death struggle

EEGs Post-Stun

- Future research -

1. Quantify stages of unconsciousness?
2. Perception of variable pain stimuli
3. Determine optimum current & voltage for:
 - Unconsciousness
 - Minimal muscular respiratory movements
4. Evaluate Gas stunning

Stunning

- Ethical criteria -

- Rapid onset of unconsciousness
 - **Yes**
- Stun duration sufficient until death
 - **Yes** with bleeding or decapitation
- Zero occurrence for under stunned birds
 - **Yes** with decapitation

Is Electrical Stunning Ethical?

**R. Jeff Buhr
January 23, 2007
Atlanta, GA**

R. Jeff Buhr
Research Physiologist

Poultry Microbiological Safety
Russell Research Center
Athens, Georgia
USDA-ARS
< jeff.buhr@ars.usda.gov >