



The limits of consciousness



DEATH, FROM CELLS TO SOCIETIES: AGEING, DYING, AND BEYOND

JOURNÉES THÉMATIQUES 2018

ECOLE DE L'INSERM LILIANE BETTENCOURT

17/03/2018

**WOLFF Audrey – PhD Student @ Coma Science Group
GIGA Consciousness – University and CHU of Liège**

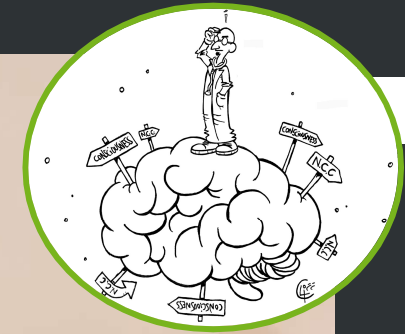
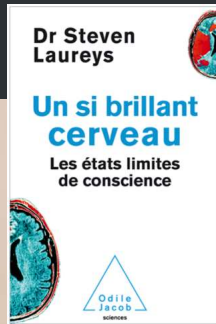
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Pr Steven LAUREYS, MD, PhD



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OUTLINE

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1. Consciousness & altered states of consciousness
2. Brain death
3. Unresponsive Wakefulness Syndrome
4. Ethics of death and dying
5. Near-Death Experience
6. Conclusion

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1. Consciousness and altered states of consciousness



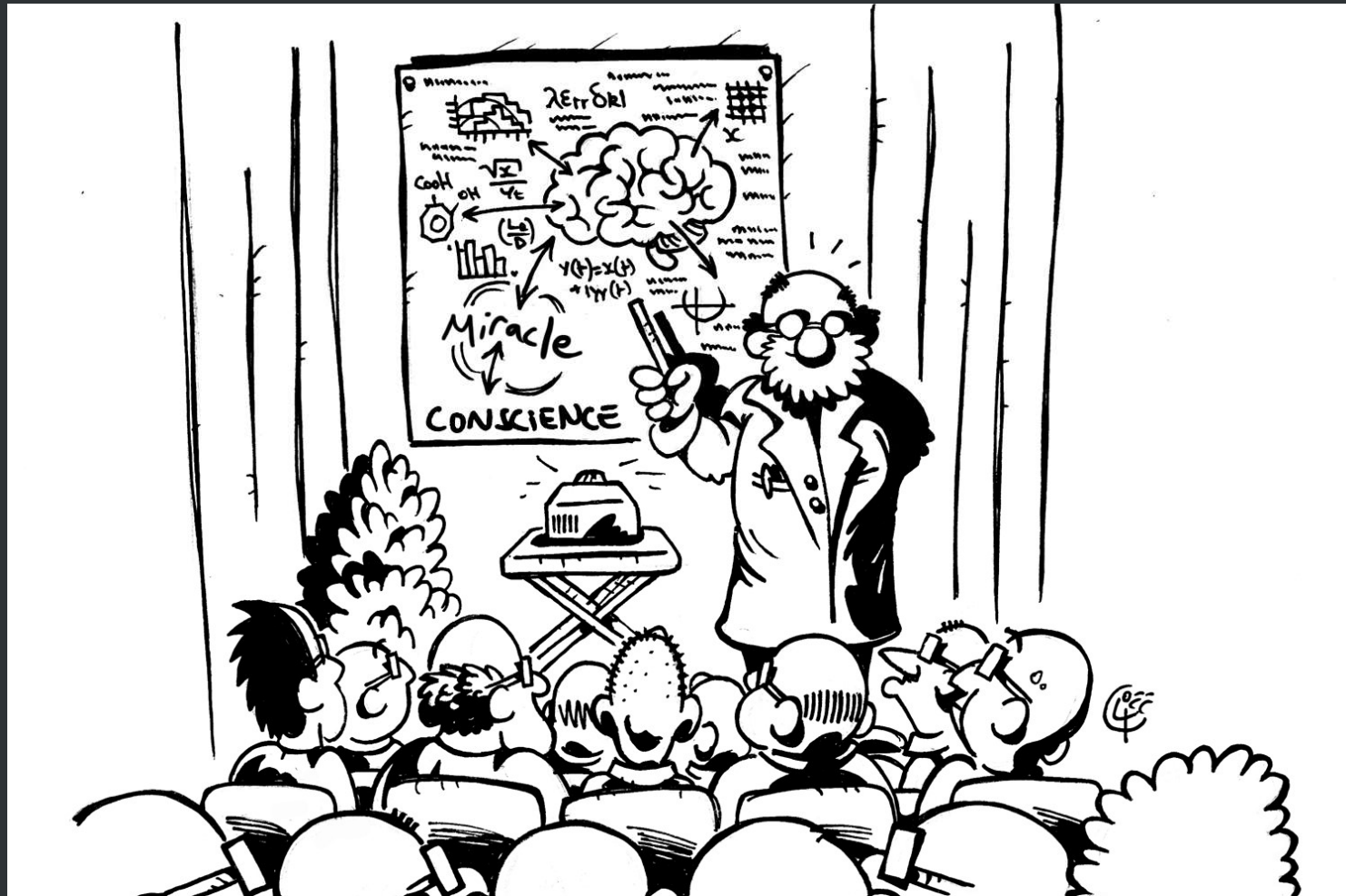


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CONSCIOUSNESS

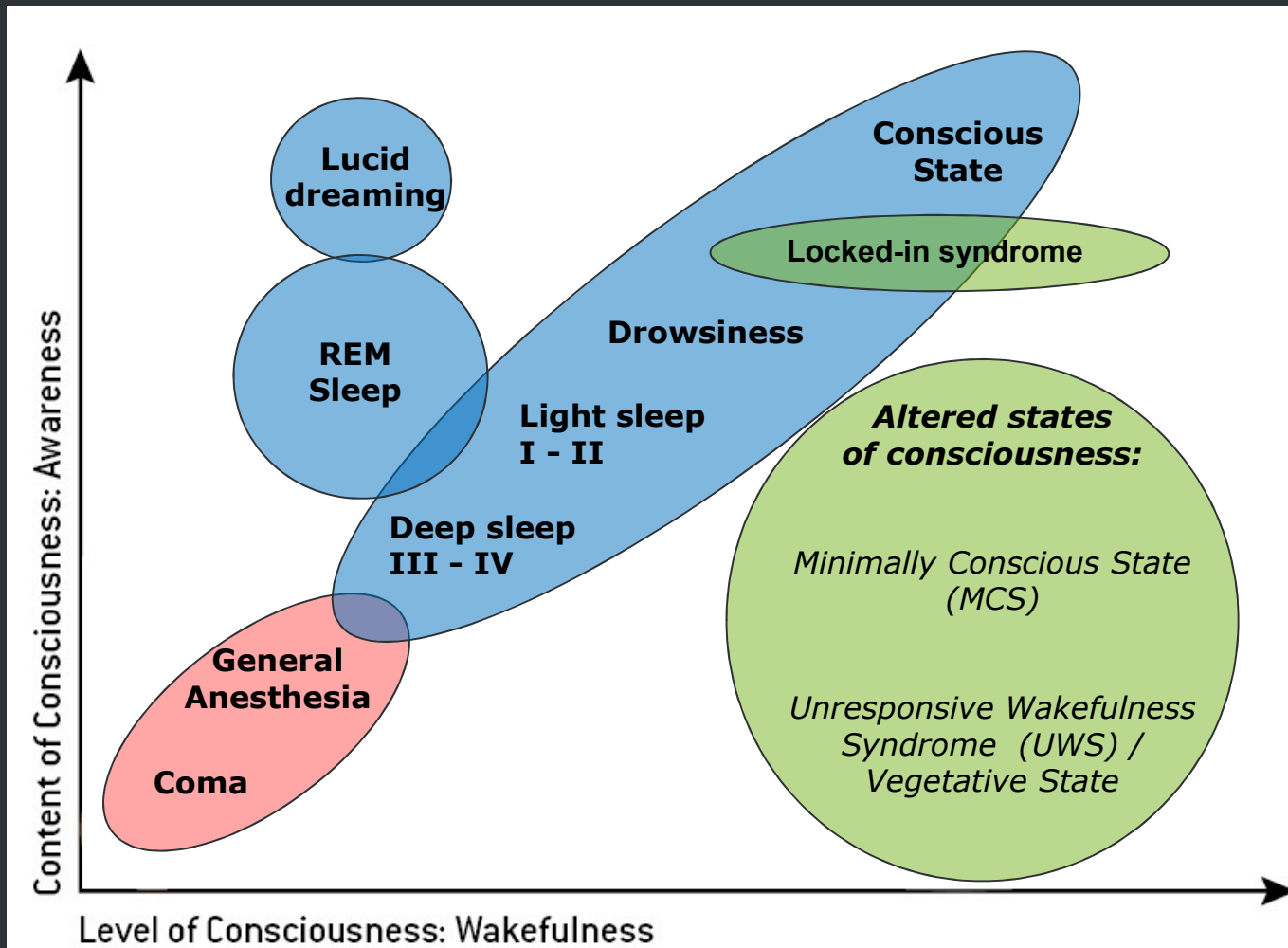
A definition of consciousness

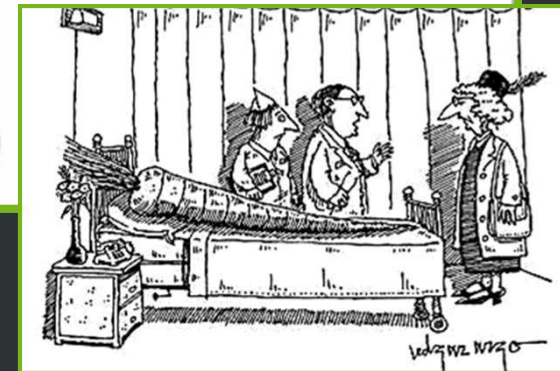
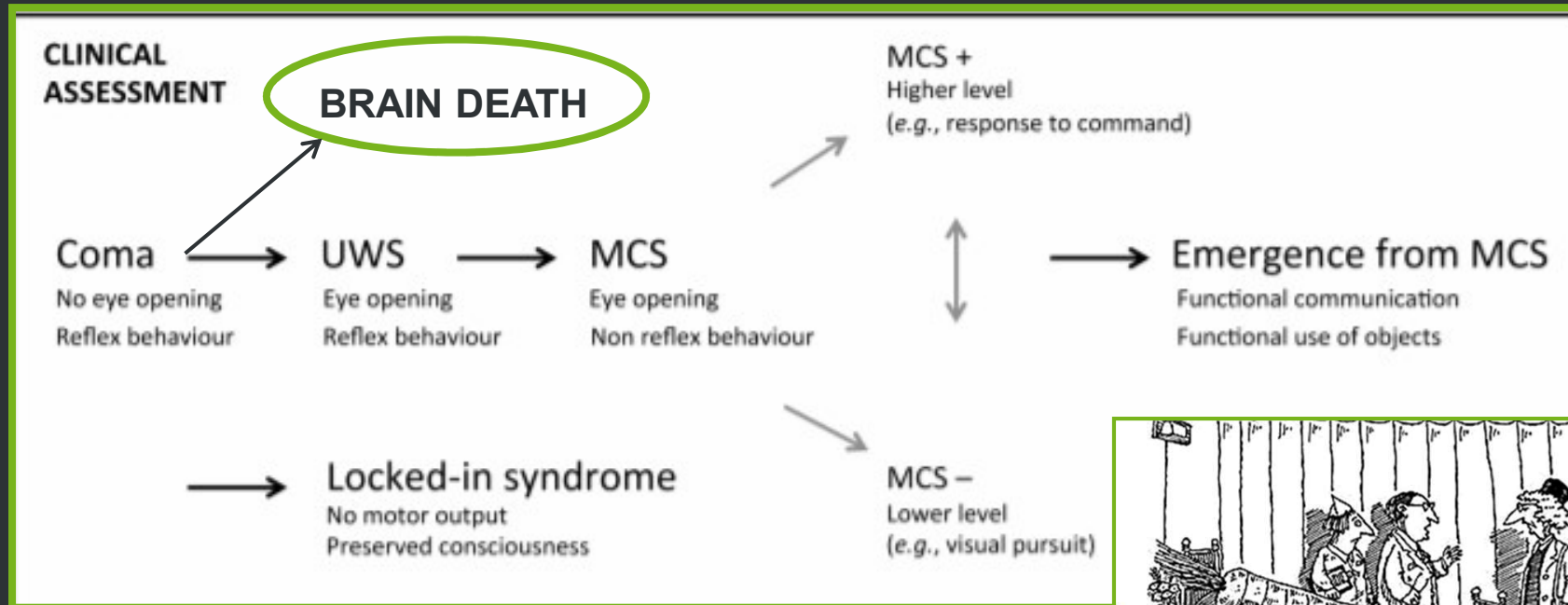
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Reducing consciousness to 2D

6





Unresponsive Wakefulness Syndrome – a new name for the vegetative state

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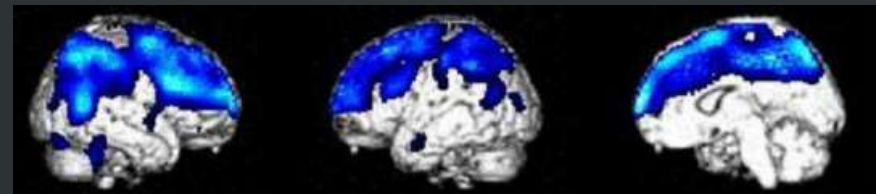
2. Brain Death



Liège: un médecin belge au chevet d'un «zombie» en chair et en os



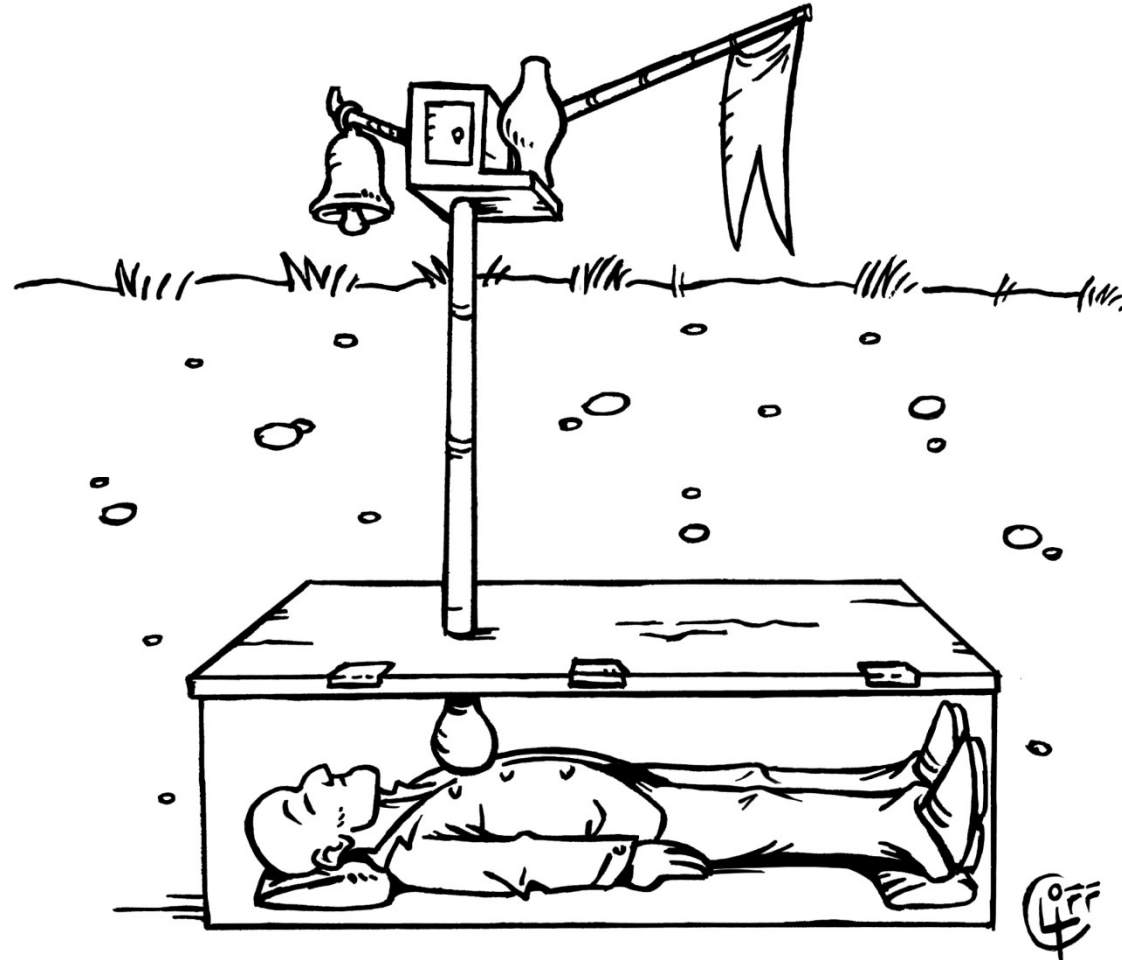
THE
WALKING DEAD



Charland-Verville and al., *Cortex*, 2013

Blue = hypometabolic areas

“I am *not* dead ”

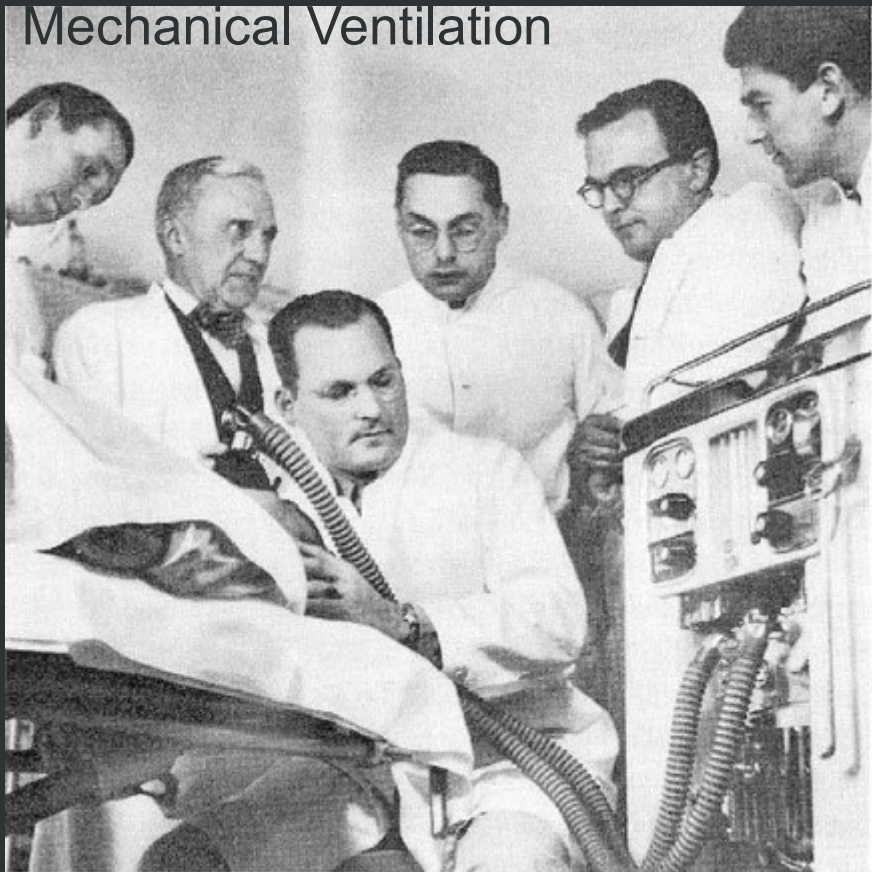




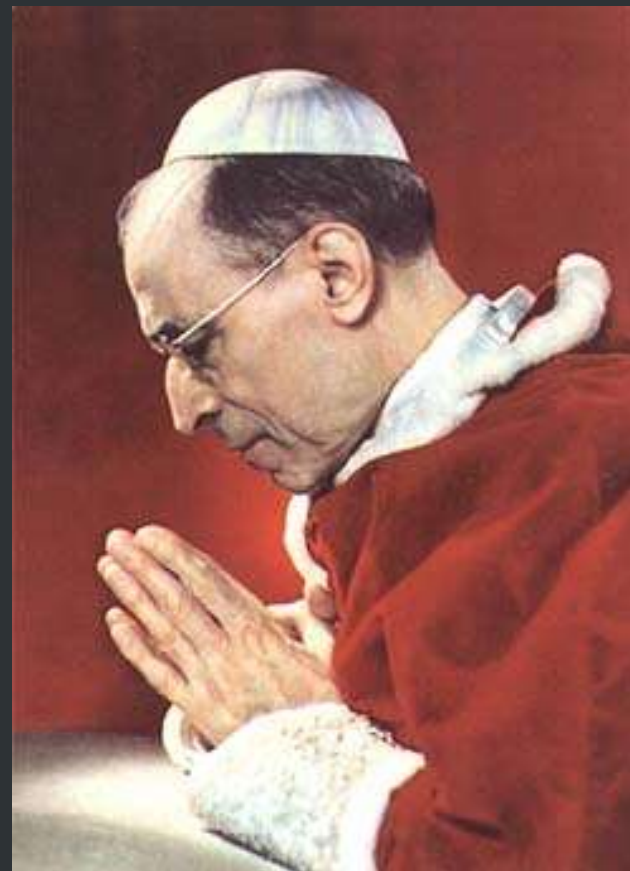
Brief history of death

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Mechanical Ventilation



Bjørn Ibsen – Copenhagen 1952



Pius XII – Vatican 1957

Laureys, *Nature Reviews Neuroscience*, 2005



Clinical death \neq death

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Transplants - Are the donors really dead ?

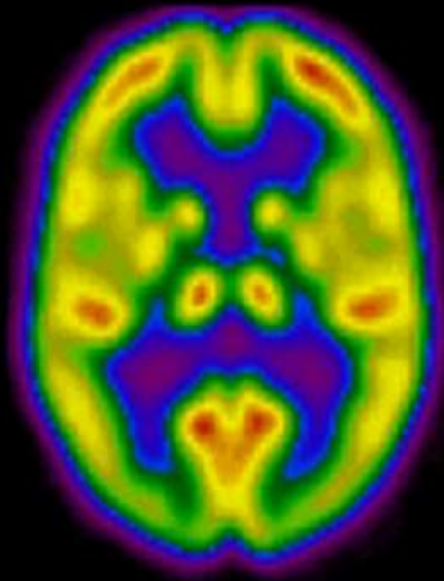
Since the 50's, no one with the criterias of brain death ever recovered consciousness

Laureys, *Nature Reviews Neuroscience*, 2005

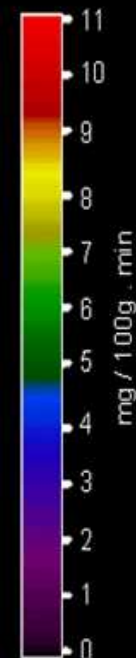
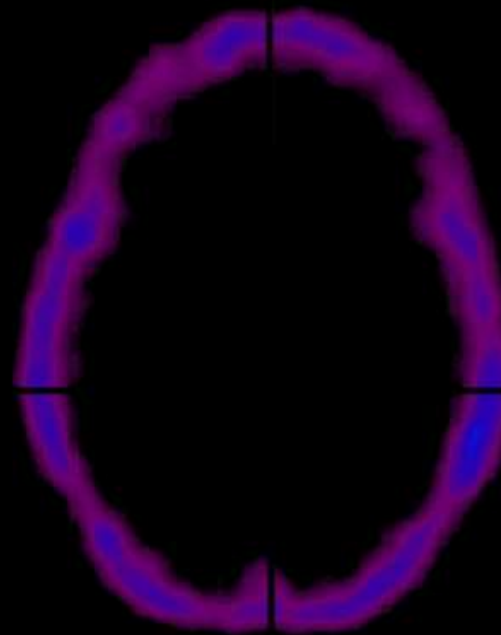
Brain death = death

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NORMAL
CONSCIOUSNESS



BRAIN DEATH



The hollow-skull sign



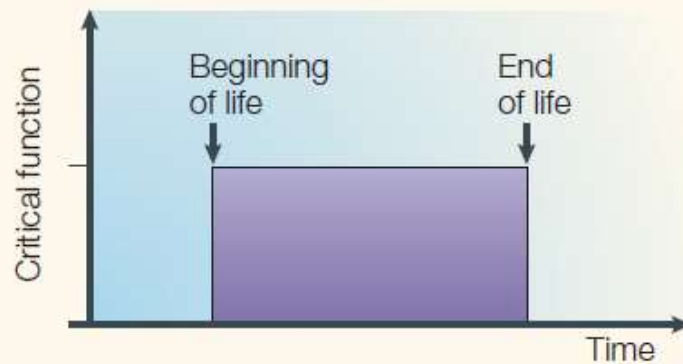
8 criteria's of brain death

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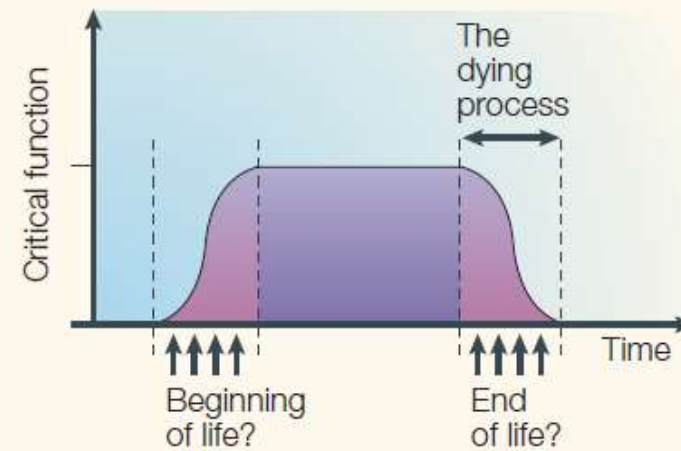
- Demonstration of coma
- Evidence for the cause of coma
- Absence of brainstem reflexes
- Absence of motor responses
- Apnea
- Absence of confounding factors,
- A repeat evaluation after 6 h is advised
- Confirmatory laboratory tests are only required when specific components of the clinical tests cannot be reliably evaluated

Death : event or process ?

a Death as an event



b Death as a process





Death donor rule

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- Patient must be declared dead before any organ removal
 - No matter the state of the person
 - No matter how much good it could do

- Even if there is a lack of donors ...

- Depends on the definition of death ...



Neocortical death myth

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Death = permanent cessation of “higher functions of the nervous system that demarcate man from the lower primates”

→ Could include UWS patients as well as MCS patients !

1. Incomplete understanding of consciousness

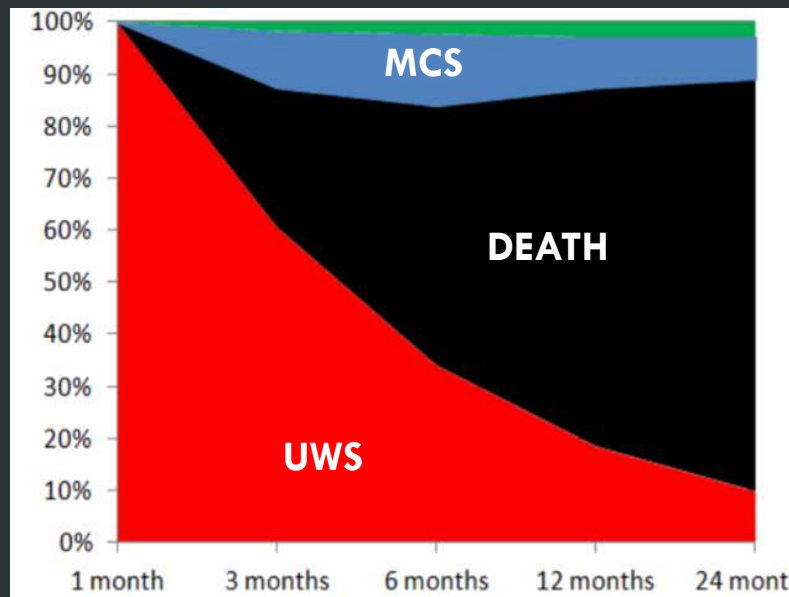
2. Clinical tests would require the provision of bedside behavioural evidence

3. Complimentary tests for neocortical death

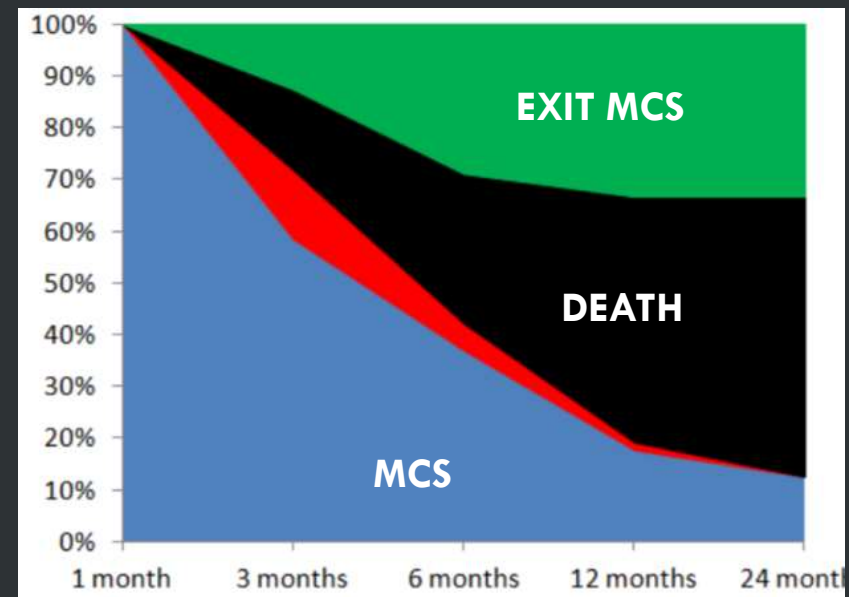
4. Proving irreversibility is key to any concept of death

Laureys, *Nature Reviews Neuroscience*, 2005

First diagnosed as Unresponsive Wakefulness Syndrome (UWS)



First diagnosed as Minimally Conscious State (MCS)



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3. *Unresponsive Wakefulness Syndrome*





UWS \neq brain dead

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- UWS : wakefulness with no signs of awareness
- Both terms are all often mixed up in the lay — and even medical — press.
- Payne & al. (1996) showed that ...

*US neurologists and nursing home directors
believed that UWS patients could be declared
dead !*



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The case of Terri Schiavo





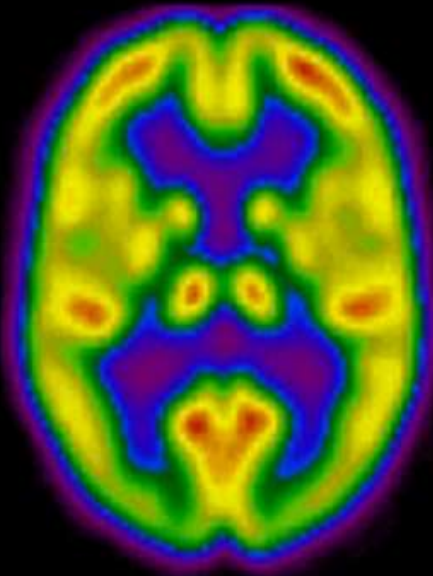
Clinical & diagnostic differences

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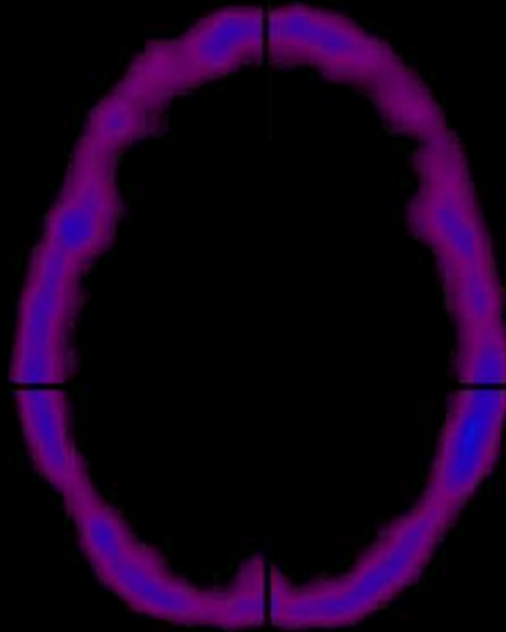
	Diagnosis	Eye opening	Breathing	Brainstem reflexes	Movements
Brain Death	Within hours / days	No	With assistance	Altered	Generated by residual spinal activity
Irreversible UWS	3 Month (NTBI) 12 Month (TBI)	Spontaneously open	Spontaneously without assistance	Preserved	Much richer array of motor activity



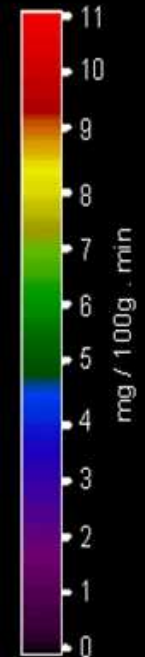
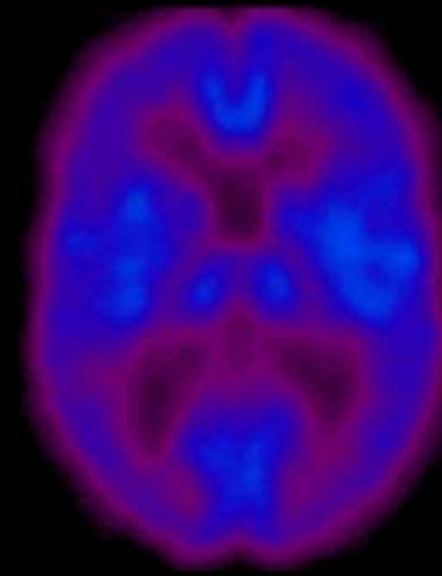
NORMAL
CONSCIOUSNESS



BRAIN DEATH



UWS



- Dualism in consciousness : mind OR body / mind AND body ?
- Being in a persistent UWS < being dead
 - For themselves
 - For a family member
- Perception of mind as a persistent UWS < being dead
 - Persistent UWS are considered as a body > as a mind
- Alterlife beliefs and high religiosity +++
- Being in a persistent UWS = **less than dead**

Demertzi and al., *Ann. N.Y. Acad. Sci.*, 2009 ; Kurt and al., *Cognition*, 2011



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4. Ethics of death and dying





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Clinical context (1)

JFK COMA RECOVERY SCALE - REVISED ©2004

Record Form

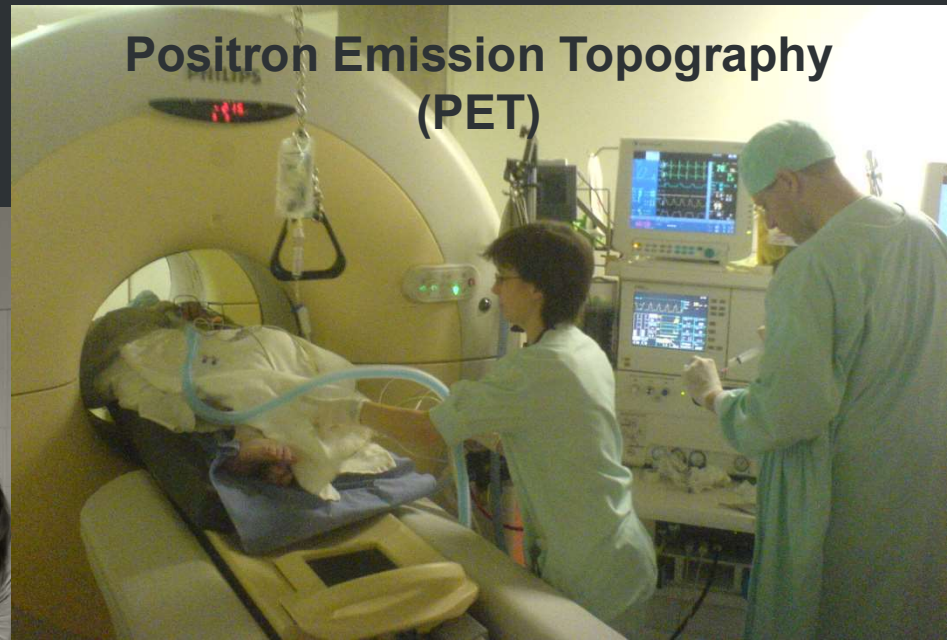
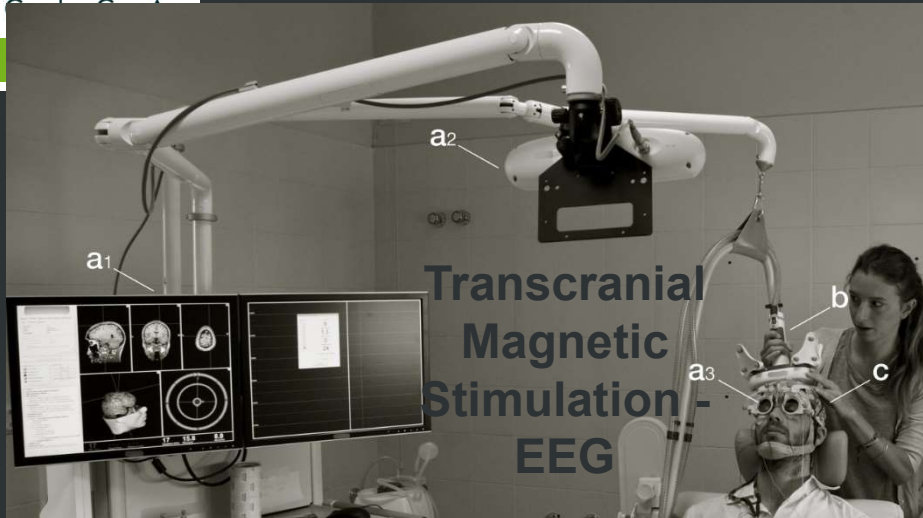
Patient:	Date:								
AUDITORY FUNCTION SCALE									
4 - Consistent Movement to Command *									
3 - Reproducible Movement to Command *									
2 - Localization to Sound									
1 - Auditory Startle									
0 - None									
VISUAL FUNCTION SCALE									
5 - Object Recognition *									
4 - Object Localization: Reaching *									
3 - Visual Pursuit *									
2 - Fixation *									
1 - Visual Startle									
0 - None									
MOTOR FUNCTION SCALE									
6 - Functional Object Use †									
5 - Automatic Motor Response *									
4 - Object Manipulation *									
3 - Localization to Noxious Stimulation *									
2 - Flexion Withdrawal									
1 - Abnormal Posturing									
0 - None/Flaccid									

OROMOTOR/VERBAL FUNCTION SCALE									
3 - Intelligible Verbalization *									
2 - Vocalization/Oral Movement									
1 - Oral Reflexive Movement									
0 - None									
COMMUNICATION SCALE									
2 - Functional: Accurate †									
1 - Non-Functional: Intentional *									
0 - None									
AROUSAL SCALE									
3 - Attention									
2 - Eye Opening w/o Stimulation									
1 - Eye Opening with Stimulation									
0 - Unarousable									
TOTAL SCORE									

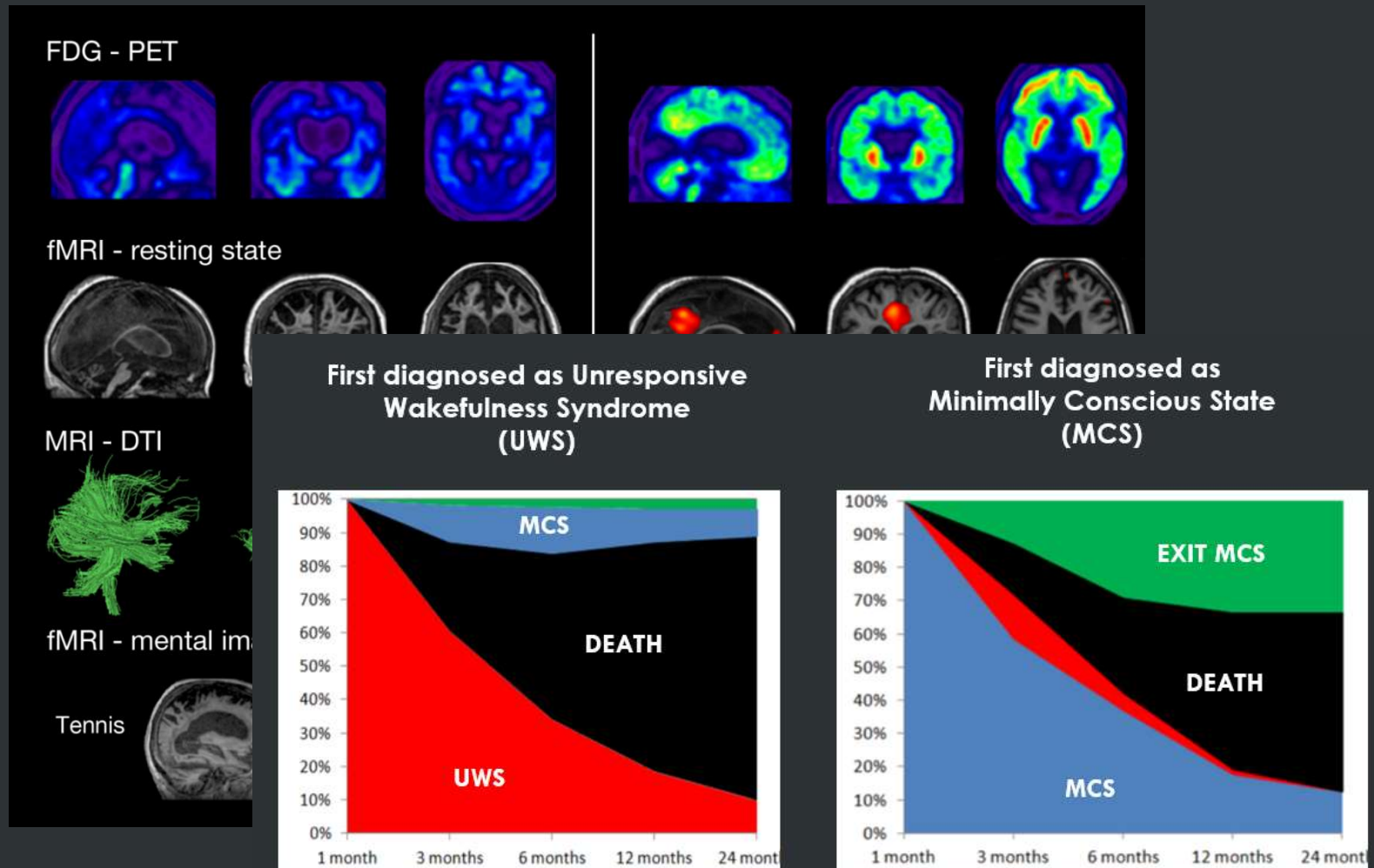
□ The Coma Recovery Scale



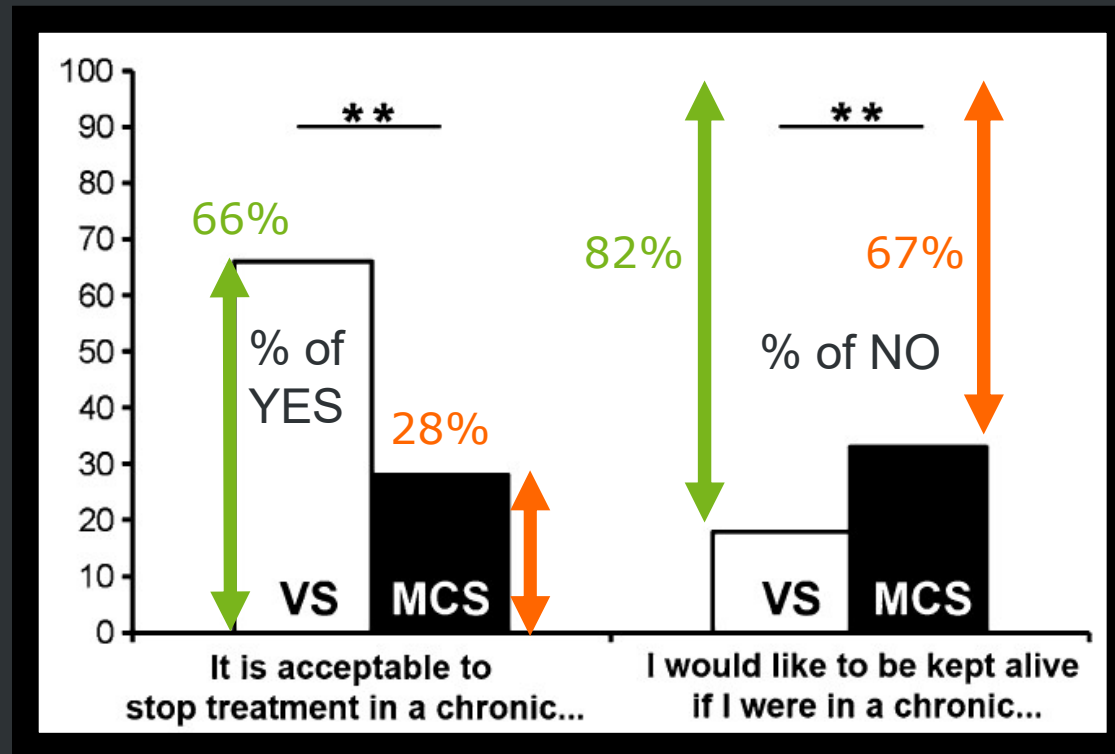
Clinical context



Wannez et al, *Ann Neurol.*, 2017 ; Stender & Gosseries et al, *Lancet.*, 2014



Attitudes towards end-of-life issues in disorders of consciousness: a European survey

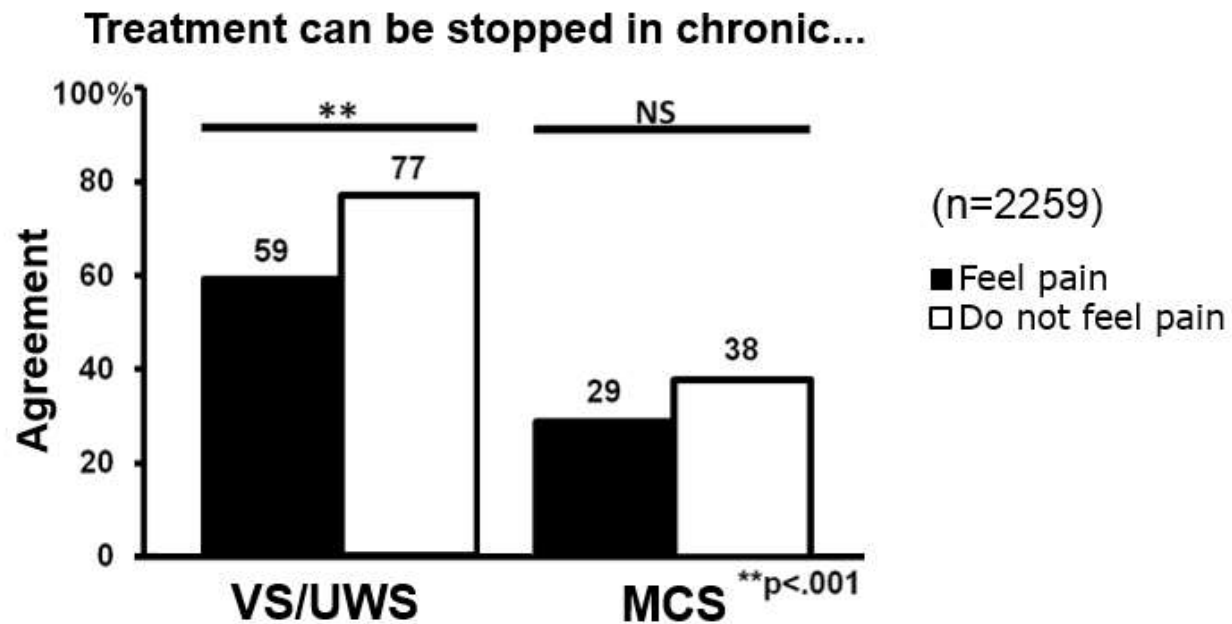




Pain Perception in Disorders of Consciousness: Neuroscience, Clinical Care, and Ethics in Dialogue

A. Demertzi · E. Racine · M-A. Bruno · D. Ledoux · O. Gosseries ·
A. Vanhaudenhuyse · M. Thonnard · A. Soddu · G. Moonen · S. Laureys

European
Neurological Society





Proxy decision-makers (PDM)

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- Generally family members
- High psychological distress
- Great physical and cognitive demands
- Struggling with the uncertainty and the grief





Theoretically, how ?

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The way the PDM should act on behalf of the patient is a progressive one:

1. Wishes of the patient
2. Patients' preferences based on their history and personal values
3. Objective markers that determine the patients' best interest



Reasons to overrule patient wishes (1)

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□ **The expected recovery of the patient**

1. Realists that understand the gravity of the situation and know that prolonged care for a patient in a UWS would be futile
2. Procrastinators who were unsure or have heard of unexpected recoveries
3. Fighters who were willing to sacrifice themselves for the patient and put trust in a miraculous recovery
4. Family caregivers being ambivalent between hope, anticipatory grief and acceptance of the condition

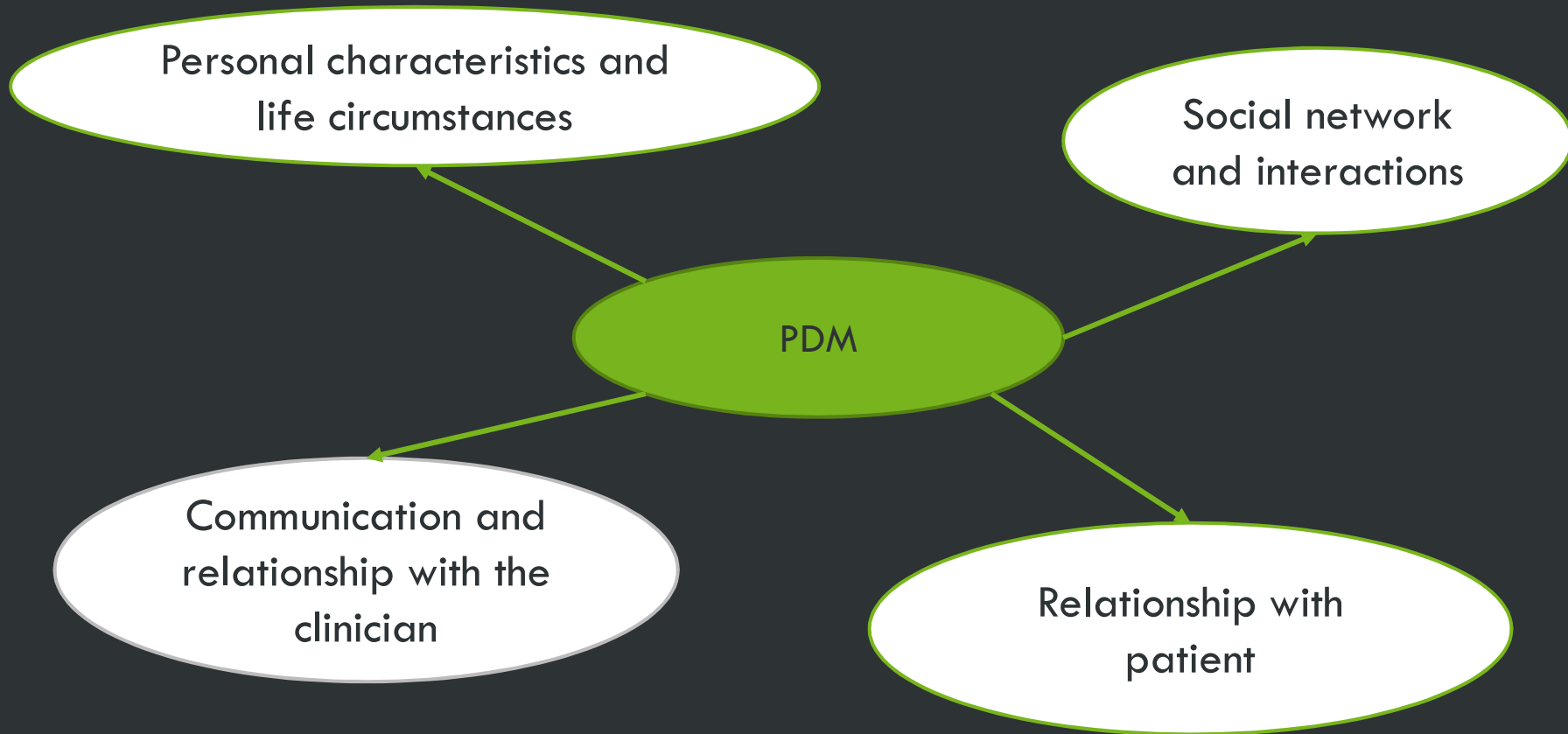
□ The family definition of life sustaining treatment

- Artificial Nutrition and Hydration ≠ medical intervention



□ Moral obligation to not cause harm or pain

- Fear of letting the patient starve to death



- Limited contact and discussions
- Quality of interaction suboptimal :
 - Vocabulary used : interfere with the understanding of info
 - Not enough emotional support
- Shared decision making > satisfaction from families
- Open communication even if *uncertainty about the prognosis*





What about Exit MCS patient ?

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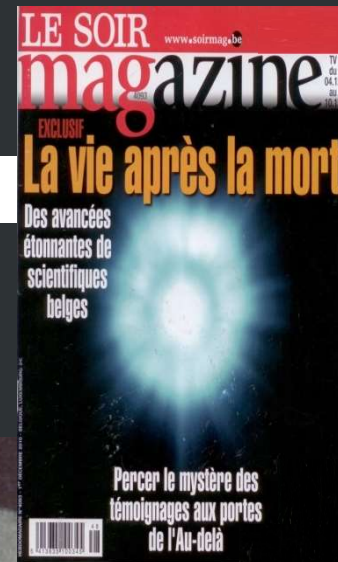
5. Near Death Experience



"I was almost dead"



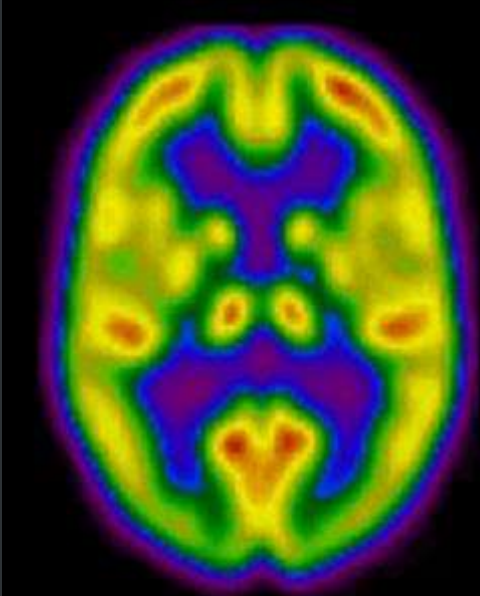
- ❑ Set of mental events
- ❑ Rich emotionnaly
- ❑ Spiritual and mystic characteristics
- ❑ Perceived or real dangerous physical or emotional situations
- ❑ Realistic Intensity
- ❑ Common characteristics
- ❑ Altered or Modified States of Consciousness



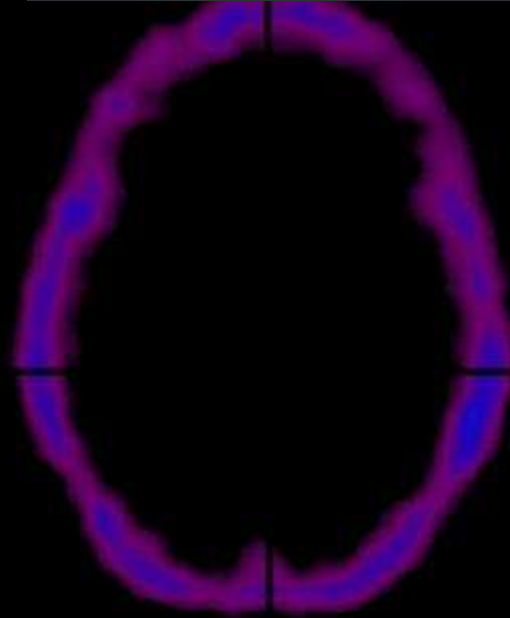


Brain death \neq clinical death

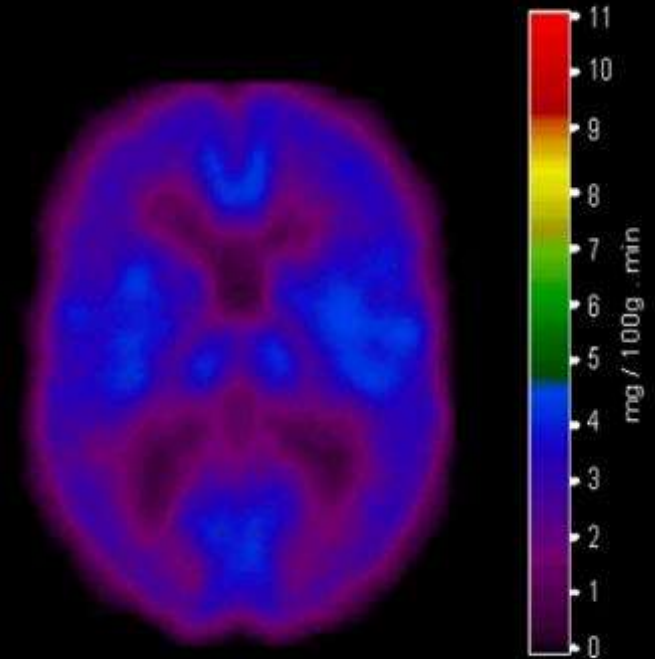
NORMAL
CONSCIOUSNESS



BRAIN
DEATH



CLINICAL DEATH



Towards a neuro-scientific explanation of Near-Death Experiences?

Laureys, *Nature Reviews Neuroscience*, 2005

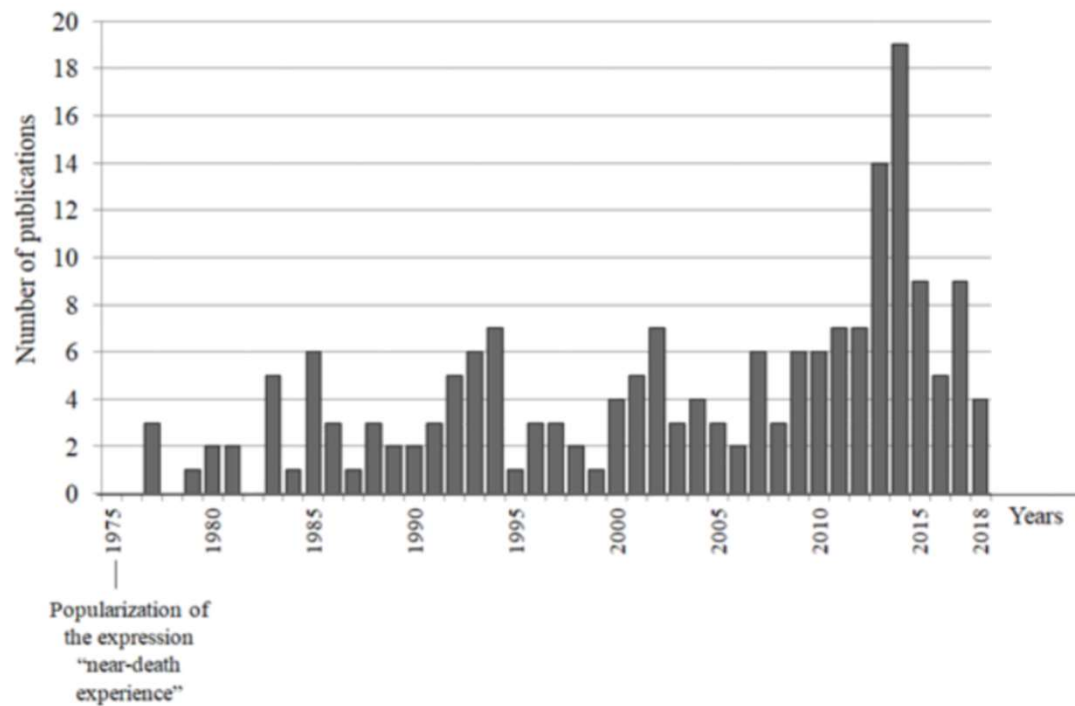
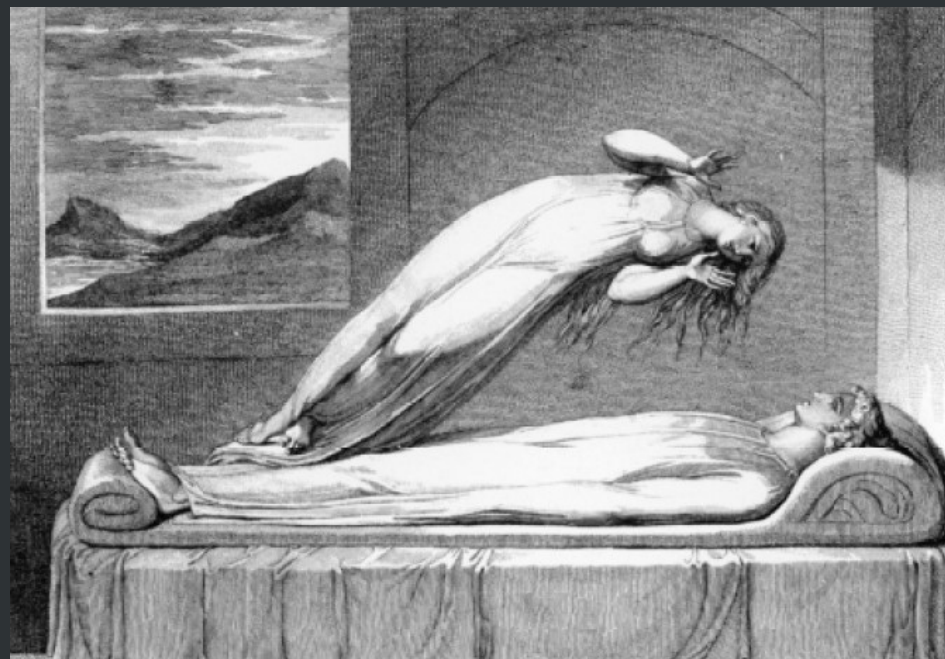


Figure 4 – Number of publications per year on NDEs (for a total of 185 publications). Medline search performed in February 2018 with the keyword “near-death experiences”.

«I left my body»



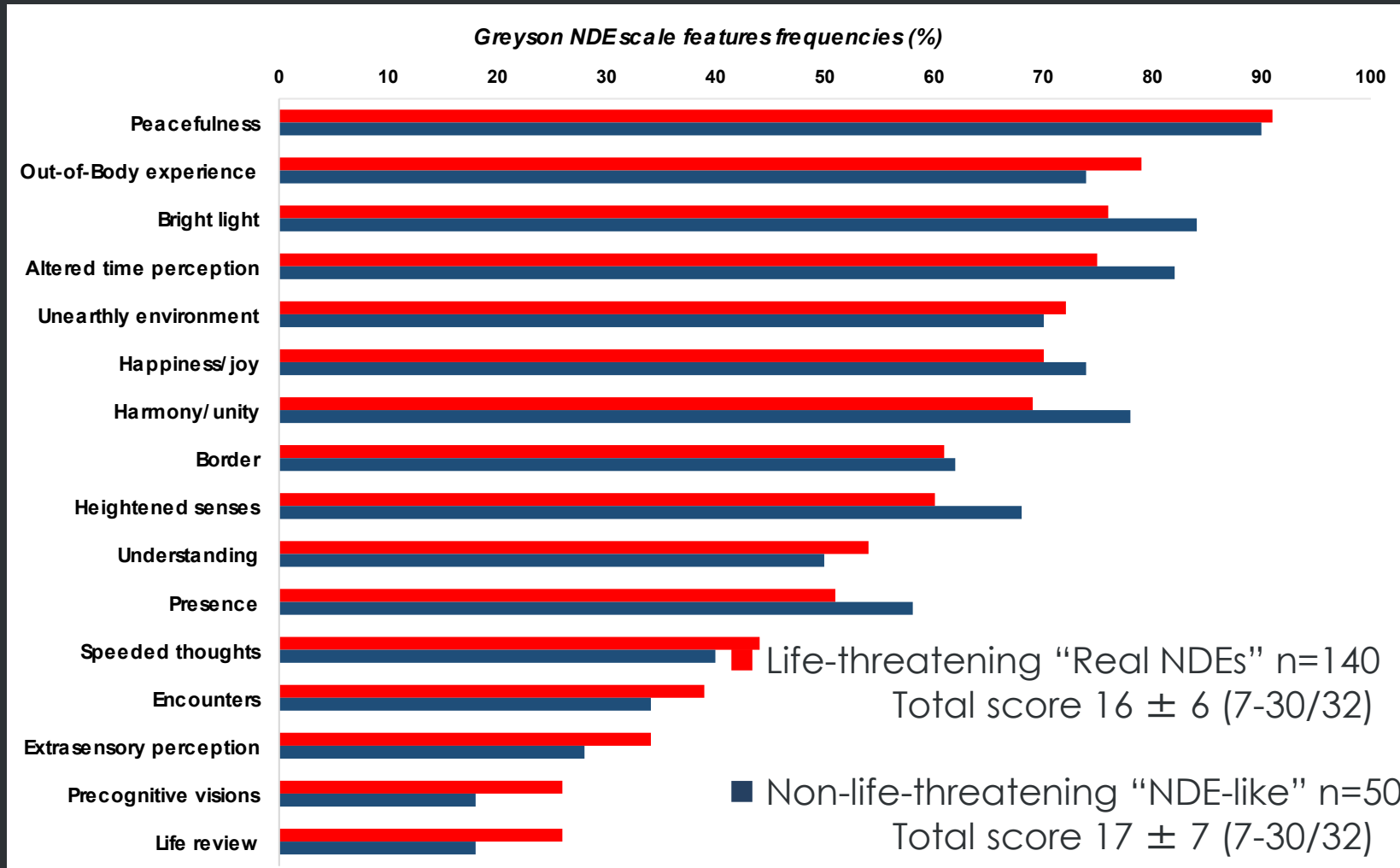
Blanke et al Stimulating illusory own-body perceptions. *Nature*, 2002

De Ridder et al Visualizing out-of-body experience in the brain. *N Engl J Med*, 2007



Influence of etiology

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6. Conclusion





Take home message

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- Different altered states of consciousness
- DEATH = BRAIN DEATH ≠ UWS
- Ethical issues
 - Diagnostic accuracy
 - End of Life decisions
- Making & promoting advance directives = help respect patient wishes
- Only proof of life after death is organ donation !

If you want more informations, contact :

awolff@uliege.be

Thank you for your attention !

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FREEDOM TO RESEARCH

CHU
de Liège

MIND SCIENCE
FOUNDATION



James S. McDonnell Foundation



You lived a « **near death experience** » and want to testify ?

Contact us !

hcassol@uliege.be



Université
de Liège

